

Are We Significant in This Vast Universe? - The Evidence Supports Belief in God

Steve Cable considers the question of why could we possibly be important in such a vast universe. Current research shows that there are reasons why God needed such a vast universe to house life on this planet. Understanding this idea can make it an apologetic for our faith rather than a fact which detracts from our faith. Science is the study of God's creation and the more we delve into it the clearer the hand of God becomes.

Why Is the Universe So Vast? Are We Truly Insignificant?

What do you feel when you look at the night sky? Awe? Insignificance? Adoration? Recently, my wife and I took three Ph.D. students from China for an overnight outing at a lake in West Texas. One of the things that impressed them most was the opportunity to view the night sky on a moonless night. Due to "light pollution," people in most cities can only make out a few hundred stars with the naked eye. These young women had never seen the night sky as King David did when he declared, "The heavens declare the glory of God!" (Psalm 19:1, NASU). They were so taken by the stars and the Milky Way that they spent several hours lying on the dock, looking up at the night sky.



These students were not Christians, and I was glad to have an opportunity to use what we know about the stars to talk to them about the overwhelming evidence for a Creator who is intensely interested in humans. However, another host may have used the same night sky to argue that if there is a God, we must not be very significant to God. Which view is correct? In this article, we will look into the Bible *and* into current scientific theories to better equip us to answer this important question.

According to the Bible, the transcendent Creator of this universe made humans in His own image as the focal point of His creation. Skeptics of a biblical worldview often point to the vastness of the universe as evidence that humans cannot be the focal point of a theistic creation. The famous astronomer, author, and television personality Carl Sagan put it this way:

Our posturings, our imagined self-importance, the delusion that we have some privileged position in the Universe, are challenged by this point of pale light. Our planet is a lonely speck in the great enveloping cosmic dark. In our obscurity, in all this vastness, there is no hint that help will come from elsewhere to save us from ourselves. {1}

Famous physicist Stephen Hawking wrote, "Our Solar System is certainly a prerequisite for our existence . . . but there does not seem to be a need for all these other galaxies." {2}

In other words, why would God create this huge universe, if He was primarily interested in His relationship with one species occupying a tiny planet?

I think this is a reasonable question. After all, based on observations from the Hubble Telescope, the current best estimate for the number of stars in the observable universe is 5 times 10 to the 22nd

power; that is a 5 with 22 zeros after it. How many stars is that? Well, if you were to count one star every second, it would take you only fifteen hundred trillion years to count them. These stars are spread over billions of light years. Amazingly, all of these stars account for only about 1% of the total mass of the universe. Why did God create such a vast universe, placing us on a single small planet with no reasonable hope of ever traveling beyond our solar system? Does the size of our universe run counter to a biblical worldview?

A Biblical Perspective of Humankind and the Vast Heavens

If God is the Creator of the universe, and the Bible is revelation directly from God, then accurate observation of the universe will ultimately prove to be consistent with His revelation. By combining the general revelation of science with the special revelation of the Bible, we should be rewarded with a greater understanding of the nature of our Creator and His intentions for mankind. Let's see if this is true in addressing the vastness of the universe.

First let's consider what God's special revelation for us, the Bible, has to say about the vastness of the universe. The Bible often refers to God's creative work in "stretching out the heavens" and filling it with stars (e.g. Job 9:8, Zechariah 12:1). A review of Bible passages on the stars and the heavens reveals a number of reasons why a vast universe is consistent with humans being the most significant part of creation.

We need to realize that creating a vast universe is not harder for God than creating a smaller universe. God brought the universe into existence out of nothing. He had no limits on the amount of matter and energy created. Consequently, it is meaningless to say that it would be a tremendous waste for God to create so many lifeless galaxies. The concept of waste only applies when there is a limited supply. When there is an unlimited supply, you can use all you desire; there is plenty more where that came from.

Within this vast universe, God placed earth in potentially the only place in the universe capable of supporting advanced life. There are many aspects of the universe that are hidden from the casual observer, but the vastness of the heavens is not one of them. God created the earth and positioned it in an ideal place so that humans could observe the vastness of the heavens and the enormous number of stars. The Bible points out at least five purposes for humans observing this vast universe:

1. *To reveal His majesty and power.* Job refers to this understanding as he reflected on his sufferings stating,

Who commands the sun not to shine,
And sets a seal upon the stars;
Who alone stretches out the heavens
And tramples down the waves of the sea;
Who makes the Bear, Orion and the Pleiades,
And the chambers of the south;
Who does great things, unfathomable,
And wondrous works without number.
Were He to pass by me, I would not see Him;
Were He to move past me, I would not perceive Him.
Were He to snatch away, who could restrain Him?
Who could say to Him, "What are You doing?" (Job 9:7-12).

Later, God confronts Job with His lack of understanding the full power and majesty of His Creator:

Where were you when I laid the foundation of the earth?
Tell Me, if you have understanding,
Can you bind the chains of the Pleiades,
Or loose the cords of Orion?
Can you lead forth a constellation in its season,
And guide the Bear with her satellites?
Do you know the ordinances of the heavens,
Or fix their rule over the earth? (Job 38:4, 31-33).

As we see in this passage, God intentionally did creative, wondrous works without number so that we could glimpse His greatness.

2. *To emphasize our insignificance without God.* The vastness of the heavens highlights how insignificant humans are apart from God's concern for us. The primary lesson that Job learned through his experience was that we are in no position to critique God's actions over His creation. God's creation is so vast that any significance we have comes solely from God's choice to be concerned with us. Job stated it this way: "Behold, I am insignificant; what can I reply to You?" (Job 40:4)

King David was the most significant person in Israel during his reign, but when he considered the vastness of God's creation he acknowledged our insignificance:

When I consider Your heavens, the work of Your fingers,
The moon and the stars, which You have ordained;
What is man that You take thought of him,
And the son of man that You care for him (Psalm 8:3-4)?

3. *As a measure of His loving kindness toward us.* God uses the vastness of the heavens to help us understand the magnitude of His love for us, stating, "For as high as the heavens are above the earth, So great is His loving kindness toward those who fear Him" (Psalm 103:11).

God's love for us is greater than the billions of light years which separate us from the most distant galaxies.

4. *As a picture of His faithfulness and forgiveness.* In a similar way, God uses our inability to completely grasp the breadth and depth of the universe to emphasize spiritual truths. Through Jeremiah, God promised a new covenant where He will remember our sins no more. God used the vastness of the heavens to convey His promise to never cast those in the new covenant away from Him with these words,

Thus says the LORD, "If the heavens above can be measured
And the foundations of the earth searched out below,
Then I will also cast off all the offspring of Israel
For all that they have done," declares the LORD (Jeremiah 31:37).

Even today astronomers recognize that the universe we can observe is much smaller than the state of the universe as it exists today. Due to the finite speed of light, it is impossible to directly observe the current size of the universe or count the exact number of stars. Just as the heavens can never be measured, God will never cast us off from His presence.

5. *As a reminder that our understanding is limited.* Our Creator understands the universe from one end to the other and from the beginning of time to its end. As humans, we are just beginning to

probe its mysteries. So, God reminds us, “For as the heavens are higher than the earth, So are My ways higher than your ways And My thoughts than your thoughts” (Isaiah 55:9).

It is clear that God intended us to observe and study the stars and the heavens. As a part of God’s general revelation, the magnitude of the universe speaks to His greatness. Through God’s special revelation, we see God using the vastness of His creation to teach us lessons about who we are and how we relate to Him. For a Creator who was willing to sacrifice His only Son on the cross for our redemption, it would be child’s play to create a vast universe solely for our instruction. With this understanding, the vastness of the universe becomes a testament to our importance to God rather than evidence of our insignificance.

A Scientific Perspective of Humankind and the Vast Universe

If God is the Creator of the universe and the author of the Bible, accurate observation of the universe will ultimately prove to be consistent with His revelation. By combining the general revelation of science with the special revelation of the Bible, we should be rewarded with a greater understanding of the nature of our Creator and His intentions for mankind.

In his book *Why the Universe is the Way It Is*^{3}, Hugh Ross points out a number of areas where combining the latest observations of astronomy and physics with biblical theology provides us with fuller answers for some of the tough questions of life. One area he focuses on is the question we have been examining: “Does the vastness of this universe mean that we are insignificant and/or accidental?”

If we assume, as most skeptics and seekers would, that the physical laws of this universe have remained constant from the beginning of the universe until now, then the current state of scientific knowledge points to three reasons why the universe must occupy the mass and volume that it does in order for advanced carbon based life to exist on this planet.

1. *The exact mass of the universe was necessary for life supporting elements to exist.* Life requires heavier elements such as oxygen, carbon, and nitrogen. These elements are produced in the nuclear furnaces of stars. If there were less mass in the universe, only lighter elements such as helium would be produced. If there were more mass, only heavier elements, such as iron, would be produced. In fact, the amount of mass and dark energy in the universe must be fine tuned to less than one part in 10 to the 60th power, or one part in one trillion trillion trillion trillion trillion, to have a universe that can create a life supporting solar system and planet.

2. *The exact mass of the universe was required to regulate the expansion of the universe to allow the formation of the sun and the solar system.* Amazingly, it turns out that the same total mass that results in the right mix of life supporting elements also results in the right amount of gravity to dampen the expansion of matter across the surface of the space-time continuum to allow the formation of stars like the sun which are capable of supporting a planet like earth. If the universe were expanding faster, stars and solar systems would not form. If the universe were expanding slower, giant stars and black holes would dominate the universe. Once again the total matter in the universe is fine tuned to support life. And what an amazing coincidence: the number that creates the right mix of elements also creates the right expansion rate. This dual fine tuning is much less likely than achieving the financial returns guaranteed by Bernie Madoff!

3. *The vast volume of the universe is required to give the earth just the right amount of light and other electromagnetic radiation to support life and not destroy it.* Life not only requires a planet with the right mix of elements orbiting the right kind of sun in just the right solar system; it also requires

a “just right” galactic environment. Astronomers has discovered what they call “the galactic habitable zone” for our Milky Way galaxy at a distance of about 26,000 light years from the center of the galaxy. Any planet closer to the center will experience deadly radiation levels. Any planet further away from the center would lack the mix of heavy elements necessary for advanced life. But the vast majority of this habitable zone is inside one of the uninhabitable spiral arms of the galaxy. Since stars revolve around the galactic center at a rate different than the spiral arm structure based on their distance from the center of the galaxy, most solar systems pass through deadly spiral arms over the course of time. Our solar system occupies a very special place as Hugh Ross points out: “The solar system holds a special position in the Milky Way . . . the one distance from the core where stars orbit the galaxy at the same rate as its spiral arm structure does.” {4}

Once again we are faced with a divine “coincidence”: the same fine-tuned distance required to safely place a habitable planet is also the exact distance required to keep that planet out of the deadly spiral arms.

Not only must the earth be located far from the center of the Milky Way, the Milky Way must be located far enough away from other galaxies to maintain the stability of its spiral structure. Many aspects of the Milky Way appear to be very rare or unique in the universe.

As you can see, a logical application of current scientific orthodoxy based on the Big Bang and constant natural laws overwhelmingly supports the view that the vastness of the universe does not imply that human life is unremarkable and insignificant. On the contrary, the most reasonable conclusion from the evidence is that life on this planet is the primary purpose behind the vastness of our universe. Both the Bible and the results of scientific observation agree: our vast universe is the work of a Creator who considers life on earth as very significant.

Consequently, we don’t have to convince a seeker that the world is much younger than it appears in order to answer the question, “Are we significant to our Creator?” We can say, “Whether you look to the teaching of the Bible or you look at the current prevailing models from the scientific community, the answer is definitely yes!” The important question is, “Is it possible to know more about my Creator and have a relationship with Him?” Beginning with the death and resurrection of Jesus, we can explain how to have an eternal relationship with God and why we believe the Bible is the reliable source of information about our Creator and our universe.

- Check out our article “The Answer is the Resurrection” at Probe.org for more information on using the resurrection to respond to key questions from seekers.
- For more information on topics related to the origins of our universe and other science topics, check out our Faith and Science section.
- For further discussion on the age of the universe see “Christian Views of Science and Earth History” in our Faith and Science section.
- For further discussion of how the age of the universe debate relates to this discussion see Appendix A: Theology vs. Science or Theology plus Science? and Appendix B: Apologetics and the Age of the Universe.

Notes

1. Carl Sagan, *Pale Blue Dot: A Vision of the Human Future in Space* (New York: Random House, 1994).
2. Stephen Hawking, *A Brief History of Time: From the Big Bang to Black Holes* (New York: Bantam, 1988).
3. Hugh Ross, *Why The Universe Is The Way It Is* (Grand Rapids, MI: Baker Books, 2008).
4. Ross, *Why The Universe Is The Way It Is*, 66.

Atheist Myths and Scientism

Steve Cable exposes some atheist myths and the false ideology of scientism, all designed to destroy people's faith.

A Two-Pronged Attack Against Christianity



Atheist attacks against American Christianity are gaining more traction in our society. Their success can be readily seen in the growth of the number of American young adults who do not profess to be Christians. Tracking recent trends, around 50% of American Millennials fall in this category, with most of those identifying as atheist, agnostic or nothing in particular. More identify as nothing in particular than as atheist, but the atheist attacks certainly have a role to play in their ambivalent feelings about Christianity.

What have atheists done to create a cultural milieu that is drawing more and more young Americans away from Christianity? In this article, we will focus on two prominent prongs of the attack against Christianity. Those prongs are:

1. Fabricating myths around the premise that Christianity and modern science are enemies of one another and have been so since the advent of modern science, and
2. Promoting the philosophy of scientism as the only way to view science.

First, the myths are an attempt to cause people to believe that the Christian church and a Christian worldview were and are anti-science. They want us to believe that the findings of science are counter to the make-believe teachings of Christianity and the Bible. They want us to look back at history and believe that the church was actively opposing and trying to suppress scientific knowledge. As Michael Keas tells us in his 2019 book *Unbelievable*, "These stories are nothing but myths. And yet some leading scientists . . . offer these stories as unassailable truth. These myths make their way into science textbooks . . . (and) enter into popular culture, whereby the myths pass as accepted wisdom." {1}

However, many historians and philosophers have correctly pointed out that the Christian worldview of an orderly universe created by an involved God produced the mindset that gave birth to the scientific revolution. In his book *How the West Won*, sociologist Rodney Stark states, "Christianity was essential to the rise of science, which is why science was a purely Western phenomenon . . . science only arose in Christian Europe because only medieval Europeans believed that science was possible and desirable. And the basis of their belief was their

image of God and his creation.”{2} In this article, we consider the key figures who propagated this myth and some of the falsified stories they have foisted upon us.

Second, they want us to accept scientism as the only valid way to view the role of science in our understanding of the universe. What is scientism? In his 2018 book *Scientism and Secularism*, professor of philosophy J. P Moreland defines it this way: “Scientism is the view that the hard sciences provide the only genuine knowledge of reality. . . . What is crucial to scientism is . . . the thought that the scientific is much more valuable than the non-scientific. . . . When you have competing knowledge claims from different sources, the scientific will always trump the non-scientific.”{3}

But scientism “is not a doctrine of science; rather it is a doctrine of philosophy . . . (In fact,) scientism distorts science.”{4} This philosophical doctrine came into favor among the public not because of scientific results, but rather as the result of proponents presenting it in popular ways as if it were the undisputable truth. As Moreland points out, “It is not even a friend of science but rather its enemy.”{5}

Myths about Christianity and Science

Atheists want to create stories to demonstrate that Christians are and have been the enemies of scientific exploration and discovery. Why this drive to recreate the past? They want to encourage people to turn away from Christianity as an enemy of science and weaken the faith of believers.

As Michael Keas makes evident in *Unbelievable*, this thinking is not based on reality. Instead, historical myths have been created to bolster their position either as a result of ignorance of the actual history or intentional deceit. After creating these myths, they use the educational system and mass media to ingrain these myths into the thinking of the masses.

Keas specifically looks at seven myths used for this purpose which we find embedded in our textbooks and proclaimed by popular television programs. To understand the nature of these myths, let’s consider two of the ones discussed by Keas.

Many of you learned of the Dark Ages, a period of time between A.D. 500 and 1500 where textbooks have claimed that science and the arts were stifled by the control of the church which opposed scientific understanding. In truth, this view is not supported by historical evaluations of that time. As reported in Stark’s revealing book, *How the West Won*, “Perhaps the most remarkable aspect of the Dark Ages myth is that it was imposed on what was actually “one of the great innovative eras of mankind.” During this period technology was developed and put into use on a scale no civilization had previously known.{6} Keas found that this myth first appeared in textbooks in the 1800s but did not surface with an anti-Christian slant until the 1960s. Carl Sagan, and later Neal deGrasse Tyson, would help promulgate this myth on television through their *Cosmos* series.

Another myth exploded by Keas is that “Copernicus demoted humans from the privileged ‘center of the universe’ and thereby challenged religious doctrines about human importance.”{7} In fact, Copernicus as a Christian did not consider his discovery that the earth orbited the sun a demotion for earth or humans. What Copernicus saw as unveiling the mysteries of God’s creation over time began to be pictured as a great humiliation for Christians. In the 1950s some scientific writers began using the term “the Copernican principle” to refer to the idea “that the Earth is not in a central, specially favored position”{8} in the cosmos. As one Harvard professor has noted, “This is the principle of mediocrity, and Copernicus would have been shocked to find his name associated

with it.”{9}

Keas also documents how this atheist strategy also pretends that many early scientists were not Christians. Johannes Kepler, known for his discovery of the three laws of planetary motion, is cited by Sagan in *Cosmos*

as someone who “despaired of ever attaining salvation,”{10} implying that Kepler always felt this way. Sagan leads one to believe that in his astronomical discoveries Kepler was somehow freed from this concern. Yet from Kepler’s own writing it is very clear that he was a Christian, telling people shortly before his death that he was saved “solely by the merit of our savior Jesus Christ.” And speaking of his scientific endeavors he wrote, “God wanted us to recognize them [i.e. mathematical natural laws] by creating us after his own image so that we could share in his own thoughts.”{11}

Much of the reported relationship between science and Christianity is a myth made up to strengthen the atheist position that science repudiates Christianity and makes it superfluous and dangerous in today’s enlightened world. Nothing could be further from the truth, as a Christian worldview was foundational for the development and application of the scientific method.

Methodological Naturalism: A Farce

What about the prevalence of scientism, a belief system claiming that the hard sciences provide the only genuine knowledge of reality?

When considered carefully, the whole concept of scientism is a farce. Why? Because as philosopher J. P. Moreland points out, “Strong scientism is a philosophical assertion that claims that philosophical assertions are neither true nor can be known; only scientific assertions can be true and known.”{12} So the premise is self-refuting. They are saying that only scientific facts can be objectively true. Thus, the statement that only scientific facts can be true must be false because it is a philosophical assertion, not a scientific fact.

Another example of the faulty philosophy behind scientism comes in their insistence on adopting methodological naturalism as a criterion for science. Methodological naturalism is “the idea that, while doing science, one must seek only natural causes or explanations for scientific data.”{13} This idea immediately demotes science from being the search for the truth about observable items in this universe to being the search for the most plausible natural cause no matter how implausible it may be.

Although they appear to be unsure as to whether to apply the concept uniformly to all forms of science, its proponents are sure that it definitely should be applied to the field of evolutionary science. They make the *a priori* assumption that life as we know it originated and developed by strictly impersonal, unintelligent forces. No intelligence can be allowed to enter the process in any way. This approach to trying to understand the current state of life on earth is certainly an interesting exercise leading to a multitude of theories and untestable speculations. It is a challenging mental exercise and is valuable as such. However, scientism does not stop there. They declare that their unsupported (and I would say unsupportable) theories **must be the truth** about our origins, at least until replaced by another strictly naturalistic theory.

This approach seems to be an odd (and unfruitful) way to go after the truth due to at least three reasons. First, many other areas of science which include intelligent agents in their hypotheses are respected and their results generally accepted, common examples being archaeology and forensic science. Second, the current state of evolutionary science primarily appears to be tearing holes in prior theories, e.g. Darwinian evolution, rather

than closing in on a plausible explanation. And, third, scientists are continuing to find evidence supporting a hypothesis that intelligent actions were involved in the formulation of life on earth.

If the sum of the available evidence is more directly explained by the involvement of some intelligent agent, then it would be reasonable to accept that potential explanation as the leading contender for the truth until some other answer is developed that is more closely supported by the available evidence. This is the attitude embraced by the intelligent design community. They embrace it because so much of the evidence supports it, including

1. the inability of other hypothesis to account for the first appearance of life,
2. the complexity of the simplest life forms with no chain of less complex forms leading up to them,
3. the relatively sudden appearance of all types of life forms in the fossil record,
4. the fine tuning of the parameters of the universe to support life on earth, and
5. the emergence of consciousness within humans.

In contrast, those supporting theistic evolution appear to do so in order to conform to the methodological naturalism of their peers. They claim to believe that God does intervene in nature through acts such as the miracles of Jesus and His resurrection. But they claim that God did not intervene in the processes leading up to the appearance of mankind on this planet. In my opinion, they take this stance not because the evidence demands it, but because methodological naturalism does not allow it. As Moreland opines, "Methodological naturalism is *one bad way* to put science and Christianity together." {14}

Things Science Cannot Explain / God of the Gaps

As we have seen, scientism is a philosophy that says the only real knowledge to be found is through application of the hard sciences and that no intelligence can be involved in any of our hypotheses. So, they believe hard science must be capable of explaining everything (even if it currently doesn't).

In this section we will consider some very important things that science cannot now nor ever be able to explain. In his book, *Scientism and Secularism*, J. P. Moreland lists five such things for us.

First, the origin of the universe cannot be explained by science. Why? Science has been able to identify that the universe most likely had a beginning point. But as Moreland points out, "Science can provide evidence that the universe had a beginning; it cannot, even in principle, explain that beginning; that is, it cannot say what caused it. . . No real thing can pop into existence from nothing." {15} He points out three specific logical reasons science cannot address this issue:

1. A scientific explanation cannot be used to explain the universe because scientific explanations presuppose the universe.
2. Science cannot explain the origin of time and without time no explanation can be considered.
3. Coming-into-existence is not a process which can be reviewed and explained because it is an instantaneous event. Something either does or does not exist.

Second, the origin of the fundamental laws of nature. All scientific explanations presuppose these laws. We can conceive of a universe where these laws might be different resulting in a different reality, but we cannot explain how our universe came into being with the laws we see active around us.

Third, the fine-tuning of the universe to support life. As far as science is concerned the parameters of the forces within this universe can be observed but we cannot know what caused them to assume the values they do. However, in recent years it has been discovered that our universe “is a razor’s edge of precisely balanced life permitting conditions.”{16} Over one hundred parameters of this universe, such as the force of gravity, the charge of an electron, the rate of expansion of the universe, etc., must be precisely balanced or there could be no life in the universe. Science cannot answer the question of why our universe can support life.

Fourth, the origin of consciousness. In this context consciousness is the ability to be aware of oneself and entertain thoughts about things which are outside of oneself and possibly outside of one’s experience. From a naturalist point of view, “the appearance of mind is utterly unpredictable and inexplicable.”{17} However, God may choose to create conscious beings; beings that are capable of asking about and discovering the works of their creator.

Fifth, the existence of moral laws. As the late atheist philosopher Mackie admitted, the emergence of moral properties would constitute a refutation of naturalism and evidence for theism: “Moral properties constitute so odd a cluster of properties and relations that they are most unlikely to have arisen in the ordinary course of events without an all-powerful god to create them.”{18}

These five important questions can never be answered if scientism’s flawed premise were true. However, Christian theism answers each of these questions and those answers are true if God is the real creator of the universe.

Integrating Christianity and Science

Scientism claims that you cannot integrate Christianity and science. Instead, they claim all theology is nonsense and only science exists to give us the truth. As Moreland points out, “One of the effects of scientism, then, is making the ridicule of Christianity’s truth claims more common and acceptable (which is one of scientism’s goals).”{19}

If this view is clearly wrong, how should we as Christians view science and its relationship with Christianity and the Bible? First, we need to understand that the topics addressed by science are in most cases peripheral to the topics covered in the Bible. The Bible is primarily concerned with God’s efforts to restore people from their state as enemies of God back into eternal fellowship with Him.

One area of significant interaction is the question of how this universe came to exist in its current state. How one views that interaction (i.e. as adversarial or as complementary) depends on whether they are clinging to the unsupported myth of unguided evolution or to the new science of intelligent design. As Moreland states, “Science has done more to confirm the Christian God’s existence than to undermine it, and science has provided little or no evidence against belief of theism. Science has, however, raised challenges to various biblical texts, and Christians need to take those challenges seriously.”{20}

Moreland suggests there are five ways to relate issues in science and Christian philosophy. Let’s consider two of those methods. One is the complementarity model. In this model, two disciplines are addressing the same object or feature but from different, essentially non-overlapping perspectives. “Neither one purports to tell the whole story, but both make true claims about reality.”{21} This is the model used by advocates of theistic evolution who take as gospel the latest claims of evolutionary science while saying of course God kicked off the whole process including us in His plan for the universe.

Another way to interact is called the direct interaction model. In this model, theories from theology and from science may directly interact with one another on some topic, either positively or negatively. One area might raise rational difficulties for the other. This approach has the most potential for bringing information from different fields together into a fuller picture of truth. Intelligent design is an area where this model is applied as it questions the validity of eliminating intelligence from the options considered in understanding the development of life on earth.

Since scientism swears that science is the only source of truth, even when scientists cannot agree as to what that scientific truth is, they want to discount inputs from any other source no matter how helpful. So the direct interaction model is a difficult road to take. What are the rational criteria for going against the experts? Moreland suggests there are four criteria for Christian theologians to decide to take this road.

1. Make sure there is not a reasonable interpretation of the Bible that resolves the tension.
2. There is a band of academically qualified scholars who are unified in rejecting the view held by a majority of the relevant experts. In this way, we know that there are people who are familiar with the details of the majority view, who do not believe that it is true.
3. There are good non-rational explanations for why the expert majority holds the problematic view. For historical, sociological, or theological reasons, the majority is not ready to abandon their position rather than because their evidence is overwhelming. "For example, the shift from creationism to Darwinism was primarily, though not exclusively, a shift in philosophy of science." {22}

Given the large amount of evidential support for a Christian worldview, any view that is counter to central components of a Christian worldview should be rejected precisely for that reason. Any view meeting the first three criteria that also attempts to undermine key parts of a Christian worldview will be overwhelmed by the significant rational support for a Christian worldview.

As followers of the God of real truth, Christians need to realize that the so-called truths being taught to justify science over theology are in fact myths and/or self-refuting statements. Every Christian needs to be able to address these fallacies in today's popular science culture. Equip your young adults with this understanding and more by attending our summer event called Mind Games Camp. More information can be found at probe.org/mindgames.

Notes

1. Michael Keas, *Unbelievable: 7 Myths About the History and Future of Science and Religion*, ISI Books, 2019, 2.
2. Rodney Stark, *How the West Won: The Neglected Story of the Triumph of Modernity*, ISI Books, 2014 p. 304, 315.
3. J. P. Moreland, *Scientism and Secularism: Learning to Respond to a Dangerous Ideology*, Crossway, 2018, 26 and 29.
4. Ibid., p. 23.
5. Ibid., p. 55.
6. Stark, p. 76.
7. Keas, p. 4 and Chapter 6.
8. Herman Bondi, *Cosmology*, Cambridge University Press, 1952.
9. Owen Gingerich, *God's Universe*, Belknap Press, 2006.
10. Sagan, 1980 *Cosmos* TV series, episode 3.
11. Kepler, letter to Herwart von Hohenburg, April 9/10, 1599.
12. Moreland, p. 52.

13. Ibid., p. 131.
14. Ibid., p. 159.
15. Ibid., p. 138.
16. Ibid., p. 146.
17. Ibid., p. 151.
18. J. L. Mackie, *The Miracle of Theism*, Oxford, 1982, p. 115.
19. Moreland, p. 31.
20. Ibid., p.174.
21. Ibid., p. 184.
22. Ibid., p. 192.

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Jerry Coyne's Illusions

Dr. Ray Bohlin critiques evolutionary biologist Jerry Coyne's materialistic claim that our brain is only a meat computer.

Jerry Coyne Says Science Proves We Make No Real Choices



Let's see. This morning I chose my black t-shirt, tan dress slacks, black shoes, and black socks. After gathering all my things for the trip to the office, I put on my now-famous Grand Canyon felt hat and headed out the door, deciding I didn't need an umbrella for the short walk in the rain.



Oops! Wait a minute! According to evolutionary biologist, Jerry Coyne, I made none of those choices. Now I did do all those things, but my brain determined those "choices." After all, my brain is just a meat computer, destined to obey the laws of physics to combine my genetic history, past environmental cues, and my latest experiences to make those decisions. "I," meaning me as a person apart from the meat computer, don't exist! Enter with me into the wacky world of evolutionary naturalism where all there is, is matter and energy.

Dr. Jerry Coyne is a Professor at the University of Chicago in the Department of Ecology and Evolution. In many ways he has broken political ranks with many of those seeking to improve education in evolution by actively proclaiming that evolution entails atheism. He lines up with those like Richard Dawkins, Sam Harris, and the late Christopher Hitchens. Religion is the greatest evil on

the planet, they decry, and we need to dispose ourselves of all religious nonsense such as freedom of choice.

You see, our mental decisions are just chemical reactions in our brains which just happen. There is no purpose or even a choice in making our choices!

Now that I probably have you thoroughly confused, let me try to let Jerry Coyne speak for himself.

In January of last year, Coyne published a commentary in the online version of *USA Today* titled, "Why you don't really have free will."^{1} He stated, "You may feel like you've made choices, but in reality your decision to read this piece, and whether to have eggs or pancakes, was determined long before you were aware of it—perhaps even before you woke up today. And your 'will' had no part in that decision. So it is with all of our other choices: not one of them results from a free and conscious decision on our part. There is no freedom of choice, no free will."

Despite Coyne's blatant certainty, he only offers, using his phrase, two lines of evidence. Notice even Coyne refers to them as just lines of evidence. There's no real fact or certainty.

Coyne's Ultra-naturalism "Predetermines" His Conclusions

Let me allow Coyne to speak for himself as he explains his first line of evidence, a materialistic assumption. He says,

We are biological creatures, collections of molecules that must obey the laws of physics. All the success of science rests on the regularity of those laws, which determine the behavior of every molecule in the universe. Those molecules, of course, also make up your brain — the organ that does the "choosing." And the neurons and molecules in your brain are the product of both your genes and your environment, an environment including the other people we deal with. Memories, for example, are nothing more than structural and chemical changes in your brain cells. Everything that you think, say, or do, must come down to molecules and physics.

It may be true that science depends on the regularity of the laws of physics, but Coyne makes no defense of whether there is anything else to our minds other than chemistry. He assumes without saying so that the material brain is all there is to our mind.

In 2007 neuroscientist Mario Beauregard and journalist Denyse O'Leary published *The Spiritual Brain*.^{2} Quoting from the dust jacket, Beauregard and O'Leary demonstrate that scientific materialism like Coyne's "is at a loss to explain irrefutable accounts of mind over matter, of intuition, willpower, and leaps of faith, of the 'placebo effect' in medicine, of near death experiences on the operating table, and of psychic premonitions of loved ones in crisis." For each of these phenomena, they provide numerous examples where people's minds understood, observed, changed, or perceived physical realities they simply could not know about in a purely physical sense.

Jerry Coyne's first line of evidence turns out to be an unverified materialist assumption that has plenty of physical evidence that cannot be explained on a materialist basis. So much for convincing evidence. But to his credit, Coyne proceeds to scientific evidence he says demonstrates that brain measurements indicate our "decisions" can be predicted by observing blood flow to certain areas of the brains seconds before we actually feel we have "decided."

Does Our Brain “Decide” Before We’re Conscious of the Decision?

Coyne’s second line of evidence consists of brain experiments claiming to predict our decisions by observing blood flow in decision-making areas of our brain seconds before we are aware of our decision. Coyne says,

Recent experiments involving brain scans show that when a subject “decides” to push a button on the left or right side of a computer, the choice can be predicted by brain activity at least seven seconds before the subject is consciously aware of having made it. (These studies use crude imaging techniques based on blood flow, and I suspect that future understanding of the brain will allow us to predict many of our decisions far earlier than seven seconds in advance.) “Decisions” made like that aren’t conscious ones. And if our choices are unconscious, with some determined well before the moment we think we’ve made them, then we don’t have free will in any meaningful sense.”

This is certainly interesting research. My first reaction is to note that these are the simplest decisions we can make. Just choose left or right. No thinking involved, no consequences. What if the choice were far more substantial, such as “Should I buy this house based on my set of pros and cons of the decision?” Or what about those “split-second” decisions to avoid a collision in a vehicle or whether to stop or go when the traffic light unexpectedly turns yellow? Each of those decisions takes far less than seven seconds.

Granted, Coyne’s article is a simple commentary in an online newspaper, but I expect more solid and convincing evidence that this. Coyne leaves us with little else than his materialist assumptions as reviewed previously.

Coyne is Required to Pretend He Has Choice

I’d like to turn my attention to Coyne’s attempts to spell out our options, once we are convinced, as he is, that we really don’t make any choices.

Coyne dismisses various philosophical attempts to rescue some sort of free will. It’s clear Coyne is scornful of philosophy in general. Maybe that explains why he is such a bad philosopher. I say that because he continues by expressing that it’s impossible to just throw up our hands and despair that life is not worth living if I don’t really make choices. Coyne says:

So if we don’t have free will, what can we do? One possibility is to give in to a despairing nihilism and just stop doing anything. But that’s impossible, for our feeling of personal agency is so overwhelming that we have no choice but to pretend that we do choose, and get on with our lives. After all, everyone deals with the unpalatable fact of our mortality, and usually do so by ignoring it rather than ruminating obsessively about it.

Now that’s a mouthful. First, Coyne rejects despairing nihilism simply because we are bound by the laws of physics. That’s my understanding of his rationale that our “feeling” of personal agency is so overwhelming. But I hope you caught the absurdity of the following comment. Coyne says, “for our feeling of personal agency is so overwhelming that we have no choice but to pretend that we do choose.” Really? We have no choice (was the pun intended?) but to “pretend” that we do choose?

I have to say that when your worldview requires you to pretend that reality is something other than what you perceive, your worldview clearly can't be trusted.

This reminds me of a class back in grad school when I asked about meaning and purpose in life in the evolutionary world view. They said that as just another animal, our only purpose is to survive and reproduce. I asked again, "What difference does it make, though, when I'm dead and in the ground?" According to evolution, my existence is over. One prof responded by saying that ultimately it doesn't really matter. So I asked, "Then why go on living, why stop at red lights, who cares?" The same professor responded by saying, "Well, in the future, those that will be selected for will be those who know there is no purpose in life, but will live as if there is."

So not only do we need to pretend that we choose but we also need to pretend that our lives have meaning. Doesn't that make you want to get up in the morning?!

How Does Knowing Our Brain's Illusions Lead to a "Kinder" World?

Towards the end of Coyne's commentary he tries to discern what we should do with our understanding that we don't have any free will. First, as you might suspect, he disparages religion, specifically Christianity. He concludes that, since we have no real choice, none of us can really choose Jesus or reject him. It's all predetermined by our genetic and environmental history. So, "If we have no free choice, then such religious tenets—and the existence of a disembodied 'soul'—are undermined, and any post-mortem fates of the faithful are determined, Calvinistically, by circumstances over which they have no control." Well, there you have it, Reformed theology according to Jerry Coyne.

His second observation is that since we are little more than marionettes responding to the laws of physics, this should influence how we deal with criminals. We may decide for the sake of society that some need to be removed from circulation, so to speak — sent to prison for our protection. But we certainly can't hold them responsible. According to Coyne, "What is not justified is revenge or retribution—the idea of punishing criminals for making the 'wrong choice.'"

Well if all this is really true, then why is Jerry Coyne trying to convince us of anything? We have no real choice. Coyne is an atheist because he can't help it. That would mean I'm a Christian because I can't help it. So why is he trying to convince me I have made a "wrong choice"? Obviously the internal contradictions abound.

Lastly, Coyne says our knowledge of no free will or real choices should lead to a kinder world, presumably because revenge is outdated. "Further, by losing free will we gain empathy, for we realize that in the end all of us, whether Bernie Madoffs or Nelson Mandelas, are victims of circumstance—of the genes we're bequeathed and the environments we encounter. With that under our belts, we can go about building a kinder world."

Just one word: Huh?

Well, personally I have gained empathy for Jerry Coyne because his commentary is just a product of circumstance, so I can just ignore it.

Thanks for reading.

Notes

1. Jerry Coyne, "Why you don't really have free will," *USA Today*, Jan. 1, 2012, usat.ly/WBnUBi. All

Coyne's quotations are from this commentary.

2. Mario Beauregard and Denyse O'Leary, *The Spiritual Brain: A Neuroscientist's Case for the Existence of the Soul* (Harper One: New York, NY, 2007).

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Theology vs. Science or Theology plus Science?

Appendix A: Theology vs. Science or Theology plus Science?

*Note: This is one of two appendices for Steve Cable's article *Are We Significant in This Vast Universe?**

Are science and religion mortal enemies, or collaborating partners, or denizens of different realms with no common ground? Is the ultimate objective of science to unmask the fictitious myths behind all religions freeing mankind to pursue a rational utopia as espoused by Daniel Dennett^{1} and other atheist academics? Or should we subscribe to the prevailing Western view of a clear secular vs. sacred split, segregating out thoughts so that science and theology are not allowed to deal with any topics which intersect?^{2} Or will unbiased scientific inquiry lead us to a deeper appreciation and understanding of our Creator as espoused by early formulators of the modern scientific method, such as Isaac Newton, as well as many respected researchers, such as leading nanotechnologist, Dr. James Tour, who stated, "I stand in awe of God because of what he has done through his creation. Only a rookie who knows nothing about science would say science takes away from faith. If you really study science, it will bring you closer to God."^{3}

The current view promoted as dogma by many in academia is that acceptable, genuine science is based on a theological presupposition, namely, that any possibility of intervention by a transcendent Creator or other non-physical entity must be excluded from consideration in evaluating possible explanations for any phenomena observed in the physical world. It is ironic that Carl Sagan, one of the popular promoters of this dogma, would take fundamental issue with his own dogma when he wrote,

A central lesson of science is that to understand complex issues (or even simple ones), we must try to free our minds of dogma and to guarantee the freedom to publish, to contradict, and to experiment. Arguments from authority are unacceptable.^{4}

In a similar fashion, a common viewpoint promoted in some theological circles is that theology trumps science in any areas in which they have an intersecting interest, i.e. a viewpoint that looks only at the Bible without allowing its interpretation of Scripture to be informed by the findings of science. From this viewpoint, science is at best a limited field of study looking at only a small part of reality, and at worst is spending large amounts of resources studying an illusion masquerading as

reality. It is assumed that science cannot provide insights to help deepen our understanding of theology.

I propose that both of these viewpoints share a common shortcoming of prejudging the result before examining the evidence. Both scientist and theologians should be free to follow the evidence where it leads, whether the evidence comes from observation of the physical aspects of our universe, or from philosophy and logic, or from divine revelation.

One area where this clash of viewpoints is reaching a fever pitch is in the field of Intelligent Design science. Researchers in this emerging field say, let us follow the evidence where it leads. If the makeup of the physical realm includes evidence of an intelligent designer, let's admit it and pass the information on to the theologians. If the physical makeup is more indicative of the handiwork of random variations and natural processes, let's cite it and pass that information along as well. As demonstrated in the 2008 documentary, *Expelled: No Intelligence Allowed*, these researchers are facing stiff opposition and even persecution from the defenders of the scientific establishment. Ironically, but not unexpectedly, the more we learn about the fine tuning required to support life, the history of our planet, and the complexity of living organisms, the more the evidence aligns with the presence of an intelligent designer rather than the results of random, undirected processes. As one scientist observed,

[O]n whatever volume scale researchers make their observations - the universe, galaxy cluster, galaxy, planetary system, planet, planetary surface, cell, atom, fundamental particle, or string - the evidence for extreme fine-tuning for life's sake, and in particular for humanity's benefit, persists. {5}

As Christians, we need not fear science. If the Bible is revelation from our actual Creator, it will not crumble in the presence of scientific studies into the nature of our universe. We do need to be concerned about agenda-driven science which is focused on manipulating scientific results and the popular public perception of those results to prove a predetermined theological point, whether it is atheism or a particular interpretation of the Bible.

If God is the Creator of the universe and the Bible is revelation directly from God, then accurate observation of the universe will ultimately prove to be consistent with His revelation. By combining the general revelation of science with the special revelation of the Bible, we should be rewarded with a greater understanding of the nature of our Creator and His intentions for mankind.

Notes

1. Daniel Dennett, *Breaking the Spell: Religion as a Natural Phenomenon* (New York: Viking Press, 2006).
2. Nancy Pearcey, *Total Truth: Liberating Christianity from Its Cultural Captivity* (Wheaton, IL: Crossway Books, 2004).
3. Candace Adams, "Leading Nanoscientist Builds Big Faith," *Baptist Standard*, March 15, 2000.
4. Carl Sagan, *Billions and Billions: Thoughts on Life and Death at the Brink of the Millennium* (New York, Random House, 1997).
5. Hugh Ross, *Why The Universe Is The Way It Is* (Grand Rapids, MI: Baker Books, 2008), 124.

The Texas State Board of Education and Public School Content

The Facts

The Texas State Board of Education is a group of fifteen individuals, representing various districts in Texas. One of their roles is to decide on standardized, statewide guidelines on public school contents for grades K-12. These guidelines are delineated in the Texas Essential Knowledge and Skills (TEKS), which dictate the content for every subject for every grade level that students must master in order to graduate from a Texas accredited public school. Importantly, these guidelines also dictate what textbooks are approved for classrooms and selection criteria for universities. While these guidelines are not enforceable in the private school setting, private schools that are college preparatory must consider these guidelines in determining student advancement and subsequent collegiate eligibility.

The old draft of the TEKS, which was approved in 1998, states that students are expected to “analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information.”{1}

The new draft of the TEKS, set for final approval in March 2009, states in the parallel section that students are expected to “analyze and evaluate scientific explanations using empirical evidence, logical reasoning, and experimental and observational testing.”{2} This line is in the introduction to the Biology class content under “scientific processes.” The content portion of the biology class has various topics listed, and what students are required to master within each of these topics. Topics include *Cells and Cellular Processes, Molecular Genetics and Heredity, Evolution and Populations, Classification and Taxonomy, Biochemistry, Systems and Homeostasis, Ecosystems, and Plants*. Under each of these topics are specific items that students need to know.

The Contentious Issues

Those are the facts of the issue as best as we can describe them. However, these changes have created more than a little uproar from various groups that have a vested interest in how evolution is taught. The lines divided as such: advocates of the unquestioned teaching of evolution in public schools who were in favor of the new wording, and advocates of questioning certain aspects of evolutionary theory who were in favor of keeping the wording “strengths and weaknesses” within the TEKS. Many people that were for the new wording said that there were no weaknesses to evolutionary theory, or accused the other side of using this language of “weaknesses” to somehow smuggle creationism into the classroom. Many people who wanted to keep the strengths and weakness language intact accused the other side of censorship and subversively teaching an ideology and abridging academic freedom.

The Texas State Board of Education hosted a public hearing on Wednesday, January 21 (2009), where they welcomed testimony from individuals. The hearing would close at 12:40 p.m., no matter how many testifiers were left on the schedule. With a list of nearly a hundred, the Board only got through thirty testifiers. Some provision was made for trading up and testifying earlier, and the Board members invited select individuals to testify at the public hearing. However the majority of people there to be heard, including me (spot thirty-nine), and my husband (a science teacher who

has taught both in public high school and private middle school and was spot sixty-three) went unheard. While each testifier had a three-minute time limit, an obviously divided Board asked several questions, either for clarification or to be on public record for having asked.

Whatever one may read or hear in the media, most of the testimonies on both sides were articulate and intelligent, and the testifiers fielded their questions remarkably well. If you look at the audience, you might think it looked like a rally; the room was a bit of a zoo. But the testimonies were certainly at a higher level than some kind of emotionally-charged, rah-rah pep rally. Whether we agreed with them or not, we thought each testifier made good points.

Testimonies

While we do not necessarily agree with everything below, we have summarized the main points presented by each side.

For the Proposed Wording and Against “Strengths and Weaknesses” Wording

- The old wording does not provide guidance to teachers, especially new teachers.
- Students are not necessarily capable of analyzing evolutionary theory, or are not necessarily capable of evaluating the current research.
- Academic freedom refers to the university level, and students do not have the same freedoms of speech as adults.
- The current draft has more specific wording.
- There is a possibility of litigation as has happened in other states.
- Students could fall behind if they are taught supposed weaknesses in evolutionary biology.
- “Strengths and Weaknesses” wording would block the publication and adoption of good textbooks. In fact, it could result in the adoption of subversive Creationist books designed to exploit this flaw in educational guidelines.
- These weaknesses are pseudoscience, or these weaknesses are from sources that engage in pseudoscience (no satisfactory definition of pseudoscience was given).
- The word “weaknesses” has changed in meaning due to the use of it for P.R. by certain Creationist groups, and therefore should not be included in the TEKS.
- Warning that people may doubt the integrity of Texas education if strengths and weaknesses are allowed.
- “Strengths and weaknesses” is inaccurate because there are no weaknesses. These supposed weaknesses are false and misleading information. Teaching weaknesses is likened to teaching that Grant surrendered to Lee.
- It’s better to get your information from the National Academy of Sciences than from “creationist” sources [quotes are mine].
- The peer review literature does not argue whether evolution happened, it is just

researching how it happened. Whether it happened is not in question.

Against Proposed Wording and For “Strengths and Weaknesses” Wording:

- Even within the “strengths and weaknesses” wording, there has been silencing of students, and some teachers are intimidated to even broach the subject. Examples were cited by two of the testifiers.
- Cases of scientific hoaxes were cited by several people, including Piltdown Man and Haeckel’s Embryos. These are significant because many evolutionists will not admit these were hoaxes/errors. While they could be examples of how theories grow and change (something they agree is part of science and should apply to evolution), they instead go unaddressed and worry those who respect true scientific research and achievement.
- No one area of science has answers to everything, so there are always weaknesses in theories.
- There has been no litigation in the last twenty years with the wording “strengths and weaknesses” and to say that this encourages pseudoscience, brings up the question as to whether Texas has been engaging in pseudoscience for the last twenty years.
- Standards should promote academic diversity and critical thinking. Some of the great minds in science were non-conformists.
- Children begin thinking abstractly at young adolescence, and their abstract and cognitive abilities continue to develop through high school. This stresses the importance of including critical thinking skills in the TEKS. Teaching strengths and not weaknesses does not promote abstract thinking.
- Teaching strengths and weaknesses is more honest.
- Examples were cited of students who did learn strengths and weaknesses and it worked well.
- Real science deals with strengths and weaknesses of a theory; why should evolution be held to a different standard?
- We should not proclaim high school students too dumb to understand (my note: two of the testimonies were given by high school seniors).
- “Evolution” is a tricky term because when someone says “evolution” they may mean three different things, one of which is a fact and two of which are conjecture: 1) Microevolution (fact), 2) Common Descent (theory), 3) Natural Selection acting on mutations is how things evolve (theory). Student should distinguish this.
- Scientific consensus is only one part of science, the conclusion part. Students need to also know the scientific process.
- There is a difference between scientific law, theory and hypothesis.
- All theories are refined in the scientific process. Evolution does not have testable

postulates. (This testimony was cut off due to time, but he was going to distinguish between origins and operations science).

Assessment

My husband David is a science teacher who has taught high school science in public school and now teaches middle school science in a private, college-preparatory school. I have two degrees in science and am a research associate at Probe Ministries. Here is our assessment of the TEKS:

The wording “strengths and weaknesses” seems very intentionally omitted from the proposed version, which is suspect, but neither one of us can say definitively that it was left out in order to promote a particular agenda of misleading students or indoctrinating them by evolutionist advocates. “Analyze and evaluate” does convey something different than “analyze, review, and critique” and it does seem to be a very subtle difference that allows for slightly less freedom of discussion within the classroom; however, with this language, by itself, there may still be opportunity to have a rigorous discussion of weaknesses, especially if it falls under the category of “evaluating.” Its omission from the TEKS however, as one Board member pointed out, does communicate something as well, so we are skeptical of the perceived freedom with this language.

Another, and what I think is a blatant problem with the evolution curriculum, is in the specific wording within the evolution content section. Within the TEKS Biology section, there are several topics that the students must cover. Within each of those topics are specific things that they must master. In the TEKS proposed draft, the evolution section of high school biology requires students to:

- A. Identify how evidence for common ancestry among groups is provided by the fossil record, biogeography, and homologies including anatomical, molecular, and developmental;
- B. Recognize that natural selection produces change in populations, not individuals;
- C. Describe the elements of natural selection including inherited variation, the potential of a population to produce more offspring that can survive, and a finite supply of environmental resources resulting in differential reproductive success;
- D. Recognize the relationship of natural selection to adaptation, and to the development of diversity in and among species; and
- E. Recognize the effects of other evolutionary mechanisms including genetic drift, gene flow, mutation, and recombination. {3}

The action verb at the beginning of each of these points is important because each verb is intentionally chosen, and from an educator’s perspective has a technical meaning. According to Bloom’s taxonomy of educational activities, verbs such as “describe,” “define,” or “identify” represent a low level of cognizance, while words such as “explain,” “recognize,” “illustrate” and “predict” are mid-level, and words such as “compare” “analyze,” “interpret” are higher level of cognizance. {4} In *all* of the other science concepts taught in biology, students are asked to “compare,” “investigate,” “predict,” “analyze,” and “interpret.” However, evolution is kept at a purely definitional level, meaning that even though the proposed TEKS include “analyze and evaluate” within the general scientific process section, there is no opportunity to do this when the

students get to the evolution section; they are only required to essentially memorize definitions or memorize what fossils lead to common descent. Many testifiers claimed that students were free and in fact encouraged to discuss evolutionary theory. They said the “strengths and weaknesses” language was being replaced by the better, more specific “analyze and evaluate.” This is intentionally misleading. The general standards do read that way, but the evolution section itself is exempt from this rigid treatment in the new TEKS.

I was particularly unimpressed with Terrence Stutz’s article from the *Dallas Morning News*, in which he labeled the board members who wanted to include “weaknesses” as being aligned with “social conservative groups that in past have worked to cast doubt on science-based theories on the origins of life,”{5} when really, most of the testifiers and Board members that wanted “weaknesses” left in the TEKS, including my husband and myself, are arguing for academic freedom and free inquiry. The way evolution is handled in the proposal does nothing to promote even an analysis and evaluation, let alone an atmosphere of inquiry on a theory that is supposed to be the cornerstone of biology. {6}

The Vote and Results:

The Texas State Board of Education had a preliminary vote Thursday, and it was tied 7-7, which means that, so far, “strengths and weaknesses” language will not be in the next version of the TEKS (it requires a majority). However, the board has until March to make its final decision, and make a final vote.

While “strengths and weaknesses” is not in the current draft of the TEKS, the board did vote on some amendments that ask students to “analyze and evaluate” specific aspects of evolutionary theory, bringing the evolution science concepts up a notch (or two) on Bloom’s scale.

According to *Evolution News and Views*,{7} the wording change is as follows:

(7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to:

(A) analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies including anatomical, molecular, and developmental;

(B) analyze and evaluate how natural selection produces change in populations, not individuals;

(C) analyze and evaluate how the elements of natural selection including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources result in differential reproductive success;

(D) analyze and evaluate the relationship of natural selection to adaptation, and to the development of diversity in and among species; and

(E) analyze and evaluate the effects of other evolutionary mechanisms including genetic drift, gene flow, mutation, and recombination.

Furthermore, the Board passed an amendment that asks students to “Analyze and evaluate the sufficiency or insufficiency of common ancestry to explain the sudden appearance, stasis, and sequential nature of groups in the fossil record.”{8} Unfortunately, media coverage on these particular amendments are scarce. We would consider these amendments a success, especially since they address the issue of low-level cognizance in the evolution requirements. Now they are at a level that seems much more appropriate for high school biology, and we feel will promote good critical thinking and intellectual inquiry. We also believe that these amendments will better serve to prepare our students for the intellectual rigor and higher level thinking skills that they will need at the collegiate level.

Texas State Board of Education
Public Testimony
Heather Zeiger, M.S.
Research Associate, Probe Ministries

I went to Texas public schools for junior high and high school. I knew then that I was going to pursue a career in science, and ended up choosing chemistry my senior year. I graduated in 1999, and at the time, I had received some education in evolutionary biology. That education mostly consisted of memorizing facts and definitions, but gave no indication that there was anything more to be discussed. By way of example, one of the things we learned in biology was the Miller Urey experiment. We learned that this was the prevailing theory on how life began, and this is how it worked. There was no further discussion on chemical origins, and as far as I knew from what I was taught in the public high school, scientists agreed that this was how it happened. Except . . . it turns out that there were and still are many questions about chemical origins. In fact, as I later learned, there is an entire field of study in which chemists deal with the very fundamental questions of how life began. There is more than a little contention among those who believe that life came from an RNA-based world and others who believe that it was originally metabolic. There are still others who think that life beginning from purely chemical processes may not even be possible under our current theories.

What was presented as a boring little tidbit in our biology books, actually is an entire field of inquiry. Chemical origins is just one area of evolutionary theory; and as we all know there are evolutionary biologists still researching these issues, which means that there are still challenges or unexplained parts of the theory to be investigated. The students that go into science, the ones I’ve worked with, are fascinated by the unexplained parts of a theory, by the mysteries. I think is a disservice to our children and to the scientific community to gloss over the places where a theory needs more work. We should encourage students to go on and become the next scientist to answer these questions in evolutionary theory. While the proposed draft does discuss strengths and limitations, in science, in general, it does not leave the evolution section open to this, but keeps it at a definitional level. I therefore contend that the Biology TEKS, science concept seven (evolution) should be phrased in such a way that would go beyond the less interesting part of science, identification and description of terms. And hopefully, this will open classroom instruction to analysis and discussion of current strengths and weakness within this important theory.

Texas State Board of Education
Public Testimony
David Zeiger
Texas SBEC Certified Science Composite Teacher for Grade 9-12

My name is David Zeiger and I am a certified composite science teacher for grades nine through

twelve. I taught Chemistry and Physics for two years in Garland ISD, and now I teach seventh grade Life Science at Trinity Christian Academy, a private college preparatory school in Addison. In my relatively brief tenure as a science teacher, I have had to come to terms with a simple discouraging fact: most of my students will not love science as much as I do, let alone become researchers, engineers, doctors, nurses, or even science teachers. In fact the National Science Foundation found that in 2000 only one third of college students earn bachelor degrees in science and engineering. {9}

Therefore, when I read the TEKS as the guiding structure for my curriculum, I have to ask what my job as a science teacher truly is. Am I wasting my time with two-thirds of my students? Memorizing the parts of a plant, reeling off the periodic table, or calculating using laws of motion; are these things that students are going to use again? Do I even want them to memorize a chart with the strengths and weaknesses of evolutionary theory? No. The things that every student can take with them are how to gain information from their environment, whether that environment is a job training manual, a relationship with their spouse, or a new technique for hammering a nail; how to test that new information against their previous experience and training; and most importantly, how to be flexible enough to change their ideas when it turns out they were wrong.

Those important methods of learning are included in the TEKS for non-biology science classes and in the non-evolution biology standards. When teaching science other than the evolutionary theory, students are asked to “compare,” “predict,” “investigate,” “explore,” “explain,” “analyze,” “interpret,” and “model,” activities from the whole range of cognizance. But, the proposed recommendations on evolution use language that refer to and limit the students to the simplest level of cognitive learning: memorization.

If we don't teach the simple fact that every theory has weaknesses, we don't teach young people true science. If we don't teach them to find and evaluate those weaknesses, we don't teach them to be humble in their search for truth. And if we don't teach them how to keep or reject those theories, we leave them as prey to whoever has a stronger opinion than they do.

Please keep teaching students to analyze and evaluate scientific theories. Critical reasoning is one of the few things I know all my students will need and use every day of their lives.

Notes

1. 1998 TEKS, Section 112.43, (c), (3), (A).
 2. Section 112.43 (c), (3), (A) of proposed TEKS
 3. Proposed 2009 TEKS Section 112.43, (7)
 4. www.teachervision.com
 5. Terence Stutz, “Texas Board of Education votes against teaching evolution weaknesses,” *Dallas Morning News*, January 24, 2009. tinyurl.com/bncw55
 6. Theodosius Dobzhansky, “Nothing in biology makes sense except in the light of evolution,” *American Biology Teacher* 1973, volume 35, pp. 125-129.
 7. www.evolutionnews.org/2009/01/recap_texas_board_of_education.html
 8. Ibid.
 9. www.nsf.gov/statistics/seind04/c2/c2s3.htm
-

Only Science Addresses Reality?

Would it surprise you to hear that churches may eventually be prohibited from teaching any ideas contrary to Darwinian evolution? “No way!” you say. “The Constitution guarantees freedom of speech! The first amendment guarantees that Congress can pass no law restricting or promoting any religious exercise!”

Well, yes the Constitution does that, but be patient with me and I’ll show why the answer to the opening question could be “yes.”

In the current issue of *Nature*, probably the most prestigious science journal in the world, a letter to the editor appeared in the August 28, 2008 issue on page 1049. Two well-known evolutionary biologists, University of Chicago’s Jerry Coyne and University of Manchester’s Matthew Cobb wrote the letter to complain about a previous editorial expressing hope that the Templeton Foundation, which funds research into the relationship between science and religion, might bring about some helpful resolutions.

Coyne and Cobb couldn’t disagree more:

We were perplexed by your Editorial on the work of the Templeton Foundation.... Surely science is about finding material explanations of the world—explanations that can inspire those spooky feelings of awe, wonder and reverence in the hyper-evolved human brain.

Religion, on the other hand, is about humans thinking that awe, wonder and reverence are the clue to understanding a God-built Universe.... ***There is a fundamental conflict here, one that can never be reconciled until all religions cease making claims about the nature of reality*** (emphasis added).

The scientific study of religion is indeed full of big questions that need to be addressed, such as why belief in religion is negatively correlated with an acceptance of evolution. One could consider psychological studies of why humans are superstitious and believe impossible things....

...You suggest that science may bring about “advances in theological thinking.” In reality, the only contribution that science can make to the ideas of religion is atheism (emphasis added).

Coyne and Cobb clearly state that religion has no authority to make claims about reality. If science is allowed to persist in this audacious distortion of religion and science, then any kind of teaching that is critical of any aspect of naturalistic evolution would be considered a negative influence on society as a whole. Religion is seen as crossing its constitutionally protected borders.

Biology teachers constantly complain now that what they teach about evolution is contradicted by the churches their students attend. This is obviously quite frustrating. If science is the only branch of knowledge that is allowed to make claims about reality, then religious teachings should not be allowed to interfere.

You may still be thinking that I’m taking this too far. Consider though that the California state

university system already refuses to give credit for high school science courses that include anything beyond naturalistic evolution. Many Christian private school graduates in California are finding that their science courses are not accepted at state universities. Essentially that means you don't get in unless you can make those credits up by taking junior college science courses that meet the evolution-only standard.

State governments may easily decide that they need to help these religious school graduates out by requiring that these religious schools not be allowed to teach religious material that contradicts state-mandated standards. It's a violation of the separation of church and state, after all!

If you ever questioned the importance of the evolution/Intelligent Design controversy, I hope you see the point now. Unless we can convince a sufficient minority in the science community that science is limited and the subject of origins is one of those limitations, we may not be able to legally teach students anything about creation or Intelligent Design.

While Coyne and Cobb certainly don't represent all scientists, they are not alone! Trust me. I watched a video recently of Jerry Coyne making a presentation at a scientific meeting where he basically made the very same claim. NO one objected. He was applauded enthusiastically. Watch it for yourself here. While the whole lecture is worth watching, the last eight minutes when he presents a slide with just the word "Religion" is the key segment.

Coyne and others are trying to establish what Nancy Pearcey called the fact/value split in her book *Total Truth*. To Coyne science is based on fact. Only material explanations are allowed in science since religion is based on personal values and have nothing to do with facts. Therefore if you try to inject your personal values (Creation, Intelligent Design) into the world of facts (science) this is a violation of the rules of science. It's not allowed.

According to Jerry Coyne speaking in the video, the only way to increase the acceptance of evolution is to reduce or eliminate the influence of religion. The two are incompatible! Coyne is unable to see that he also has a worldview, materialism, which influences how he interprets the data of science. He erroneously believes he is being objective about his interpretation.

This is a cultural battle as well as a scientific battle. For more information and resources from Probe to help you educate yourself and others about evolution and Intelligent Design see browse our articles at www.probe.org. If we don't "tear down strongholds" like this, we may find ourselves behind impenetrable, silent walls.

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The Spiritual Brain

Heather Zeiger keys off The Spiritual Brain by Beaugard and O'Leary to critique the materialist position that belief in God is simply in the neurons of the material brain. The Christian worldview is non-materialist and recent experiments bear out its power of explanation over and against the materialist worldview.

The Worldview of Neuroscience

The popular worldview held in neuroscience, or the study of the brain, is materialism. Materialism says that humans are only physical beings, which means there is no possibility of an immaterial mind or a soul. On the other hand, non-materialists would say that humans have both a physical aspect and a spiritual aspect. As Christians, we are non-materialists, and would say that we are both physical and spiritual because God, a spiritual being, created us in His image. However, our physical bodies are important because God gave us bodies suited for us.

But what if materialism were true? First, self-consciousness would just be an evolutionary bi-product; something that randomly evolved to help our species survive. Secondly, we would just be a product of our genes and our environment, so free will or the ability to make decisions would be an illusion. This implies that our thought life, our prayers, and everything that dictates our identity is nothing more than neurons firing.^{1} And from this we can conclude that our beliefs are unimportant because we really can not trust them anyway. They might be caused by a misfiring neuron. But is this what the data shows us?

In this article we will be looking at some examples in neuroscience that seem to contradict materialism, and to guide us we will be using the recently released book, *The Spiritual Brain* by Mario Beauregard and Denyse O'Leary. We will look at some experiments materialists have tried to do to explain religious experiences and their effects on the body. Then we will look at some experiments that can only be explained from a non-materialistic worldview. Finally, we will see how the data from neuroscience fits within a Christian view of the mind and brain.

The Spiritual Brain does not take a distinctly Christian perspective. So while the studies within this book do not necessarily confirm or deny that Christianity is the "best" religion, it is still useful for apologetics. First, it allows us to break through the language barrier between a materialist and a Christian by looking at data in general neuroscience terms. Second, science studies the world around us, which is God's general revelation, and while this gives us truths about the character of God and His creation, our interpretation of the data must be filtered through the lens of the special revelation of God's Word.

Is God All in Our Heads?

Is there a part of our brain that creates God? Are some people genetically predisposed to being religious? A materialist would say "yes" to these questions. However, as the book *The Spiritual Brain* shows us materialists have not been successful in proving this.

Dean Hamer, geneticist and author of the book *The God Gene*, proposed that some people are more religious than others because they have one DNA letter that is different from non-religious people.^{2} While this story was touted as a breakthrough in the media, the scientific community was not amused. Hamer's experiments were not well-defined, and no one could replicate them.^{3}

Another popular theory is that people that have a religious experience may be suffering from mild forms of temporal lobe epilepsy. Basically, a misfiring in the brain causes people to be obsessive about something, like religion. These scientists speculate that people like Mother Teresa, Joan of Arc, and the apostle Paul are likely candidates for temporal lobe epilepsy.^{4} Epilepsy specialists, however, do not believe that religious experiences are characteristic of temporal lobe epilepsy, and usually seizures are not associated with peace, tranquility, or religious visions. Also, temporal lobe epilepsy is quite rare, yet over sixty percent of Americans have reported having some kind of religious or mystical experience. And as we will see, many parts of the brain are involved in religious experiences, while temporal lobe epilepsy is much more centralized.^{5}

Perhaps one of the strangest experiments to hit the popular media was that of the God Helmet. Neuroscientist Michael Persinger claimed that religious people were more sensitive to magnetic fields, and that electromagnetic radiation was what prompted religious experiences. He developed a helmet that produced strong electromagnetic waves. Several people who tried on the God Helmet reported having a religious or mystical experience of some sort. However, there were some fundamental flaws in the whole setup, including the fact that Persinger never published his results and did not have brain scans to back up his statements. Eventually, a group of scientists from Sweden, using a double-blind test, proved that the God Helmet was really the power of suggestion. The electromagnetic waves didn't cause the religious experiences. {6}

Experiments That Don't Mind

All of these failed experiments presumed that there is no God and there is no spiritual component to people. We have shown, however, how the evidence from neuroscience doesn't seem to fit the materialistic worldview. As we will see, some experiments reported in *The Spiritual Brain* cannot be explained from this worldview. What we will find is that they fit nicely within a Christian worldview.

The first example is obsessive compulsive disorder therapy. Obsessive compulsive disorder, or OCD, occurs when a person has distressing or unwanted thoughts that dominate their thinking, and these obsessions trigger an urge to do some kind of ritual behavior, also known as a compulsion. The interesting thing about OCD is that the person knows that the obsession is irrational and the ritual won't really fix it, but their feelings tell them otherwise. Scientific studies have shown that the brain is actually misfiring. The part of the brain that tells a person, "There's a problem, do something to fix it," is firing at the wrong times. OCD is a clear case of a healthy mind and a malfunctioning brain.

A materialistic worldview would say that the only way to treat OCD is by *physically* fixing the bad neurons. However, the treatment that actually works involves the patients *mentally* fixing the bad neurons. Patients learn to take control of their OCD by recognizing when their brain is misfiring, and try to starve the urges to do the ritual. After treatment, brain scans show that the brain of an OCD patient is starting to fix itself. The patient is changing his physical brain with his mind! {7}

Similar kinds of therapies have been applied to depression and phobias. {8} In both cases, *The Spiritual Brain* reports instances where a patient's brain chemistry was directly affected by their mind.

Another phenomenon that can't be explained from a materialist's worldview is the placebo effect. The patient is given a medicine that they are told will help them, but in actuality they are given a sugar pill. Interestingly, the patient's belief that the sugar pill will help them has caused measurable, observable relief from symptoms. Many doctors say that a patient's attitude oftentimes can help or hinder real medicines or therapies from working. {9}

The ability of the mind to change the brain's chemistry does not fit within a materialistic worldview. But as Christians we know that our minds are very real and can have a very real effect on our physical bodies.

Can We Take a Brain Scan of God?

As noted previously, the popular worldview among neuroscientists is materialism, which essentially means they do not account for or acknowledge spiritual effects on the brain nor do they believe that there is a spiritual component to the person. This would mean that even religious experiences are just our neurons firing. Materialists would claim that either the effects of religious experiences, including prayer, are neurons misfiring, or the person is faking it.

On the other hand, Christians believe that there is a spiritual realm, and there is a spiritual component to human beings that we call the mind or the soul. We believe that when we pray that we are actually praying to God who is real and separate from us, not just a figment of our imagination.

Mario Beauregard, one of the authors of *The Spiritual Brain*, took brain scans of Carmelite nuns while they were remembering the deepest and most poignant religious experience they had had.^{10} Using functional MRI and QEEG he hoped to see what parts of the nuns' brains were active.^{11}

Dr. Beauregard and his lab found that religious experiences involved many brain regions at once, which rules out materialists' suggestion that there is some kind of "God spot" in the brain.^{12} They also found that brain scans during these religious experiences were very complex and consistent with something other than merely an emotional state. Lastly, they determined that the data did not have any of the markers one would expect to see if the nuns were faking it or lying.

This is all that the data can tell us. Physical machines cannot prove the existence of a spiritual God. But as the authors of *The Spiritual Brain* point out, what these experiments do show is that certain explanations, namely materialistic ones, are inadequate for explaining the data in neuroscience. The nuns are experiencing something beyond what materialism can account for.

Prayer is complex and more than just emotional contrivances, so from a Christian worldview, the results are not surprising.

The Christian View of the Mind and Brain

Experiments such as the God Helmet and theories about temporal lobe epilepsy did not work because their premise was that God was something we made up ourselves. However, as Christians we know this is false. The Bible says that God is the creator and is distinct from His creation, not made from it.

The results of experiments with OCD, phobias, depression, and the placebo effect do not make sense to materialists because the mind seems to affect the physical brain. However, we know from Scripture that the mind, or the soul, is an essential part of our being. James 2:26 and Luke 8:55 show us that when the soul leaves, the body is dead, and when the soul returns, the body is alive. Also, passages such as Matthew 26:41 and Romans 8:10 and 11 tell us that our spirit can affect what our bodies do and keep us from sinning. Passages about the resurrection such as in 1 Corinthians 15 discuss the distinction between our spirit and our physical body.

Lastly, the experiment with the Carmelite nuns showed that during a deeply prayerful experience, their brains display signs of a very complex interaction that is going on. As Christians, we believe prayer is a way to interact with the Creator Who is separate and distinct from us. While this experiment does not prove God's existence, it is reasonable to conclude that it is the level of complexity we would expect to see if someone were interacting with something distinct from themselves.

At one time people feared that neuroscience would be the death of God. The fear was that science might prove that everything that we do, including prayer and worship could be reduced to neurons firing in our brains. Hopefully, you are convinced that neuroscience actually points us towards God. There is evidence for a spiritual component of the human self. And, the evidence is consistent with what we would expect from a Christian worldview.

Notes

1. Mario Beauregard and Denyse O'Leary, *The Spiritual Brain* (New York: Harper Collins, 2007) 3, 4.
2. *Ibid.*, 48-50.
3. *Ibid.*, 51, 52.
4. *Ibid.*, 58, 64.
5. *Ibid.*, 72, 71.
6. *Ibid.*, 79-100.
7. *Ibid.*, 126-130.
8. *Ibid.*, 133-140.
9. *Ibid.*, 141-142.
10. For a detailed account of the Carmelite nun experiment see Beauregard and O'Leary, *The Spiritual Brain*, 255-288.
11. Two things we must keep in mind. First, usually the brain will take the same pathways when it remembers an event as when the event actually happened. Second, this experiment can't tell us what the nuns were actually thinking, but it can tell us what kind of brain activity was occurring.
12. Beauregard and O'Leary, 42-44.
13. For more articles and information on the subjects covered in *The Spiritual Brain* see Denyse O'Leary's blog, Mindful Hack, at mindfulhack.blogspot.com.
14. See also Kerby Anderson's article "Mind, Soul and Neuroethics" at www.probe.org/mind-soul-and-neuroethics/.

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A Meaningful World

The Poison of Meaninglessness

We have been drinking a poison that first infects our heads, then slowly moves to our hearts. It is the poison of meaninglessness. Many people assume that science says the universe is without purpose and everything is a result of random, meaningless events. A recently released book, *A Meaningful World* by Benjamin Wiker and Jonathan Witt,^{1} seeks to be the antidote to this poison by looking at science and how certain features of the universe do not fit within the materialistic worldview. This book will be our guide as we consider the question, How does science reveal meaning in the universe? But first, we need to understand the poison before we can discuss its antidote.

Within the scientific community, the assumption of meaninglessness is a result of its members' worldview. Most scientists hold to a materialistic worldview where everything is explained by physical or material causes, which are purposeless, random, natural events. Furthermore, a materialist reduces everything to its basic parts and claims that ultimate meaning lies in these parts. For example, when people say that we are a product of our genes, they are reducing humans to their chemical parts. By this definition, people do not have a soul, and the illusion of human genius or creativity is explained as neurons firing in the brain or animal instinct.

So if that is the poison, what is the antidote? The antidote comes from Christians who break the materialist spell by showing that the world is full of meaning and purpose because it has a Creator. This can be done by looking at scientific evidence for a meaningful world.

A good place to begin is with the idea of genius. Why study genius? Because the most poisonous

effect of materialism is the way it skews our self-understanding or our worldview. In a materialistic world without a purpose, there would be no signs of creativity and genius in nature. Before Darwin's time, the evidences of creativity and beautiful design in nature were some of the best arguments against materialism. However, the theory of evolution through random, natural causes denied the masterful work of design.

First, we will learn how to recognize some common elements found in a work of genius by looking at one of the most well-known geniuses of all time, William Shakespeare. Then, we will see if those same elements show up in nature.

How Do We Know It's Genius? The Example of Shakespeare

A Meaningful World describes four elements that will show up in a work of genius: depth, clarity, harmony, and elegance. If the world is designed by an ingenious designer, then we should see these four elements of genius in nature.

How do we detect genius in nature? Let's take a look at the work of a well-known playwright, William Shakespeare, as our model for describing the elements of genius.

Consider the situation in *Hamlet* where we get the famous and often misused line, "Methinks it is like a weasel."² The surface reading is that Hamlet and Polonius are looking at clouds and Hamlet observes that one looks like a weasel. As we delve deeper and consider the context, we find that Hamlet is actually exposing Polonius as a weasel himself.

The deeper meaning in Shakespeare's work has intrigued academics for years. And it points us to our first character of genius, *depth* or depth of meaning.

However, depth is nothing if it cannot be detected. So here we come to our next element of genius, *clarity*. Shakespeare did not write the scene with Hamlet and Polonius for his own whimsy, but so that the reader would detect the double meaning in Hamlet's weasel comment. Ingenious works have depth and meaning that beg to be discovered. Hence, they have clarity.

The last two elements of genius go hand in hand: *harmony* and *elegance*. Harmony would describe how various parts—or in Shakespeare's case, how various scenes—are interrelated. In all of Shakespeare's plays, the characters and scenes are related to each other; no scene is random or contradictory to the rest of the play. They are in harmony with each other.

The last element, elegance, is not about parts but about the unifying whole. When all of the parts have come together and operate harmoniously, then we have a new element, in this case a play. No one scene stands alone, but is within a context of the whole. One cannot understand the line "Methinks it is like a weasel" without setting up the context of the play itself.

So from Shakespeare we have identified four important elements to genius: depth, clarity, harmony, and elegance. Let's see if we can find these same elements in nature.

Genius in the Periodic Table of Elements

When we turn to chemistry to see if we find a conspiracy of ingenious design, we will find that, just like a cleverly crafted puzzle that was meant to be solved, when you arrange the elements according to weight, the periodic table makes a stunning natural jigsaw puzzle.

Now that scientists have solved the jigsaw puzzle, they find that it gives us amazing information about atomic properties. This insight has allowed us to make everything from pharmaceuticals to cosmetics to weapons to particle accelerators. So is it just coincidence, or does the periodic table display the properties of ingenious design?

Let's consider how the periodic table works. When you line the main elements up in groups of eight, the periodic table functions much like a Sudoku puzzle. Elements going across a row, or period, are related in their structure, while elements going down a column are related in their properties. Sudoku puzzles are designed by the puzzle maker with just the right amount of clues for the puzzle to be solved. If you look at the history of chemistry, you will find that the periodic table was first put together because there just happened to be the right amount of clues to give us a reason to be suspicious of design.

Remember those four elements of Shakespeare's work: depth, clarity, harmony, and elegance? It turns out that when we consider the periodic table, these properties across rows and columns display a *depth* of meaning beyond the obvious weight of elements. Secondly, its properties are clear enough for us to discover them, so it has *clarity*. The jigsaw puzzle of the elements arranged in this way display a *harmony* that sings sweetly to chemists' ears; for example it turns out that elements on the right of the table generally combine with elements on the left of the table. Third, the periodic table of elements is *elegant* in how it operates as a functioning whole. We could not know the characteristics of many of the elements without having other elements to compare them to. In this sense, the table reads like a play in which each element is a character whose personality is only really seen in light of the entire cast of characters.

Although a materialist would say that we are nothing but chance chemical reactions, it seems that our chemistry is not so random after all, but that it was designed with us in mind. Next we will find mathematics and physics also have the properties of ingenious design.

Genius in Mathematics and Physics

The worldview of many scientists would have us believe that the universe is meaningless because it is the result of chance random processes. In mathematics, a language of the universe, do we find the handiwork of genius designer?

In the book *A Meaningful World*, the authors emphasized the *clarity* of mathematics because the ability of the human mind to discern mathematical principles is quite remarkable. The universe seems to follow certain mathematical laws: the pattern of the multiplication table, musical scales, and the beauty of symmetry. These mathematical laws, however, are not elusive. Since ancient times man has been able describe truths about nature in terms of numbers, counting, and patterns.

We can easily find the *harmony* and *elegance* in the language of nature by looking at mathematics and physics. Math has harmony because, starting with basic arithmetic, you can build all the way up to complex principles like calculus and trigonometry. The elegance of mathematics is really seen when applied to physical phenomena. After many years of experiments, we have discovered that the complicated idea of gravity can be described by one simple equation. This is natural elegance.

The *depth* of mathematics is more difficult to grasp because we are so accustomed to using math. After Newton's time, mathematics seemed to be the end all, be all, of the universe. This was stretched to the point that some worshipped mathematics over God. But soon mathematicians and scientists found that we did not actually have the whole picture. With Einstein's theory of general relativity and quantum mechanics, mathematics grew as a field and continues to grow and refine.

Although mathematics is an abstract idea, it is the language of the physical world. As we have seen, mathematics and the way it describes physical phenomena displays clarity, depth, harmony, and elegance. Math is the language that God invented. And it is one of the ways that He speaks to us of His existence.

Genius in Biology

Since Darwin's day, biology has been infused with the idea that everything from bacteria to human beings has sprung from the result of random, purposeless, natural causes. But nature seems to show the fingerprints of the creative genius of our creator, God.

Can we see those signs in biology? *A Meaningful World* describes harmony within biology at length. Let's take a look at the cell.

The cell contains many parts: the mitochondria, the nucleus, and DNA. Each of these parts has its particular job to do. And, in addition, each part has a job that is related to all of the other parts of the cell. Think of the cell like a car engine and mitochondria as the carburetor. A carburetor has a specific job in the engine. You cannot talk about what a carburetor is without explaining how it works within the engine. Its job is related to all of the other parts. This is *harmony*, one of our elements of genius.

But what about elegance, depth, and clarity? It seems that these are also apparent in biology. The *elegance* of the cell is how it functions as one intricate machine, like our car engine. The cell is a biological engine; actually it is a very efficient, self-sustaining, self-replicating engine.

What about depth in biology? Let's go back to the cell. Cells get their energy through metabolism. We used to think that this was a simple path with many useless byproducts. Upon closer inspection, one sees that those byproducts have functions within the cell that are necessary for its survival. As we continue to study the cell, we find more and more *depth* to its function.

Finally, how does biology demonstrate *clarity*? Were we meant to find the handiwork of a designer? Most biologists would agree that biology is the study of things that have the appearance of design. If it appears designed perhaps it was, and perhaps we were meant to discover that. The genius behind biology is clear enough that God says that we are without excuse. {3}

Hopefully, you can see that creation is a masterful work of a divine genius. As the book *A Meaningful World* has shown us, nature bears the hallmark of design that has us, its students, in mind.

Notes

1. Benjamin Wiker and Jonathan Witt, *A Meaningful World: How the Arts and Sciences Reveal the Genies of Nature* (Downers Grove, Ill.: InterVarsity Press, 2006).
2. Hamlet Act 3, Scene 2
3. Romans 1:19,20 (ESV)

Mind, Soul, and Neuroethics

Neuroscience is the next frontier for research, and Kerby Anderson urges Christians to pay attention to these findings and provide a biblical perspective to the research and an ethical framework for its application.

Let me begin with a question. Imagine that our medical technology has advanced enough that we can transplant a human brain. If we exchanged your brain with that of another person, would you wake up in your body with someone else's thoughts and memories? Or would you wake up in the other person's body?

Or consider the following questions concerning brain research:

- Scientists are beginning to work on a "smart pill" that would increase your memory and intelligence. If such a pill existed, who should take it?
- Scientists are working to develop brain fingerprinting to reveal a person's knowledge of events. If perfected, should these brain scans be used like polygraph tests to detect if people are lying?
- Pharmaceutical companies are working to develop chemicals that block the formation of memories. If perfected, should these pills also be used to erase memories that people don't want to have?
- Areas of the brain can be stimulated or suppressed by placing a device over the scalp. Should doctors use these devices to control your brain?

These are just a few of the questions being raised in a relatively new ethical field of discussion known as neuroethics.

In the past few years, neuroscience has been making discoveries about the human brain at an incredible rate of speed. Advances in neuroscience and imaging methods have made it possible to observe the brain more directly. And advances in neurosurgery have also made it possible to intervene more precisely and effectively.

This new arena of neuroethics is beginning to deal with the hard questions about our rapidly growing knowledge of the human brain and our ethical and social responsibilities concerning this new information. Doctors, scientists, lawyers, politicians, and theologians are all interested in neuroethics. But as you can see from the above examples, the implications of these concerns should extend to all of us since we will ultimately be affected by the moral and legal decisions concerning neuroscience.

In developing a Christian perspective on neuroethics, we should begin with a proper understanding of the mind and brain. Nearly all scientific investigation begins with the *a priori* assumption that we are material, not spiritual. Thus, scientists assume there is only a brain and not an immaterial mind. Put another way, they assume there is only a body and not a soul.

Dualism

Are we merely a brain or are we both brain and mind? This is a fundamental question in science, philosophy, and theology. New advances in science seem to be challenging the notion that we are both mind and brain.

Most Christians are Cartesian dualists in that they believe that the soul inhabits the body. The name Cartesian dualism comes from the philosopher René Descartes who four hundred years ago argued that identity and thought were distinct. He is famous for the phrase, "I think, therefore I am." In other words, the fact that he could think about himself showed that there was something distinct from him. He was doing something with his brain, but he was also distinct from his brain because he was having thoughts.

A quarter century ago, Probe Ministries published a book that showed that we are both mind and brain. The book, *The Mysterious Matter of Mind*, by Dr. Arthur C. Custance presented experimental evidence that led scientists to conclude that the mind is more than matter and more than a mere by-product of the brain. {1}

One of the most famous findings in this field involved the research of Wilder Penfield. Although he was born in the U.S., he did most of his research in Canada and was later celebrated as "the greatest living Canadian."

In 1961, Penfield reported a dramatic demonstration of the existence of a mind that is separate from the brain. He found that the mind acted independently of the brain under controlled experimental conditions. His subject was an epileptic patient who had part of the brain exposed. When Penfield used an electrode to stimulate a portion of the cortex, here is what he reported:

When the neurosurgeon applies an electrode to the motor area of the patient's cerebral cortex causing the opposite hand to move, and when he asks the patient why he moved the hand, the response is: "I didn't do it. You made me do it." . . . It may be said that the patient thinks of himself as having an existence separate from his body.

Once when I warned a patient of my intention to stimulate the motor area of the cortex, and challenged him to keep his hand from moving when the electrode was applied, he seized it with the other hand and struggled to hold still. Thus, one hand, under the control of the right hemisphere driven by the electrode, and the other hand, which he controlled through the left hemisphere, were caused to struggle against each other. Behind the "brain action" of one hemisphere was the patient's mind. Behind the action of the other hemisphere was the electrode. {2}

This experiment (and others like it) demonstrates that there is both a mind and brain. Mind is more than just merely a by product of the brain.

Neuroscience: Opportunities and Challenges

Neuroscience has been making discoveries about the human brain at an incredible rate of speed, and this provides both new opportunities and major ethical challenges. For example, existing brain imaging methods provide scientists with some very powerful tools to discover the structure and function of the human brain. These tools can detect various brain abnormalities. They can also help in the diagnosis of various neurological disorders.

Scientists have also been using these brain imaging machines to study emotions, language, and even our perceptions. It is possible that eventually these machines could even be used to read our thoughts and memories.

Scientists who have developed a brain fingerprinting machine believe they will be able to determine

a person's knowledge of events. By measuring electrical activity within the brain, they can see the response of a person to certain stimuli (words, sounds, pictures). Analysis of these responses might be helpful in various investigations.

Sometimes crime investigators use a polygraph machine to detect lies. But these devices are not completely foolproof. Scientists believe they might be able someday to develop accurate readings from functional magnetic resonance imaging (fMRI) to determine whether a person is telling the truth.

What are the implications of this? Is it possible that one day people who are suspected of a crime will be required to submit to a brain scan? Could brain scans be used to determine high-risk employees, potential criminals, even terrorists? For now, this is mere speculation, but neuroscience may force us to deal with these questions in the future.

Some have even speculated that measurements from these machines could help in distinguishing true memories from false memories. In some experiments, certain areas of the brain appear to respond differently to true memories and false memories.

Could brain scans be used to predict certain neurological disorders? Scientists using fMRI have found that people with schizophrenia have different sizes of key brain structures (e.g., larger lateral ventricles, reduced hippocampus, etc.) than those people without this mental disorder. Many of the ethical questions already surrounding the use of genetic screening would no doubt surface with the application of brain scans that would screen for neurological disorders.

A related question in this growing field of neuroethics is the use of mood altering drugs. Psychopharmacology has already provided pills to treat depression, anxiety, and even attention deficit disorder. Future development in this area will no doubt yield other mood-altering and brain-altering drugs.

In the future, it might be possible to genetically engineer drugs or even genetically engineer human beings to treat and even cure mental disorders. This same technology might also allow scientists to increase memory and perhaps even increase intelligence. For now, the idea of a smart pill is just science fiction. But what if we develop such a medicine? Who should get the pill? Under what conditions would it be administered? These are all questions for the twenty-first century in this growing field of neuroethics.

Erasing Memories

In the film *Eternal Sunshine of the Spotless Mind*, a couple (played by Jim Carrey and Kate Winslet) undergo a brain procedure that allows them to erase each other from their memories because their relationship has turned sour. The story develops when Joel discovers that his girlfriend, Clementine, has undergone a psychiatrist's experimental procedure which removes him from her mind. Joel then decides to undergo the same procedure. In the process, however, he rekindles his love for her.

Although the film is science fiction and essentially a thought experiment, erasing memories is something scientists are pursuing right now. They are already testing a pill that, when given after a traumatic event, seems to make resulting memories less intense. The pill appears to blunt memory formation and could be very useful as a treatment. For example, this pill could be used if a person experiences a horrible event (such as a rape or witness to a murder). It would also be helpful to those who have endured an earthquake, hurricane, or tsunami.

Doctors also believe that it would help victims of post-traumatic stress disorder (PTSD). This was a problem first recognized in the Vietnam War and a disorder diagnosed in men and women who have been serving in Iraq and Afghanistan. Those affected often experience mental symptoms (flashbacks) and physical symptoms.

When a traumatic event occurs, the brain is flooded with stress hormones (such as adrenalin) that actually store these memories in different ways than the manner in which memories are normally preserved. These memories seem to be stored in our brain's hard drive, and therefore seem nearly impossible to erase.

The new pills are a class of drugs known as beta blockers which can cross the blood-brain barrier. They can actually dull the impact of the memory formation by getting to the place where stress hormones work to form these traumatic memories. Scientists believe that they can not only blunt the impact of these memories, they might even prevent PTSD. Some physicians believe it might be possible to cure PTSD by triggering these memories and then administering this new drug to eliminate them.

Not everyone is excited about the prospects of erasing memories. Already we have a variety of drugs that can alter a person's personality. Antidepressants and tranquilizers are used by millions of people every day. Antipsychotic drugs are used to treat people with such mental disorders as schizophrenia. Erasing a person's memory with certain drugs would certainly change their personality. Would that change always be for the better?

When researchers working in the area of erasing memories were asked to testify before the President's Council on Bioethics, there was deep concern. Chairman Leon Kass argued that painful memories serve a purpose and are part of the human experience.

Biblical Perspective

Advances in the field of neuroscience certainly raise new ethical dilemmas for the twenty-first century. But they also challenge the biblical understanding of human nature. Neuroscience is beginning to explain a great deal of human behavior by mapping the human brain. Scientists are locating regions that influence personality, character, and even spirituality. Does this challenge the concept of Cartesian dualism? Can we explain mind as merely a by-product of brain?

One researcher in this field thinks the research does challenge this biblical foundation. She says you "can still believe in what Arthur Koestler called 'the ghost in the machine'." But she concludes that "as neuroscience begins to reveal the mechanisms of personality, character, and even sense of spirituality, this Cartesian line of interpretation becomes strained. If these are all features of the machine, why have a ghost at all? By raising questions like this, it seems likely that neuroscience will pose a far more fundamental challenge to religion than evolutionary biology." {3}

So if you think evolution has been a challenge to Christianity, just wait until the findings of neuroscience reach the society at large. There are large and significant issues that need to be addressed. So what is a Christian perspective on these issues of mind/brain and body/soul?

First, the Bible teaches that when the soul leaves the body, the body is dead (James 2:26). And if the soul returns to the body, the whole person comes back to life (Luke 8:55). This dual nature of the body and soul is documented in many passages of Scripture (Matt. 26:41; Rom. 8:10; 1 Cor. 5:5; 6:17, 20; 7:34; 2 Cor. 7:1; Gal. 5:17).

Second, the New Testament also talks about the resurrection of the body, and Paul elaborates on the nature of this body (1 Cor. 15:35-44). We have the most complete picture of this resurrection body by observing what the Bible tells us about Jesus Christ after His resurrection. Paul tells us this is the body we will have (Phil. 3:20-21).

This resurrection body of Jesus Christ was able to freely pass through physical barriers (walls, locked doors). But it could also be examined for purposes of identification. It is a body that is able to communicate with the physical world (can be seen, heard, felt). Likewise, we can anticipate that our bodies will be able to share a meal and then disappear only to reappear in another location. It will also be a body that can act upon the physical world by moving objects, going for a walk, even starting a fire.

The Bible teaches that we are more than matter. We are both body and soul, mind and brain. Neuroscience is the next frontier for research, and Christians must pay attention to these findings and provide a biblical perspective to the research and an ethical framework for its application.

Notes

1. Arthur C. Custance, *The Mysterious Matter of Mind* (Grand Rapids: Zondervan/Probe, 1980).
2. Wilder Penfield, in the "Control of the Mind" Symposium, held at the University of California Medical Center, San Francisco, 1961, quoted in Arthur Koestler, *Ghost in the Machine* (London: Hutchison Publishing Group, 1967), 203-4.
3. Martha J. Farah, "Neuroethics," Op-Ed, American Medical Association, www.ama-assn.org/ama/pub/category/12727.html.

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Was Darwin Wrong? A Rebuttal to the November 2004 National Geographic Cover Story

Our authors examine arguments for evolution commonly brought out by evolutionists. They show these arguments are not as strong as they purport and in many instances make a stronger case for intelligent design. Every person, especially Christians, should be aware of the information presented in this article.

Over the last few decades more and more scientists from every field of discipline have voiced concerns with Darwinian evolution's ability to explain the origin and diversity of life on earth. However, you would not know that from reading a recent article in *National Geographic*. The cover of the November 2004 issue grabs the reader's attention with the question, "Was Darwin wrong?" To few people's surprise, upon turning to the first page of the article you see the boldfaced words, "NO. The evidence for Evolution is overwhelming." But how can this be when so many scientists are in disagreement? Is it possible that the five lines of evidence presented in the article aren't as

indisputable as the reader is led to believe? What if each one of these evidences for evolution is fatally flawed? What would evolution have left to stand upon? It is my opinion, as well as many others', that this is indeed the case. Let us critically evaluate each of these five lines of evidence (embryology, biogeography, morphology, paleontology, and bacterial resistance to antibiotics) and see what, if anything, we can conclude from them.

Embryology

First let's examine the so-called evidence from embryology, which Darwin himself considered to be "by far the strongest single class of facts in favor of" his theory.^{1} *National Geographic* asks the question, "Why does the embryo of a mammal pass through stages resembling stages of the embryo of a reptile?"^{2} This, however, is a loaded question.

This line of evidence presented by *National Geographic* is known as Embryonic Recapitulation, or in other words, as the embryo develops it passes through stages that retrace its evolutionary past. This idea was originally developed in the mid 1800's by Ernst Haeckel, which he illustrated with drawings of embryos of various species. However, as Jonathan Wells points out in his book *Icons of Evolution*, this has been known to be false for over 100 years! Not only were Haeckel's drawings fraudulent but the late Stephen J. Gould called them "the most famous fakes in biology." Furthermore, embryologist Walter Garstang also stated in 1922 that the various stages of embryo development of different species "afford not the slightest evidence" of similarities with other species supposed to be their ancestors, stating that Haeckel's proposal is "demonstrably unsound."^{3} In 1894 Adam Sedgwick wrote, "A species is distinct and distinguishable from its allies from the very earliest stages all through the development."^{4}

So how is *National Geographic's* question, "Why does the embryo of a mammal pass through stages resembling stages of the embryo of a reptile?" a loaded question? Because mammalian embryos never pass through such stages in the first place! Darwin's "strongest" evidence for evolution turns out to be no evidence at all.

Biogeography

Biogeography, as defined by *National Geographic*, "is the study of geographical distribution of living creatures—that is, which species inhabit which parts of the planet and why."^{5} *National Geographic* asks, "Why should [such similar] species inhabit neighboring patches of habitat?"^{6} Why are there several different species of zebras found in Africa, or dozens of species of honey creepers in Hawaii, or thirteen species of finches in the Galapagos Islands? The answer given is that "similar species occur nearby in space because they have descended from common ancestors." There is nothing controversial about that. But I don't believe that this in anyway supports the kind of evolution that *National Geographic* is trying to promote. Allow me to explain by taking a closer look at the term "evolution."

There are two different kinds of "evolution" within the biological sciences. The first kind of evolution is *macroevolution*, or, big change over time. Macroevolution requires a vast amount of new genetic information and describes the kind of evolution required to make a man out of a microbe. It is this kind of evolution that is being propagated by *National Geographic*.

The second kind of evolution is *microevolution* which describes small changes or variations within a kind. For example, you may breed a pair of dogs and get another dog which is smaller than both its parents. You may then breed the new smaller dog and get an even smaller dog. However, there are limits to this kind of change.^{7} No matter how often you repeat this procedure the dog will only get so small. It is also important to note that the offspring will always be a dog. You will never get a non-

dog from a dog through this kind of change. Not to mention this kind of evolution tells us nothing about where the dog came from in the first place.

So what about *National Geographic's* examples? They are all examples of microevolution. Why, for example, are there several species of zebras in Africa? Because they had a common ancestor that probably lived in Africa—a zebra. Or why are there thirteen species of finch on the Galapagos Islands? Because they are all descended from a single pair or group of finches. To use this kind of observation and try to explain where a zebra or finch came from in the first place goes beyond the data and the scientific method, and enters into the realm of imagination.

Evolutionists are still puzzling over the connection between these two forms of evolution, macro and micro. Perhaps the puzzle remains because macroevolution is just wishful thinking.

Morphology

Morphology is a term referring to “a branch of biology that deals with the form and structure of animals and plants.” {8} It is presented by *National Geographic* as having been labeled by Darwin the “very soul of natural history.” So what is this evidence from morphology that lends itself as “proof” for microbes-to-man evolution? Simply put, it is that similarities in shape and design between different species may indicate that those species have originated from a common ancestor by way of descent with modification. *National Geographic* gives a few examples such as the “five-digit skeletal structure of the vertebrate hand,” and “the paired bones of our lower legs” which are also seen “in cats and bats and porpoises and lizards and turtles.” {9}

Perhaps an easier to follow illustration concerning this is evolutionist Tim Berra’s famous illustration which he used in his book *Evolution and the Myth of Creationism*. In it he states the following:

If you look at a 1953 Corvette and compare it to the latest model, only the most general resemblances are evident, but if you compare a 1953 and a 1954 Corvette, side by side, then a 1954 and a 1955 model, and so on, the descent with modification is overwhelmingly obvious. This is what paleontologists do with fossils, *and the evidence is so solid and comprehensive that it cannot be denied by reasonable people* [emphasis in original]. {10}

So why is this illustration famous? It’s because Berra, although an evolutionist, unwittingly demonstrated why similar structures across different species is just as naturally attributed to intelligent design. For what do each of these various Corvette models have in common? They were all designed and manufactured by the same company, General Motors. In fact, the Corvette has many design features in common with other automobiles as well, such as four wheels, a gasoline engine, brakes, a steering wheel, etc. Why do most cars share these things, and many others things, in common? Because they are effective and efficient features designed for the proper operation of the vehicle. Maybe this is the same reason we find commonalities between many different kinds of plants and animals.

It must be granted that if evolution were true, then one would expect to see similarities between closely related species. However, as illustrated above, they could also be explained as the result of a common designer. So how can we tell which it is?

There are at least two ways. First, if similar structures did truly descend from a common ancestor, then those structures should have similar developmental pathways. In other words, they should

develop in a similar manner while still in the embryonic stage. However, as early as the late 1800's scientists observed that this simply isn't the case. Embryologist Edmund Wilson in 1894 noted that structures which appear similar between adults of different species often differ greatly either in how they form or from where they form, or both.{11}

Secondly, if similar structures are the result of descent with modification, then you would expect the development of those structures to be governed by similar genes. Concerning this very point biologist Gavin de Beer said, "This is where the worst shock of all is encountered . . . the inheritance of homologous structures from a common ancestor . . . cannot be ascribed to identity of genes."{12} In other words, different genes govern the development of similar structures which runs contrary to what evolution would predict.

It would appear then, that morphology, the "'very' soul of natural history," is more the "ghost" of natural history than supporting evidence for evolution. There are certainly many features of organisms resulting from a common ancestry, such as the beak of the Galapagos finches; but that doesn't mean that the beaks of all birds are also related by common ancestry. Perhaps applying the perspective of Intelligent Design can help clarify the difference.

Paleontology

Paleontology simply put is the study of the fossil record. So how does the fossil record support the "theory" of evolution? According to *National Geographic*, Darwin observed that species presumed to be related tend to be found in successive rock layers.{13} *National Geographic* asks if this is just coincidental. The answer provided, of course, is a firm no. Rather, they say, it is "because they are related through evolutionary descent."{14} Is this conclusion truly supported by scientific observation?

The biggest problem with identifying a gradual change from one species into another within the fossil record is that by and large no such gradual sequence of fossils exists! With the exception of a few disputed examples, such as the horse and whale, what truly stands out in the fossil record is sudden appearance. The late Stephen J. Gould, a world renowned evolutionist, noted concerning this, "The extreme rarity of transitional forms in the fossil record persists as the trade secret of paleontology. The evolutionary trees that adorn our textbooks have data only at the tips and nodes of their branches; the rest is inference, however reasonable, not the evidence of fossils."{15} This is *especially* true within the Cambrian rock layer, dated by evolutionists at over 500 million years old, where complex species appear for the first time with no sign of gradual development from simpler forms.

To illustrate this point, imagine, if you will, that you covered the entire state of Texas with playing cards. If someone were to then go for a walk across Texas and periodically pick up a card at random, what might they begin to think if all they ever picked up were 2s and aces, and never any of the cards in between? He might begin to wonder if those other cards were there at all.

This is precisely what we find within the Cambrian rock layer. We always find fully formed species, like finding just 2s and aces, and never any intermediates, like your 3s, 4s, and so on. In fact, *National Geographic* even acknowledges this problem when it compares the fossil record in general to a film with 999 out of every 1,000 frames missing.{16} It's more likely that there are few if any missing frames; rather those frames never existed in the first place.

Darwin himself, observing the lack of transitional forms within the fossil record, noted this problem to be "perhaps the most obvious and serious objection which can be urged against [his theory of evolution]."{17} Today, with nearly 150 years of advancements in the area of paleontology, the

fossil record still fails to meet the expectation of Darwin's theory. This problem goes unaddressed by *National Geographic*.

Bacterial Resistance to Antibiotics

National Geographic derives a fifth line of evidence from more recent scientific data. They state, "These new forms of knowledge overlap one another seamlessly and intersect with the older forms, strengthening the whole edifice, contributing further to the certainty that Darwin was right." {18} Is this really the case? The most lauded of these "new forms of knowledge" is from the study of bacteria that acquire resistance to modern medicines. *National Geographic* states that "there's no better or more immediate evidence supporting the Darwinian theory than this process of forced transformation among our inimical germs." {19}

These adaptations are in fact evidence for change over time, but not the kind that would change a microbe into a man. Rather, all examples of bacterial resistance are that of micro-evolution, i.e. change *within* a kind. For example, a staph infection is caused by a bacterium known as a *Staphylococcus* or "staph" for short. Whenever a staph bacterium acquires resistance to a particular antibiotic, it still remains a staph. It doesn't change into a different kind of bacterium altogether. In fact, no matter how much it changes, it always remains a staph.

Secondly, when we take a closer look at how bacteria become resistant to a particular treatment, we find something very interesting. Just like in humans, information on how bacteria grow and survive is stored in the bacteria's DNA. Therefore, if any change is to take place to turn an organism from one kind to another "more complex" kind, such as a microbe into a man, it must add new information to that organism's DNA. However, that is not what we observe taking place in bacteria at all. New information is *never* created. Existing information may be modified, lost, or even exchanged between bacteria, but never created.

Thirdly, and perhaps most significantly, is that nothing which *National Geographic* presents even begins to explain where the information to make a bacterium came from in the first place. Rather, and to no surprise to the creationists, the study of bacterial resistance testifies to an intelligent Designer who created all living organisms with an ability to adapt to changing environments.

Conclusion

Modern science has indeed offered us great insight into the complexities of life and the inner workings of all living things. Advances in population genetics, biochemistry, molecular biology, and the human genome will surely result in greater understanding of life on our planet. But unlike what *National Geographic* suggests, it is these advances which have served to convince an increasing number of scientists to abandon Darwin's theory as an explanation for the origin of life on earth. Rather, these advancements point to the necessity of intelligent design as an added tool in the toolbox.

Notes

1. Jonathan Wells, *Icons of Evolution* (Washington, DC: Regnery Pub., 2000), 82.
2. David Quammen, "Was Darwin Wrong?," *National Geographic* November, 2004: 13.
3. Wells, 88.
4. *Ibid.*, 97.
5. Quammen, "Was Darwin Wrong?," 9.
6. *Ibid.*, 12.
7. Lester, Lane P., Raymond G. Bohlin, and V. Elving Anderson, *The Natural Limits to Biological*

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8. Merriam-Webster Inc., *Merriam-Webster's Collegiate Dictionary*, 10th ed. (Springfield, Mass: Merriam-Webster, 1996).

9. Quammen, "Was Darwin Wrong?," 13.

10. Tim Berra, *Evolution and the Myth of Creationism* (Stanford, Calif.: Stanford University Press, 1990), 117.

11. Edmund B. Wilson, "The Embryological Criterion of Homology," pp.101-124 in *Biological Lectures Delivered at the Marine Biological Laboratory of Wood's Hole in the Summer Session of 1894* (Boston: Ginn & Company, 1895), p. 107.

12. Wells, *Icons of Evolution*, 73.

13. Quammen, "Was Darwin Wrong?," 12.

14. *Ibid.*, 13.

15. Stephen J. Gould, "Evolution's Erratic Pace," *Natural History* 85(5).

16. Quammen, "Was Darwin Wrong?," 25.

17. Charles Darwin, *On the Origin of Species by Means of Natural Selection* (New York, New York: The New American Library of World Literature, Inc., 1958), 287.

18. Quammen, "Was Darwin Wrong?," 20.

19. *Ibid.*, 21.

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