

“I’m a Girl Because That’s What Mommy Wanted!” – The Ethics of Screening for Gender Using IVF

The brave new world of the future is not so far away anymore. Fertility clinics, originally created to assist infertile couples have children, can now screen for numerous genetic traits. Are we ready for the responsibility and future ethical questions? My experience says we are woefully unprepared. In our consumer oriented society of the 21st century, we want what we want, when we want it. If a couple has the financial resources and says they are willing to take the medical risks, who can say what they can and can’t do?



Watch Dr. Bohlin
on WFAA-TV video

In July 2015 an article appeared on Yahoo Parenting^[1] about a couple in Frisco, Texas, north of Dallas. Rosa (36) and Vincent (37) Costa spent \$100,000, enduring seven rounds of In Vitro Fertilization (IVF), including one miscarriage, just to ensure their third child would be a girl.

Numerous fertility clinics allow infertile couples to genetically screen their embryos for nearly 400 genetic disorders. One additional benefit is that the embryos can also be screened for gender. Gender is a fairly simple assessment. Males will contain an X chromosome and a Y chromosome. Females are XX. These chromosomes are easily identified and distinguished.

This service is becoming more commonplace for couples since a round of IVF can cost around \$12,000. If for an additional

\$6,000, screening can focus on healthy embryos, why not? Identifying the sex of the embryos is an added bonus. But in the last few years, couples like the Costas have mushroomed. Some clinics report a rise of 250%. As one who has addressed the issue of genetic engineering for over twenty years, I have regularly discussed the possibility of choosing the sex of your next child. The primary method used by fertility clinics is to assess gender before implantation. If you desire a girl, then only female embryos are implanted. Embryos of the “wrong” sex can be discarded, frozen for later use, made available for adoption or donated to “science” for stem cell research. Most frozen embryos end up in limbo. They do not stay viable forever. Some frozen embryos have been successfully revived after 5 years in storage. But many are simply discarded. Embryos donated for stem cell research are also ultimately killed. In order to retrieve the valuable embryonic stem cells, the embryo is destroyed.

Consequently, this IVF procedure to guarantee the sex of your child ultimately results in the death of numerous perfectly healthy embryos. So you have perfectly healthy parents sacrificing healthy embryos just to get the male or female child they desire. This cost is far more consequential than the dollar amount. I’m opposed to even discarding genetically challenged embryos for healthy embryos. Now we have crossed the line to create human life in the laboratory with the full intention of sacrificing embryos of the wrong sex. In another [article{2}](#), fertility specialist, Dr. Jeffrey Steinberg, acknowledges he has had the technology to screen for eye-color since 2009. He delayed making it available then due to an outcry from the public. Saying he has a waiting list of 70-80 people, he’s getting ready to make it available again.

But despite the clear loss of innocent human life in our search for a “balanced family” or even worse, children of the preferred eye color, we run into the specter of facing up to responsibilities too few have considered. The Costas, for

instance, want a little girl. There is nothing wrong with that necessarily. But what are they really expecting? After all, they've spent \$100,000 in the effort. The article mentions they will be decorating the new nursery in pink. But what if Olivia, their chosen name, ends up not liking pink? What if she's a tomboy who doesn't even like dresses? Or even more extreme, what if she decides as a little girl, she's really a boy! What do you do then? Even when selecting a child's gender, you likely have some concept in your mind of what a boy or girl will be like-otherwise, why choose gender at all?

It seems we are unwilling to ask the hard questions. Fertility experts will likely cater to what their clients want. There is competition, after all. One fertility specialist even believes that withholding these technologies puts him in the role of "playing god." He won't withhold something a client wants when the technology is available. That equates the consumer as a "god." The American Idol is not just a performer looking to win a contest to land a lucrative recording contract. The American Idol is personal choice. As I said earlier, if someone says they understand the risks, has the money and wants to pursue a medical technology, whose is going to say no? Should we say no? We have known for some time that absolute power corrupts absolutely. Do we just stand by and allow people to make choices that show an utter disregard for innocent human lives in the pursuit of personal preferences? Life becomes cheap across the board. Everyone is suddenly at risk. Where do we draw the line?

My great concern is that public demand, not reasonable ethical considerations, will guide medical decisions. Do we really not have the collective will to say there are some medical procedures or even experiments we will not do?

Notes

1. [Why One Mom Spent 100K to Guarantee Baby No. 3 Is a Girl](#)
Accessed July 14 2015.

2. [Couple Spends 50K to Choose Baby's Sex, Shining Light on Trend](#) Accessed July 14, 2015.

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DNA, Information, and the Signature in the Cell

Where did we come from? Heather Zeiger uses Stephen Meyer's book *Signature in the Cell* to *logically show that the best answer is an intelligent cause—God—rather than natural causes.*

Where Did We Come From?

Where did we come from? A simple question, but not an easy answer. Darwin addressed this question in his book, *On the Origin of Species*. Although he never really answered how the universal common ancestor first came to life, he implied that it was from natural causes. In this article, we are going to look at Darwin's method of deducing occurrences in the past based on observations we see today. This is now referred to as the *historical* or *origins science* method. We will find that purely naturalistic causes fall short of explaining what we know about DNA, but intelligent design seems to be a promising alternative. Then we will look at scripture and see how Christians can use these evidences for design to talk about who that designer is. We will be using Stephen Meyer's new book, *Signature in the Cell*, to guide us on the science and method of approaching this question.

Charles Darwin's book, *On the Origin of Species* discusses his theory on how natural selection acts on living things so that the fittest organisms for a particular environment survive,

and how this process eventually leads to novel species and body plans. Implied in his work is the notion that all living things came from nature and from natural causes. So his presupposition is that life must have first come from impersonal things like matter and energy. Because of this, origin-of-life scientists have been trying for years to demonstrate how life may have come from non-life.

Let's try to figure out how a cell could form from purely naturalistic processes. Better yet, since we now know that natural selection acts on random mutations within the genome, let's focus in on DNA, the instruction booklet for the cell. Without DNA, cells would not function.

DNA is part of a complex information-processing systems^{1} DNA is a long, helical structure found inside the nucleus and mitochondria of the cell. It is made of a four-molecule alphabet arranged in a very specific order. This sequence is like an instruction book telling the cell what parts to use to build a protein. But this instruction book needs to be decoded with other proteins. The difficult thing is that proteins are needed to make more DNA, but DNA is needed to make proteins. And the cell cannot function without proteins. This means that the first DNA molecule must have been made differently than how it is made today.

DNA is a very complex information processing system. In fact, Bill Gates has compared it to a computer program but far, far more advanced than any software ever created.^{2} DNA is more than just an improbable sequence of bases; it is functional. It tells the cells what to do. So the question we really need to answer is, how can this kind of information arise in the first place?

Origins and Operations Science

We are investigating what science can tell us about the origin

of life. Did we just come out of a chemical soup, or was it something else? First, we need to answer this question: How did DNA, the body's instruction book, first get here? In order to answer the question, we need to decide what method to use to investigate this question. Since we are looking at the science, we should use the scientific method. However, we need to make a distinction between approaching something that is a re-occurring, testable phenomenon, and a singular event in the past.

As a scientist, I usually work in the area of *operations science*. This is the type of science we learn in school. You start with a hypothesis, then you conduct an experiment to test your hypothesis. Repeat your experiment several times, collect data, and make conclusions about your hypothesis. Operations science deals with regular, repeatable things that can usually be described by mathematical formulas. Oftentimes, operations science is looking at some kind of naturally occurring process.

But there is another type of science that forensics experts and archeologists use. It is called origins science. Origins science determines what caused a singular event in the past. The role of origins science is to first determine if something was caused by chance, natural laws, or intelligence. For example, one could find a rock formation that looks very similar to a human head. Was this formation caused by chance and natural laws, such as wind and rain wearing away the rock? Or was it caused by intelligence? Did someone carve the rock to look this way?

Origins science operates under a different set of rules than operations science because the event in question has already happened, and it is not a reoccurring, observable phenomenon. The best that we can do is look at clues to give us a reasonable guess as to what might have happened. In *Signature in the Cell*, Meyer uses origins science to determine if DNA is a result of chance, natural laws, or intelligence:

Thaxton and his colleagues argued that inferring an intelligent cause was legitimate in origins science, because such sciences deal with singular events, and the actions of intelligent agents are usually unique occurrences. On the other hand, they argued that it was not legitimate to invoke intelligent causes in operations science, because such sciences only deal with regular and repeating phenomena. Intelligent agents don't act in rigidly regular or lawlike ways, and therefore, cannot be described mathematically by laws of nature. {3}

DNA replication happens all of the time, but it requires proteins. But proteins are made by instructions from DNA. So the first DNA molecule must have been made in a special, atypical way, meaning it qualifies as origins science. Origins science allows for singular acts of intelligence to explain certain phenomena.

This means we need to investigate, using origins science, how the first DNA molecule with its information-carrying capacity was produced.

What Are the Possibilities?

DNA is the code for life. If we determine where it came from, then we are one step closer to determining the origin of life. Let's look at the typical origin of life theories posed by scientists as our first step in our origins science method, and see where theories are lacking or where they are helpful. Two things these theories all have in common is that they presume no designer, but only natural causes, and none of them can explain the origin of information.

The first option is that DNA might have arisen by chance. When scientists talk about chance, they are not saying that some entity called Chance did something. They mean random chemical shuffling, and out of that came DNA. But it's not good enough

to explain how random chemicals came together. Think of scrabble pieces. To say that DNA came about by chance would be similar to saying that someone shook a bag of scrabble pieces and threw them on the floor and it spelled out a sentence. And this would not be just any sentence, but step-by-step instructions on how to build a cellular machine. Chance is not a good explanation for the origin of DNA, because the probability of getting something as specified and complex as DNA is well beyond the accepted probability of zero.

The other option is DNA might have come about because of necessity or natural law. Maybe there is some chemical or natural reason that forced the DNA molecules to form. Two examples of this type of origin of life theory are *self-organization* and *biochemical predestination*. The idea behind both of these is that the molecular alphabet in DNA arranged itself because of chemical properties or environmental factors. Unfortunately, scientists have found that the molecules in DNA do not chemically interact with each other because they are stuck to a phosphate backbone, not to each other.[\[4\]](#) On top of that, there isn't even a chemical attraction between these DNA sequences and the protein parts they code for (known as a *codon*). Since there is not a self-organizing motivation for this, and there is not an environmental factor that would favor certain combinations over others, necessity seems to fall short of explaining the functional information of DNA.

Some scientists propose that it is a combination of chance and necessity. The most popular origin of life models are based on this theory. However, Stephen Meyer shows in his book that the two most popular models, the *RNA-first world* and the *Oparin* model, do not explain how functional information first arose. Ultimately these theories boil down to claiming that random chance causes functional information.

So if all of the naturalistic theories of origin of life fall short, then perhaps we should expand our options to theories

that allow for intelligent agents.

What if We Allow Intelligence?

It seems that all of the naturalistic explanations for the origin of life fall short of accounting for the information-rich molecule, DNA. As Meyer points out, apart from DNA and the machinery in cells, such specified information is not found anywhere in the natural world.[{5}](#) The only time we see these properties is in human language and writing. So if DNA has the properties of something that was designed, then why not entertain the idea that it was designed?

Today design is not permitted as an explanation in science. However, historically, this has not been the case. In fact, it was a belief in an intelligible and coherent world created by God that motivated early scientists such as Newton, Boyle, and Pascal.[{6}](#) However, after the Enlightenment (mid-1700s), many scientists started operating under different assumptions. They assumed that only natural causes, such as chance and necessity, are permitted to explain observations.

Flash forward to Charles Darwin's time (1860s). Darwin looked at presently acting conditions to extrapolate back to the origin of all living things. He saw that environmental factors select for certain traits, such as beaks on finches. And he saw that things like dog breeding will select for certain desired traits. He therefore concluded that maybe the various animals and body plans came from conditions similar to this. He named this selective force, this breeder, natural selection. This was based on what Darwin knew in the 1850s, and some assumptions about intelligent causes influenced by Enlightenment thinking. At that time Darwin knew nothing about DNA. It would not be discovered until the 1950s.

Stephen Meyer discusses how presently there are no known natural causes for the kind of functional information we see

in DNA. The only place we see this is in human language and writing. So perhaps we cannot assume natural causes. Maybe DNA arose by intelligent design. Furthermore, experimental efforts to try to produce DNA or RNA in the lab show that a chemist or a computer programmer must be involved in the experiment in order to obtain functional information. Natural selection cannot act as a breeder, because it does not have the end goal in mind.

Intelligent Design is a strong possibility for explaining the origin of DNA. It is something that we see in operation today. And it is experimentally justified.

What Does This Have to Do with Christianity?

We have been looking at the properties of DNA and how it has all of the characteristics of a written code. Using the methods of origins science that Stephen Meyer used in *Signature in the Cell*, we can conclude that intelligent design is the best explanation for the origin of DNA. Intelligence is causally adequate to produce a code like DNA. It is observable, in the sense that today intelligent agents produce codes. And any experiments that try to reproduce DNA seem to require the input of information by an intelligent agent to make anything meaningful. This is why Meyer calls DNA the signature in the cell. However, the science alone cannot tell us whose signature it is, so we need to look elsewhere for that. That's where Christianity comes in.

As Christians we believe that God reveals himself through general and special revelation. General revelation is God revealing things about himself in nature. Think of it like God's fingerprints on creation. Special revelation is what God has specifically revealed in the Bible. If we want to find out whose signature is in the cell, we need special revelation to inform us on that. And the Bible says this much. Right before

Paul says that creation reveals the attributes of God in Romans 1:18-20, he says it is the gospel that brings salvation in verses 16 and 17.

From the science it is reasonable to say DNA first arose by intelligent design. DNA is one of many extra-Biblical clues pointing us to a designer. This evidence, taken with many other extra-biblical evidences such as the fine-tuning of the universe for life, the moral law on our hearts, and even the way that we know gravity works the same today as it did yesterday, makes one suspicious that there must be a designer. Now take the evidences for the authority of Scripture from archeology and the Bible's internal structure and consistency and we have many reasons to believe that this designer is the God of the Bible. As Paul says in Romans 1, "His invisible attributes, namely, his eternal power and divine nature, have been clearly perceived, ever since the creation of the world, in the things that have been made. So they are without excuse" (v. 20). So, even though the science will not bring someone to a saving knowledge of Christ, they are without excuse because it does reveal God's attributes. Maybe when someone sees the Signature in the Cell, they will ask, whose signature is it?

Notes

1. "After the early 1960s advances in the field of molecular biology made clear that the digital information in DNA was only part of a complex information-processing system, an advanced form of nanotechnology that mirrors and exceeds our own in its complexity, storage density, and logic of design." Stephen C. Meyer, *Signature in the Cell* (HarperOne, 2009), 14.
2. Bill Gates, *The Road Ahead* (Viking, 1995), 188; quoted in Meyer, *Signature*, 12.
3. Meyer, *Signature*, 29.
4. The only time the nucleotides in DNA interact with each other is when they are paired, A-T, C-G, and they do this

through hydrogen bonding. However, this pairing is with nucleotides across from each other and serves to protect the DNA molecule. The coding has to do with the sequence of bases next to each other, and there is no chemical reason for one nucleotide to “prefer” being next to another.

5. “Apart from the molecules comprising the gene-expression system and machinery of the cell, sequences of structures exhibiting such specified complexity or specified information are not found anywhere in the natural—that is, the nonhuman—world.” Meyer, *Signature*, 110.

6. In the radio transcript, I included James Maxwell in this list. While he is among scientists whose belief in God did influence his work, he lived from 1831-1879 which was after the beginning of the Enlightenment. I chose to take his name out here for clarity, although he is a good example of someone who did not hold to the typical presuppositions of the Enlightenment.

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A Fine-Tuned Universe

Heather Zeiger makes an argument for why the earth and the universe are so fine-tuned for life.

Answering the Big Questions of Life

Let’s pretend that you go outside to find your front yard full of trash and debris. The first question that probably comes to mind is, “Did someone do this on purpose, or was this an accident?” In hopes of determining a cause, you begin by looking at clues. Does the neighbor’s yard have debris in it?

If so, then it's possible the wind blew the trash and debris into both your yards. If not, then you become suspicious. Why are you suspicious? The probability that the wind would blow trash in your yard, but not your next door neighbor's yard is low. But it is possible, so you look for more clues. Upon further examination you find that the debris stops right at the property line between your yard and your neighbor's yard. This makes you even more suspicious because the probability of this happening by chance is now lower than it was before. Although you were not there to see the trash thrown in your yard, you are fairly certain someone did this on purpose. Although you may intuit the cause, the reason why you assume foul play is because with each clue comes a probability of its occurrence. With multiple clues, the probabilities multiply, so finding two clues that are improbable makes the entire event even more improbable.

Taking our scope beyond your backyard to the earth and to the universe, the question becomes, "Why are the universe and earth here after all? Why is it the way it is?" When it comes down to it, just like with your front yard, we are left with two causal options: either life, the universe, and everything in between were put here on purpose, or it was an accident.

Every effect has a cause, but if we take cause and effects back far enough, eventually we will find something that is eternal or the ultimate cause. Therefore, we have two options: either that eternal thing is natural or it is supernatural. Or put another way, either the universe itself (or at least the matter and energy that makes up the universe) is eternal, or something outside of the universe and nature is eternal.

This article will look at the clues within our universe that will help us answer whether the universe arose by accident or was put here on purpose. We will be looking at some very improbable fine-tuned parameters that not only allow for stars and galaxies to be here, but also parameters that allow for life. Finally we will look at parameters that seem to be in

place not just for any life, but for us in particular.

Not to give away the ending, but the Bible tells us that “the heavens declare the glory of God,”[{1}](#) and it turns out there are some clues that seem to indicate intentionality or purpose in design. However, the Bible also says that man will suppress the truth. So even though the clues seem to point towards design, we will see examples of how some scientists explain these clues without invoking any kind of designer or supernatural agent. Basically, we will see how they can still have an eternal universe instead of something eternal that is outside of the universe.

The Fine-Tuned Parameters for Life[{2}](#)

Physicists have concluded that certain features of the universe have to be almost exactly as they are, otherwise the universe wouldn't be here. For example, the universe is expanding outward. If it expanded any faster, it would overcome gravity, and galaxies, stars, and planets would fly apart. If it expanded any slower, gravity would take over and everything would come crashing back together.

On a much smaller scale, the same idea applies to the atom. When asked what he was thankful for, a friend of mine replied, “That my atoms don't just explode.”[{3}](#) If you think about it, why don't our atoms just fly apart? Just like the expanding universe, the properties of protons, neutrons, and electrons are just right so that the electrons don't come crashing into the atom or the atom doesn't fly apart. Without atoms, nothing would be here, and yet the forces that hold the atom together are apparently so balanced that they seem to be resting on a knife's edge.

Not only is our universe fine-tuned for existence, but the earth is fine-tuned for life. You may not realize this, but water is a unique substance with very uncommon properties.

Most substances are denser when they are a solid than when they are a liquid, but water is not. It is denser as a liquid, so we observe ice floating instead of sinking. What's the big deal? The big deal is that we need this property to survive. The ocean has an entire ecosystem including plants and bacteria. The oceanic plants and bacteria account for a large amount of oxygen in our atmosphere. Thanks to water freezing from the top down, these organisms can continue to live underwater, even if the top of the water is frozen.

Interestingly, Earth is in just the right temperature range for water to be a liquid. This is a very narrow temperature range compared to the ranges for steam or ice. Given all of the possible temperatures and pressures in the universe, you will most likely find water as a solid or a gas. But Earth just happens to be in that narrow range for water to occur as a liquid. Considering that we need water to survive, I find this rather convenient.

Physicists have come to the conclusion that the universe is remarkably fine-tuned. There are constants, such as the gravitational constant or the gas constant, that are just the right values for life. Gravity and the atomic forces seem to be perfectly balanced for life. So the question is, what does this remarkable fine tuning mean? Is there someone who has set the dials of the universe to make it just right for us? Or is this the result of random chance?

Goldilocks Explains Fine-Tuning

The fine-tuned parameters of the universe that allow for its existence and allow for life are highly improbable. Many people try to explain away these very improbable factors by appealing to chance or natural laws. But the fine-tuned factors are so improbable that they would seem to be impossible.

One way to try to explain this is to assume that maybe the universe is infinite; after all, given an infinite amount of time, even the improbable can become possible, right? It turns out the universe is not infinite. Physicists have concluded, using evidence from Erwin Hubble's studies and Einstein's theories, that the universe had a beginning that they call the Big Bang.

If scientists want to appeal to chance, they are confined to a given amount of time. However, the fine-tuned parameters are so improbable that even fifteen billion years is not enough time. Some scientists try to find a way to have an infinite universe anyway because they wish to circumvent the God question.[\[4\]](#) The only way to do this, given fine-tuning, is to increase your probabilistic occurrences. The most popular theory is the *multiverse* or many universes theory. This idea is that there are many universes, and the one we're in happens to be well-suited for life. Our fine-tuned parameters are not fine-tuned at all; they are just one set among many sets of parameters, each within its own universe.

Remember Goldilocks and the three bears? "This porridge is too hot . . . this porridge is too cold . . . this porridge is just right!" Given three options, Goldie found one that was just right. According to multiverse theory, there are an infinite number of universes: some too hot, some too cold. But if there are an infinite number to choose from, certainly one must be just right.

However, there is no evidence for there being any universes other than our own. Physicists readily admit that we do not have access to the other universes, but we must assume they are there. Essentially, they have constructed a theory that postulates something infinite and beyond ourselves, something wholly other than our universe and not necessarily measurable from our finite perspective. It seems that in order to get away from a creator, physicists have posed a theory which appeals to something that we can never know to be true and

must take on faith. But unlike the Christian faith, this is faith in something that has no evidence of its existence.

String Theory Explains Everything . . . or Nothing[\[5\]](#)

Many scientists want to find a mathematical theory of everything in hopes that maybe *this* will answer the question as to why the universe is here.

Scientists have several theories to explain how the major forces interact with each other. There are theories for electricity and magnetism and for the forces that hold an atom together. But the one thing that still has physicists baffled is gravity. How do we explain gravity in relation to these other forces? Some scientists believe that if we can find a way to relate gravity to all of the other forces, then maybe we will understand how the universe came into existence.

In the last twenty years, physicists have developed a theory called string theory that tries to combine gravity and quantum mechanics. String theory began by describing the parts that make up protons (known as hadrons) as particles that behave as if they are on the ends of strings. The mathematics for this looks a lot like that of harmonic oscillators (springs). However, these strings are not particles, they are strings of energy. Okay, reasonable enough. We know that electrons and photons act like both particles and waves, and one can think of these strings as standing waves. But because of issues with the mathematics, either everything has to be fundamentally made up of strings of energy or nothing.

String theory mathematics, though, led to some interesting features, including the fact that there has to be ten dimensional space, not our normal three dimensions plus time. So those other dimensions either have to be hiding somewhere or the math fails. Scientists have proposed theories that

describe the other dimensions as being “compacted.”

String theory math is complex and perhaps inelegant, but it is compelling because it does a better job than any other theory of relating gravity to quantum mechanics. I think there is some promise to the ideas of string theory, but scientists seemed too eager to make it a theory of everything in hopes that the purpose of the universe can be explained through mathematics and physical laws. We can never really be sure of the validity of string theory because it is impossible to test it experimentally.^[6] However, we should note that scientists don't escape the fine tuning issue. String theory math works in ten dimensions and ten dimensions only. So string theory is itself finely tuned. Fine tuning doesn't arise from it. In fact, any equation or theory of everything would still be fine tuned. It seems to point towards a designer (or Mathematician, if you would prefer).

Ultimately, natural laws or equations cannot explain fine tuning because it still boils down to this question: Are the laws put here on purpose or did they arise by chance? If you refuse purpose, then you are left with chance.

Fine-Tuned for Life and for Discovery

What if the fine tuning of the universe is the result of some kind of design or something supernatural beyond our universe? Does this hypothesis help explain some other inexplicable coincidences? It seems that if the universe and earth were designed for life, maybe it was also designed, not just for organic life, but with us intellectual beings in mind.

The fine-tuned parameters of the universe beg to be explained. However, as William Lane Craig says, explaining these observations puts the physicist in the realm of philosophy because he is trying to explain the purpose for the observation of fine-tuning. “The theistic philosopher can

therefore without apology or embarrassment introduce his metaphysical commitment to theism as an at least equally plausible, if not superior, alternative explanation to metaphysical, naturalistic accounts of the complex order of the universe.”[{7}](#)

The fine-tuning of life seems to point to some of the attributes of God. Psalm 19 says, “The heavens declare the glory of God, and the sky above proclaims his handiwork.”

This perspective has explanatory power.[{8}](#) We are able to explain things that naturalists have passed off as a coincidence. For example, the earth’s moon is important for life because it affects the tides which circulate nutrients in the ocean. But the moon also happens to be the perfect size such that from the Earth’s viewpoint, it can completely block out the sun [during an eclipse]. The sun is 400 times farther away from the earth than the moon, but it is also 400 times larger. In other words, the moon’s size is exactly proportional to the Earth’s distance from the sun. This isn’t needed for life, but it *is* needed for discovery. Thanks to total solar eclipses, relativity theory was confirmed. We have also learned about the composition of the sun, the activity of the sun, and many other features of our sun.

And if that isn’t suspicious enough, it turns out the Earth is in a perfect position in our galaxy to study astronomy. If we were anywhere other than in between two of the spiral arms of the Milky Way, the sky would be too bright to use telescopes.

And what about our atmosphere? Yes, the Earth’s atmosphere has the perfect balance of nitrogen, oxygen, hydrogen, and carbon dioxide to allow for life, but it also happens to be clear enough to allow us to look out into the heavens. All of this might be attributed to chance coincidences, but if we allow that the universe was designed for life, then perhaps it was designed with us in mind. And why not? Psalm 8 says, “When I look at Your heavens, the work of Your fingers, the moon and

the stars, which You have set in place, what is man that You are mindful of him?"^{9} But the Psalm continues by describing man as very valuable to God; he is only a little lower than the heavenly beings, and God has crowned him with glory and honor.

The scientific observations tell us that the universe and the Earth seem remarkably fine-tuned for life and for discovery. Investigation of these clues seems to point towards some kind of purpose and design. If we take what we observe in nature with what is revealed in Scripture, there is compelling reasons to believe that God created the heavens and the earth, and He created them with us in mind.

Notes

1. Psalm 19:1 (ESV)
2. This section is a survey of common fine-tuned parameters taken from *The Privileged Planet* by Guillermo Gonzales and Jay W. Richardson. For a list of the fine-tuned parameters, see Reasons to Believe: www.reasons.org.
3. Quote from Todd Kappelman, Research Associate, Probe Ministries.
4. See Leonard Susskind, "Introduction," in *The Cosmic Landscape* (Back Bay Books, 2006).
5. The information from this section comes from Susskind, *The Cosmic Landscape*; Brian Greene, *The Elegant Universe* (Vintage Books, 2000); and articles by William Lane Craig.
6. We can never "see" a string because we do not have the technological capacity to study something that is that small (known as a Plank length), so there is no experimental way to confirm string theory by finding strings. Brian Greene identifies certain experimental possibilities if we had just a little more knowledge. These experiments could be evidence for string theory since they are based on presupposing strings. See his *The Elegant Universe*, chapter 9).
7. "The Teleological Argument and the Anthropic Principle" by William Lane Craig

www.reasonablefaith.org/site/News2?page=NewsArticle&id=5179

8. Examples of how the universe is fine-tuned for discovery are taken from *The Privileged Planet* by Jay W. Richards and Guillermo Gonzales.

9. Psalm 8:4 (ESV)

Additional References for String Theory:

String Theory is a complex theory. This article only touches the surface. Two sources that do a good job of explaining string theory without delving into the mathematics are:

- *The Cosmic Landscape* by Leonard Susskind
- *The Elegant Universe* by Brian Greene

Both of these books are from a naturalistic worldview. While they are both good descriptions of string theory, Greene and Susskind take their theory beyond the realm of science and into the realm of philosophy and, I believe, make the implications of string theory into something more than it is. They also are forthright in their hope that string theory will solve the “problem” of an apparently fine-tuned universe.

Christian perspectives on string theory and multiverse theory:

- “Does God Exist?” by William Lane Craig

www.reasonablefaith.org/site/News2?page=NewsArticle&id=5507

- “Subject: Multiverse and the Design Argument” Q/A with William Lane Craig

www.reasonablefaith.org/site/News2?page=NewsArticle&id=5741

- Reasons to Believe’s series on string theory:

www.reasons.org/astronomy/string-theory

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Creating Life in the Lab

Written by Heather Zeiger

The J. Craig Venter Institute recently announced their successful synthesis of a complete bacteria genome to an unsurpassed level of accuracy. Researchers were able to replace the genome of the host cell with the synthesized one. Several web sites and commentators have dispelled any aura of the miraculous by pointing out what exactly Venter’s group did and what they did not do. For just a sampling (bolded emphasis is mine):

“What Venter and his team did was to determine the sequence of the DNA in one of the world’s simplest bacteria, use the sequence information to synthesize a copy of that DNA from subunits sold by a biological supply company, then put the synthetic copy of DNA into a living bacterial cell from which the natural DNA had been removed.”[{1}](#)

From the original research article on the Venter group’s discovery: “We refer to such a cell controlled by a genome assembled from chemically synthesized pieces of DNA as a ‘synthetic cell,’ even though **the cytoplasm of the recipient cell is not synthetic.**”[{2}](#)

“The idea that this is ‘playing God’ is just daft. What he has done in genetic terms would be analogous to taking an Apple Mac programme and making it work on a PC—and then saying you have created a computer. It’s not trivial, but it is utterly absurd the claims that are being made about it.”[\[3\]](#)

“To clarify the facts, ‘the team put chemically synthesized pieces of the *M. mycoides* DNA into yeast which assembled the bacteria’s genome. Then, the *M. mycoides* genome was transplanted into *Mycoplasma capricolum* and “booted up” to create a new synthetic version of *M. mycoides*’...For this ‘proof of principle’ instance, they tried to ‘synthesize’ a bacterium as close to the original genome as they could, with the major ‘new’ genetic material being watermark protein messages (e.g. spelling “CRAIGVENTER”). They didn’t use the original DNA as a template, but just as a ‘standard’ for comparison. **Since this was a test of concept, the goal was to generate something that already exists.**”[\[4\]](#)

Neat Trick or Cause for Concern?

I think one of the most laudable feats of this group that should please many biochemists is that they were able to perfect the DNA synthesizing technology to the point that they reconstructed an entire bacterial genome—a much longer sequence than what is typically done in the laboratory setting—and they were able to do it with such accuracy that the cell’s translational machinery read it. Exciting for biochemists, but advancements in laboratory technique and technology are hardly the stuff of headlines. As a chemist, I think it’s a neat trick; as a bioethicist, I am concerned. My concern is not about the technology itself, but about the underlying presuppositions that seem to go unquestioned, even unnoticed.

The media response has been that of excitement and fear. At the heart of the fear surrounding genetic engineering is power. Why would anyone care about bacteria[\[5\]](#) unless he or

she thought it implied something about human beings? Unless they are in the field, most people do not pay particular attention to the musing of a scientist about his research project on some esoteric species identifiable only by its Latin name. We do not care, that is, until that little bacterium has the potential to bring great harm or great good (or both) to human beings.

The fear or excitement (depending on your view of technology and scientists) is spread by two fundamental assumptions:

- 1) Since every organism, including human beings, is made up of genes, if scientists can manipulate one gene, then they can manipulate any gene, including human genes, and;
- 2) by manipulating genes scientists are manipulating life itself and the very essence of an organism's identity. This philosophical assumption, known as *reductionism*, is what we often assume without thinking about it.

These philosophical assumptions are grounded in a worldview of *materialism* (a.k.a. *naturalism*; I will use the term materialism throughout this article). The materialistic worldview says that matter and energy are all there is, there is no supernatural and there is nothing beyond what is in the natural world. If that is the case, then by definition, human beings are defined by their physical parts. There is nothing nonphysical which we can call our identity. That also means that the difference between something being alive versus not being alive must be defined by physical parameters. Since all organisms have a genome, scientists assume that there is some combination of nucleotides (the individual molecules of the genome) or a certain minimal number of nucleotides that makes something alive.

The Venter Group's Reductionist Project

The Venter group, from the beginning of their project, was

quite up front with the goals of their research. When asked about the implications of their project, Craig Venter responded in an interview posted in *SciWatch* in 1997:

What is life? I don't think there are that many biologists trying to answer that one We're . . . working on a reductionist view of trying to take the smallest genome that we have...and see if we can't understand how those . . . [genes] work together to create life[{6}](#)

This is the same sentiment held by James Watson, Nobel Laureate and co-founder of the structure of DNA. In his book, *DNA*, he states:

Our discovery had put an end to a debate as old as the human species: Does life have some magical, mystical essence, or is it, like any chemical reaction carried out in a science class, the product of normal physical and chemical processes? Is there something divine at the heart of a cell that brings it to life? The double helix answered that question with a definitive No.[{7}](#)

According to scientists who hold to materialistic presuppositions, life is chemistry. Who we are boils down to our chemistry, which puts those that can manipulate our chemistry in a position of power.

Given these beliefs, it is no wonder that people automatically jumped from the genome of a bacterium to the implications for people. But one thing science has shown us is that the leap from bacteria to man is not simple or straightforward. Man's genome is not much larger than many other, simpler organisms, yet scientists have found that human DNA is much more complex. As it turns out, it is more than an issue of connecting nucleotides together like a chain of beads in the right order.

Reductionism and the Human Genome Today: What Is New

Dr. Richard Sternberg of the Biologic Institute conducts research based on several findings that seem to indicate that the blueprint for an organism's overall body plan is not found by reading the genome on a nucleotide-by-nucleotide basis. There seems to be a more complex interaction between the genome and other cellular functions and between different parts of the genome in different ways that was once thought. His research seeks to identify those interactions and how they translate into an organism's blueprint. [\[8\]](#)

What scientists are finding is that the genome is not read as a letter-by-letter array (one-dimensional), as was once thought, but that there are spatial and translational (three-dimensional) factors that help determine how our genome is interpreted. *No longer is it a simple issue of what letters code for what. Now it is what letters, located where, and interacting how, code for what. This flies in the face of reductionism because now we cannot assume that the chemistry codes for life. Apparently there is more to it than that.*

Reductionism and the Human Genome Yesterday: What Is Not New

Even before scientists discovered that there are layers of complexity to the genome, many researchers found that their experiments did not work as expected from a reductionist perspective because the step from bacteria to man is not a direct correlation. By looking back to the beginning of genetic engineering technology, we find that many people held reductionist presuppositions that fueled fear and concern. We also find that reductionism failed to account for the setbacks in going from simple organisms to man. Many people reacted to the discovery of recombinant DNA (rDNA) in the 1970's and 1980's with fear, concern, and anticipation.

rDNA involves building DNA strands and inserting them into organisms using something called vectors. Today this technology is frequently used in the lab, and it was used by the Venter group for their procedure. In the 1970's and 80's much of the ethical debate centered on the implications of using rDNA in human beings, even though the procedure was only being used in bacteria. We call the use of rDNA technology in humans, human genetic engineering. Ironically, after all of the hype surrounding this new technology, 30 years of using rDNA has not resulted in success in human genetic engineering.

Reductionists would say that because every organism is composed of genes and life must be defined by its physical parts, if we can engineer and replace DNA in simple organisms, we can do the same in humans. However, in reality we still cannot replace portions of human DNA with synthesized DNA because there is a level of complexity in mammalian cells, and human cells in particular, that scientists still do not understand.

Conclusion: The Meaning of Life Is Not Found under a Microscope

The further down you go, even to the level of atoms, subatomic particles and quarks, you will never find the essence of life; at most you can understand structure. Those are two very different things that are confused when you have a commitment to a materialistic perspective. From a materialistic perspective, the essence is in the structure. Man is the sum of his parts. Contrast this to a theistic perspective. Man is made from similar elements as other organisms, connecting him with part of creation, but he is also beyond creation because of his relationship with or access to God. In a Christian theistic view, in particular, the essence of man is not in his parts but in how those parts combined with his spiritual component make him more than a creature. He is something, someone, made in the image of God. Part of that image is our

creativity and ability to communicate original ideas, as well as our self-awareness, including our place in time and our mortality. These are all attributes that describe God. Yet these traits don't seem to be shared by animals, even animals that are genetically similar to human beings.

In a *Science* article from 1999, several ethicists considered the implications of Venter's group's goal to create a minimal genome. Prophetically, the authors caution against reductionist implications: "...a reductionist understanding of life, especially human life, is not satisfying to those who believe that dimensions of the human experience cannot be explained by an exclusively physiological analysis... **There is a serious danger that the identification and synthesis of minimal genomes will be presented by scientists, depicted in the press [ref removed], or perceived by the public as proving that life is reducible to or nothing more than DNA...**"[\[9\]](#)

Now, eleven years later, one of the authors of that same article responded to the Venter group's recent announcement by saying:

Venter and his colleagues have shown that the material world can be manipulated to produce what we recognize as life... Their achievement undermines a fundamental belief about the nature of life that is likely to prove as momentous to our view of ourselves and our place in the Universe as the discoveries of Galileo, Copernicus, Darwin, and Einstein.[\[10\]](#)

The author perpetuates the very assumption that the original ethics article cautions against! We should be careful to not assume so much. There is no reason to believe that the ultimate nature of life is locked away in our genes, and many reasons to believe that it is not. The Venter group did not create life; they studied and mimicked the structure of Someone else's creation.

Notes

1. Jonathan Wells, "Has Craig Venter Produced Artificial Life?" posted on May 24, 2010 on Discover Institute blog, *Evolution News & Views*, www.evolutionnews.org/2010/05/has_craig_venter_produced_arti035081.html.
2. Original research article published in Science Express online:
www.sciencemag.org/cgi/content/abstract/science.1190719
3. Steve Jones, geneticist, quoted by Jonathan Sarfati in "Was life really created in a test tube? And does it disprove biblical creation?" May 25, 2010, creation.com/synthetic-life-by-venter
4. Science Integrity, "Notes on 'Creation of a Bacterial Cell Controlled by a Chemically Synthesized Genome'," (link to cited article found here), scienceintegrity.net/SynthesizedGenome.aspx
5. The particular bacteria, *M. mycoides*, was selected because it has one of the simplest known genomes.
6. Quoted in Science vol 286, December 1999, p. 2087. Original quote from Anonymous, Sci Watch (September/October), 3 (1997).
7. Watson, James D., *DNA: The Secret of Life*, Random House, Inc. New York, 2003.
8. Richard Sternberg, "Current Research," www.richardsternberg.org/research.php. See also: www.biologicinstitute.org.
9. Science, vol. 286, December 1999, pg. 2087, emphasis added.
10. "Sizing up the 'synthetic cell'," online version of commentary in Nature, www.nature.com/news/2010/100520/full/news.2010.255.html.

How to Talk to Your Kids About Evolution and Creation – What Kids Should Know About Evolution

Sue and Dr. Ray Bohlin bring decades of Christian worldview thinking and a PhD in science to the important topic of communicating a balanced rational position to our children and teenagers on questions that they will encounter in our society.

This article is the transcript of a Probe radio program the Bohlins recorded. Sue's questions and comments are in italics, followed by Ray's answers.

Problems with Evolutionary Theory

Why is there a problem with evolution in the first place? Someone once asked you, "What should I believe?" Remember what you told them?

Basically I said you should only believe what there is evidence for. After spending years studying evolution in bachelor's, master's, and doctoral programs, I can tell you that, first of all, there **is** evidence for small changes in organisms as they adapt to small environmental fluctuations.

Second, there **is** evidence that new species do arise. We see new species of fruit flies, rodents, and even birds. But when the original species is a fruit fly, the new species is still a fruit fly. These processes do not tell us how we get horses and wasps and woodpeckers.

Third, in the fossil record, there are only a few transitions between major groups of organisms, like between reptiles and

birds, and these are controversial, even among evolutionists. If evolutionary theory is correct, the fossil record should be full of them.

Fourth, there are no real evolutionary answers for the origin of complex adaptations like the tongue of the woodpecker; or flight in birds, mammals, insects, and reptiles; or the swimming adaptations in fish, mammals, reptiles, and the marine invertebrates. These adaptations appear in the fossil record with no transitions. And fifth, there is no genetic mechanism for these large-scale evolutionary changes. The theory of evolution from amoeba to man is an extrapolation from very meager data.

So the problem with evolution is that it is a mechanistic theory without a mechanism, and there is no evidence for the big changes from amoeba to man.

The Evolution of the Horse

I have our son's eighth-grade biology textbook here. Every textbook, including this one, has a story about the evolution of the horse. It is always offered as proof of evolution. What do you say?

It does not prove much about evolution at all. David Raup, with the Field Museum of Natural History in Chicago, says:

“Well, we are now about 120 years after Darwin and the knowledge of the fossil record has been greatly expanded. We now have a quarter of a million fossil species but the situation hasn't changed much. The record of evolution is still surprisingly jerky and, ironically, we have even fewer examples of evolutionary transitions than we had in Darwin's time. By this I mean that some of the classic cases of darwinian change in the fossil record, such as the evolution of the horse in North America, have had to be discarded or modified as a result of more detailed information—what

appeared to be a nice simple progression when relatively few data were available now appear to be much more complex and much less gradualistic. So Darwin's problem has not been alleviated in the last 120 years and we still have a record which does show change but one that can hardly be looked upon as the most reasonable consequence of natural selection."[\[1\]](#)

There is no chronological sequence of horse-like fossils. The story of the gradual reduction from the four-toed horse of 60 million years ago to the one-toed horse of today has been called pure fiction. All that can be shown is the transition from a little horse to a big one. This is not significant evolutionary change, and it still took some 60 million years. It does not say anything about how the horse evolved from a shrew-like mammal.

Homologous and Vestigial Organs

Homologous organs: What are they?

Homologous organs are organs or structures from different organisms that have the same or similar function. Evolutionists say this similarity is due to common ancestry. The important question is, Do these organs look and function the same because of common ancestry or because of a simple common design? In other words, do they look this way because they are related to one another, or were they designed to perform a similar function? Homology is not a problem for creationists; we have a different but reasonable explanation. It is the result of common design, not common ancestry.

What about vestigial organs, the ones that are supposedly left over from the evolutionary past? I remember being taught that the coccyx, the tailbone, is left over from when we were monkeys. And the appendix, same thing—we needed it when we were evolving, but we do not need it now. Vestigial organs are unused leftovers from our evolutionary past. Since we do not

use them, they have diminished; they have become vestiges of their past function—according to evolutionary theory.

Yes, according to evolution. But we have discovered that these structures do have a function. The prime example is the one you mentioned, the tailbone. The coccyx serves as a point of attachment for several pelvic muscles. You would not be able to sit very well or comfortably without a tailbone.

The appendix was also long thought to be a vestigial organ, having absolutely no function within our bodies, but now we find it is involved in the immune system. It does have a function. It is true that you can live without it. However, as we learn more about the appendix, we realize that if it remains uninfected, it may be serving a very useful purpose.

So in other words, “vestigial organs” are not necessarily useless; we just may not have discovered what their role is.

Yes, very often we have called these things “vestigial” because we never bothered to investigate their function because of their reduced stature. Now we find that things like the coccyx and the appendix really do have a function. And if they have a function, then we cannot call them vestigial; they are not leftovers from our evolutionary past.

I am looking at pictures of embryos in this textbook that are very similar. The explanation given in the book is that they are similar because they have a common evolutionary ancestor. Obviously, this is being advanced as evidence of evolution. Is that what it is?

Definitely not. Embryological development does not follow the history of our evolutionary past. [That idea was proven wrong 50 or 60 years ago.](#) It is unfortunate that this error is still in the textbooks. Obviously, there are some similarities among species very early in embryological development; for instance, among mammals, reptiles, amphibians, and birds. That is because they all start from a single cell. As development

progresses, they become less similar. That is exactly what you would expect from an evolutionist or creationist perspective.

The Early Atmosphere of the Earth

You know, I was pretty happy with how this particular textbook treated evolution. It does not even use the word evolution, and it treats it strictly as a matter of theory, not fact. But you came across another, newer high-school textbook that is stridently pro-evolution. I am concerned about some things I see in this chapter on the origin of life. It is talking about the earth's early atmosphere, and this statement is in bold print (so the students know it's going to be on the test, don't you know!) <smile>

"The earth's first atmosphere most likely contained water vapor, carbon monoxide and carbon dioxide, nitrogen, hydrogen sulfide, and hydrogen cyanide."

Then in the very next section it talks about Stanley Miller's famous experiments in 1953. It says the atmosphere he was trying to recreate was made of ammonia, water, hydrogen, and methane. What is going on here?

This particular section is confusing at best and misleading at worst. Clearly they have described [Miller's classic experiment](#), but researchers today agree that the atmosphere used for that simulation did not exist. But yet Miller's experiment produced results. If you use the atmosphere that the textbook describes as the real one, the results are much less significant. The textbook gives the impression that chemical evolution is easy to simulate. But this is far from the truth. One experimenter says:

At present, all discussions on principles and theories in the field [meaning the origin of life] either end in stalemate or in a confession of ignorance. [{2}](#)

But you would definitely not get that impression from reading this section of the book.

Phylogenetic Trees

I have another question. Here is this beautiful, tidy chart that shows how neatly different animals evolved from one common ancestor. This evolutionary tree has a crocodile-like animal at the bottom, and all these branches coming out from him, and we end up with turtles and snakes and reptiles and birds and mammals all descended from this one animal. Are we talking science fantasy here, or is there a problem with this evolutionary tree?

Evolutionary trees, or phylogenetic trees, are regularly misrepresented in high-school textbooks. The nice solid lines give the impression that there is plenty of evidence, plenty of fossils to document these transitions—but the transitions are not there. If we were to look at this same type of diagram in a college textbook, all those connecting lines—the transitions—would be dotted lines, indicating that we do not have the evidence to prove that these organisms are related. The transition is an assumption. They assume these organisms are related to each other, but the evidence is lacking. Stephen Gould, a paleontologist and evolutionist from Harvard, says,

“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.”[\[3\]](#)

In other words, these charts make pretty pictures, but they're not pictures of reality.

That's correct.

Natural Selection and Speciation

In this same high-school biology text, I am looking at the chapter on evolution called "How Change Occurs." The big heading for this section is "Evolution by Natural Selection." Natural selection always seems to be linked inseparably to evolution. What is it?

Natural selection is a process where the organisms that are fit to survive and reproduce, do so at a greater rate than those that are less fit. It sounds circular, but it is a simple process, something you can easily observe in nature.

There are some pictures here of England's famous peppered moths. Why do they keep showing up in science textbooks?

They keep showing up because the [peppered moth](#) was the first documented example of Darwin's natural selection at work. There were two different color varieties of the same moth: a peppered variety and a dark black variety. The peppered variety was camouflaged on the bark of trees, but the black variety was conspicuous. As a result, the birds ate a lot of black moths. The most common variety, therefore, was the peppered variety. But then the bark of the trees turned dark or black because of pollution. Now the dark form was hidden, but the peppered variety stood out, so the birds ate up the peppered variety. The proportion of peppered moths to black moths shifted in response to the change in the environment.

So here was a change of frequency. At one time we had more peppered moths, and now we have more dark ones. A clear example of natural selection taking place. But the question is, Is this really evolution? I don't think so. It just shows variety within a form. This does not tell me anything as a biologist and a geneticist about how we have come to have horses and wasps and woodpeckers.

When we are looking at peppered moths, we are dealing with

natural selection within the same species. What about a whole new species; for example, Darwin's [Galapagos finches](#) off the coast of Ecuador. Isn't that an evidence of evolution?

Here is another area where we need to be careful. Speciation is indeed a real process, but speciation only means that two populations of a particular species can no longer interbreed. The two populations get separated by a geographical barrier such as a mountain range, and after a time they are no longer able to interbreed or to reproduce between themselves.

But all we have really done is split up the gene pool into two different, separate populations; if you want to call them different species, that's fine. But even Darwin's finches, although there are some changes in the shape and size of the bill, are clearly related to one another. *Drosophila* fruit flies on the Hawaiian Islands—there are over 300 species—probably originated from one initial species. But they look very much the same. The primary way to distinguish them is by their mating behavior.

There is a lot of variety within the organisms God created, and species can adapt to small changes in the environment. But there is [a limit to how far that change can go](#). And the examples we have, like peppered moths and Darwin's finches, show that very clearly.

Responding to Evolutionary Theory

You have given a creationist's response to evolution in textbooks, but apart from the books there is a personal issue to deal with. How do you think Christian students ought to react when they get to evolution in a science curriculum in school?

First, don't panic. This should not be a surprise; you knew it was going to come eventually. Second, understand that evolution is a very important idea in society today. It is

important to know about it and to understand it. Try to explain it to your kids in that way. You do not have to believe it or accept it, but you need to understand it, know what people mean when they talk about evolution.

What about answering a question on a test?

Here it can get a little sticky. You may feel that you have to lie in order to give the answer the teacher wants. But I do not think that is the case at all. What you are doing is simply addressing the issue of evolution; you are showing that you understand it. You do not have to phrase your answer in such a way that says, "I believe this is the way it is." It may come down to how you state your answer. But you are simply demonstrating your knowledge about evolution, not your acceptance of it.

It seems to me that when you show you understand the concept of evolution, you are demonstrating respect for the teacher and really for the theory too, as the prevalent theory of our day, without having to make a statement of, "Yes, I believe this!"

Sure. The concept of respect, I think, is extremely important, because you have to realize that as a middle-school or high-school student, you are dealing with teachers who have studied or taught evolutionary theory for many years. Their level of understanding is much deeper than yours. You cannot simply go in there and try to convince the class that the teacher is wrong, or that evolution is wrong; you need to play the role of a student. And the role of a student is to learn, to try to understand and comprehend the ideas being discussed. But you do not have to communicate in such a way that you appear to believe evolutionary theory.

I found this page in the textbook we have been looking at, right after the chapters on evolution. It is a message from the authors to the students. It says,

“Evolutionary theory unites all living things into one enormous family—from the tallest redwoods to the tiniest bacteria to each and every human on Earth. And, most importantly, the evolutionary history of life makes it clear that all living things—all of us—share a common destiny on this planet. If you remember nothing else from this course ten years from now, remember this, and your year will have been well spent.”{4}

I have never seen a message like this before, from the authors to the student. This textbook obviously has a very strong evolution bias.

Here we have to realize that what is being taught is not science anymore; this is a worldview. This is a statement of naturalism. Obviously, evolution is extremely important to the naturalistic worldview, and the authors are trying to communicate its significance. We are going to see [more and more of this bias in textbooks.](#)

Before Christian parents can talk to our kids about evolution, we first must have an understanding of evolution itself, as well as an understanding of the problems with it. We don't need to be afraid of this powerful theory; we do, however, need discernment, in sifting through the rhetoric and distinguishing it from the truth about God's world.

Genesis 1

Typically, if a child spends any time at all in Sunday school, he gets to the point where he realizes, “Hey, this doesn't relate at all to what I'm learning in school!” Our hope is that we can help parents integrate the truth of Scripture with what is known about origins in the world. As Christians, our starting point for thinking about origins is Genesis 1: “In the beginning God created the heavens and the earth.” From that point on, though, there are a lot of different

perspectives explaining the rest of the chapter.

That is true, and unfortunately it not only gets confusing for many of us, but it gets very confusing for many of the academics and the scholars as well. There are a number of different ways to interpret Genesis 1. Let me just run through [three of the most prominent views](#) among evangelicals today.

The first is the **literal** or the **very recent** creation account. Some people would call the proponents of this view “young earth creationists.” They believe that each of the six days of creation was a twenty-four hour period similar to our days today. These days were consecutive and in the recent past, probably ten to thirty thousand years ago. They hold that the flood was a world-wide and catastrophic event and that all the sedimentary layers were a result of Noah’s flood. All the fossils, therefore, are a result of the flood of Noah.

The second way of looking at Genesis 1 is the **Day Age Theory**, sometimes called **Progressive Creation**. Here, each of the six days of creation is a very long period of time, perhaps hundreds of millions of years. God would have created progressively through time, not all at once. The flood was a local event in Mesopotamia or perhaps even a world-wide, but tranquil flood. Therefore, the flood did not leave any great scars or sediments across the earth.

The third view understands Genesis 1 as a **Literary Framework**. This view suggests that Genesis 1 was not meant to communicate history. Peoples of the Ancient Near East used a similar literary device to describe a complete or perfect work; in this case, a perfect creation. God could have created using evolution or progressive creation; the point is that there is really no concordance between earth history and the days of Genesis 1.

We need to explain to our children the view that makes the most sense to us, but at the same time let them know that

there is some disagreement between evangelicals. You may even be confused yourself, and it is okay to communicate to your children that you do not know, either, and that not knowing is all right. We need to give direction but leave the doors open for other options.

Can we know which one is the correct interpretation?

Creation is a mystery. We need to show respect, not only for the mystery, but also for those people holding different views. Evangelicals with backgrounds in Hebrew and Greek differ on their understanding of Genesis 1. So how can we expect a ten-year-old to grasp the problem and make an actual decision?

When we explain the creation account in Genesis 1, we need to communicate to our children that different scholars, all committed to the Bible as God's Word, interpret Scripture differently. The important thing is that we stress that God created the earth, the universe, and every living thing, especially humans.

Early Human History

Now we are going to look at some specific issues that arise from Genesis in terms of early human history. Let's start with Adam and Eve. Were they real people?

This is a very important question, and I think it is one that most evangelical scholars can agree on. Adam and Eve were real people, and almost all evangelical scholars agree that they were created by God. The reason is that this is the one creation event where God gives us details as to how He went about it. When He created the other mammals and the sea creatures and the birds, He *made* them or He *created* them or He *formed* them, but we are given details about Adam and Eve's creation. We are told how God did it. Adam was formed from dust, and Eve was created from a rib taken out of Adam's side.

It is clear that humans do not have an evolutionary origin.

What about australopithecines, those supposed ape-like human ancestors?

Australopithecines most likely are simply extinct apes. Some quibble as to whether they walked upright and therefore may have been on their way to developing into human beings, but even if they did walk upright, that is not a real problem. They are still extinct apes, and they really had no human qualities whatsoever. There is a very good book that you may want to look at called *Bones of Contention*. There are a couple of books called *Bones of Contention*, but this is a recent one by Marvin Lubenow. Lubenow goes into great detail about the actual fossil finds—what they mean, where they fit—all from a creationist's perspective, and he does a very good job. He talks about the fact that human remains seem to span the whole era of supposed human evolution from four million years ago to the present, and that even the one particular type of fossil called *homo erectus* covers a very broad range. *Homo erectus* does not really fit where he is supposed to, and the fossils seem to contradict evolutionary theory rather than support it.

There is one more question that keeps coming up again and again. Where did Cain's wife come from?

In some ways it is surprising that this question seems to be so perplexing to people, but in another way I really understand it. Clearly, Cain married a sister. We react against that idea today because of the many laws we have today concerning incestuous relationships. We have laws against incest because the children that result from that type of relationship are often afflicted with a genetic disease. This is because all of us carry detrimental recessive genes within our chromosomes. Closely related family members may carry similar if not the same set of recessive genes. When we marry within the family, those recessives can pair up and result in a child who is genetically handicapped. But in the original

creation, there was no such problem. These were the originally created beings, there were no genetic mutations to worry about.

When it comes to human origins, the Bible gives no room for anything other than God's personal fashioning of Adam and Eve. It is the fact that God personally created mankind that gives us such intrinsic value.

Noah's Flood

The flood of Noah is extremely important because several New Testament teachings depend on it. The Lord Jesus told us that the time right before He returns will be just like it was in the days before the flood. Peter reminds us that God's judgment fell once on the earth and He has promised to do it again. If the first judgment was not real, what are we to think of the second one?

But all too often what comes to mind when we think of Noah's flood is the image of a cute little round boat with the heads of fluffy sheep and tall giraffes and friendly elephants sticking out of it. We think of it as a harmless bedtime story like Cinderella or Scuffy the Tugboat, a remnant of childhood Bible lessons and storybook times. Did the flood of Noah really happen?

We are talking about an historical event and one that is very serious. It is spoken of in Genesis in a historical narrative. But evangelicals do disagree as to just how it happened. There are basically three different views.

One is the universal catastrophic flood account, where the flood was a world-wide event. It did indeed cover all the high mountains at that time, and it was catastrophic—lots of tidal waves and breaking up of the fountains of the great deep.

The other view is that the flood was universal—it covered the whole earth—but it was a tranquil event and probably did not

leave any scars or sediments on the earth.

And the third view is that the flood was just in the Mesopotamian area. Since its intent was to destroy mankind, and mankind had not spread very far, the flood only had to cover the Mesopotamian area. Again, as with the creation account, we need to tell our kids what our conviction is. What do we think about it? And again, if you are not certain, if you are not sure about your view, go ahead and communicate your uncertainty as well. It is okay to be uncertain about some of these things; scholars do not really know everything about them, either. And we have to be ready to realize that the kids might not even like our particular interpretation, or they may have heard things in school, Sunday school, or church that may differ with our view. But it is okay to give our kids a little bit of room on these kinds of issues.

With all of these different interpretations of the flood, what can we feel safe telling our children? What is the point of the flood? What is the bottom line of this event?

The purpose of the flood of Noah was to destroy mankind as it existed at that time. Where scholars differ is just how far mankind had spread. Some suggest that the human population may only have been a couple hundred thousand, so they may have been contained in the Mesopotamian area. But if humans had been around for four or five thousand years, and they had a chance to multiply and grow, there may have been several millions or tens of millions of people spread across the earth. That may be why some suggest that, in order to destroy mankind, the flood had to be universal. But we still do not know whether the flood was a catastrophic or a tranquil event, and so there is some room for discussion. I think all these different theories are helpful because they allow us to investigate God's Word to the best of our ability and try to determine what it really means.

There is one view of the flood—the universal catastrophic

flood model—that has really captured the attention of much of the Christian community. Several organizations propose this model. In fact, you spent a couple of weeks in the [Grand Canyon](#) with one of these organizations investigating the flood model for the formation of the canyon. We want to address a few specifics about this catastrophic model of the flood of Noah. Would you give just a brief outline of this model?

This catastrophic model definitely suggests a very different scenario than the cute animals or the little round boat. We are talking about the breaking up of the fountains of the great deep and huge amounts of water rocking back and forth across the earth. The young earth creationists suggest that most of the sedimentary layers were formed during the flood. Most of the fossils that we find in those sedimentary layers, therefore, would have been laid down as a result of the flood of Noah. There should also be evidence around the earth of the catastrophic formation of all these sedimentary layers.

How close to the truth is this model? Does it explain everything?

There are a lot of things that it does explain. There is evidence for catastrophic origin for most, if not all, sedimentary layers. Organisms seem to require a very rapid burial in order for them to be formed as fossils. But there are problems with this model as well, and I think it is important that we recognize what those are. For instance, all the different types of sediment would have to be the result of just one event, a catastrophic flood. When we look at these sedimentary layers, we have sandstone, limestone, mudstone, shale—all different types of rocks—but they all would have had to come from the same event, and that is a bit of a problem. The majority of Christian geologists believe that the strata are due to other events like river floods, deposits from big storms or hurricanes that occurred periodically or, in some cases regarding the sandstones, even desert sand dunes. While the catastrophic model is a captivating idea, I do not see a

need to force ourselves to accept it or reject it at this time.

There is a lot of work to be done concerning this model. If you have a curious, science-oriented child, why not encourage him or her to pursue a career in science and become a part of the group that tries to investigate it?

Cavemen

Another question the kids are often curious about: Where do cavemen fit into the Bible?

Most creationists believe cavemen were the early survivors of the flood. Remember, if the purpose of the flood was to destroy mankind, then most of these fossils would be individuals who survived the flood or lived soon afterwards. Cro-Magnon man and Neanderthal man, and probably even fossils described as *homo erectus*, are all post-flood humans, descendants of Noah's three sons. The so-called primitive characteristics could be due to genetic in-breeding, faulty diets, and life in a harsh environment.

Racial Differences

Where do the different races come from? If we are all descended from one couple, Adam and Eve, why are there different colors of skin?

Races would have originated with Noah's three sons and their wives. Several sets of genes produce the wide variety of skin color present in the current population. It is not difficult at all to envision genetically-similar populations becoming isolated after the flood and being the progenitors of the different races. Much of this genetic variability may have been contained in Noah's sons' wives, arising from genetic segregation that took place since the creation of Adam and Eve. Adam and Eve were probably people of intermediate skin

color with most, if not all, of the genetic variability present in their genes.

Dinosaurs

We cannot talk about explaining creation to our kids without addressing the inevitable question of the dinosaurs. Where do dinosaurs fit into the Bible?

There is no question that kids today, particularly boys, are really enamored of dinosaurs. The answer depends on what your approach is.

If you are approaching creation from an old earth perspective, then the dinosaurs have been extinct for seventy or so million years and there is no reason to expect them to be mentioned in the Bible at all. Men and dinosaurs never existed together.

If, however, you are approaching creation from a young earth model, where everything was created in the fairly recent past, then dinosaurs must have existed at the same time as man because they were created on the same day, only ten to thirty thousand years ago. And that raises the question as to whether Noah took dinosaurs on the ark.

It is difficult to imagine a brontosaurus getting on the ark, and most creationists answer that by suggesting he probably did not take adult dinosaurs on the ark, just juveniles or small babies. The extinction of the dinosaurs then was probably due to the flood. Even if Noah did take some on the ark, apparently the climate and ecology of the earth had changed dramatically as the result of the flood and they were not able to survive following the flood.

But it also raises the very distinct possibility that some dinosaurs may still exist in small, isolated pockets around the world. I do not want to add too much credence to this, but there are very intriguing stories—and I just want to call them stories for right now, not fact—from the Congo of different

kinds of dinosaurs being reported by villagers and even some missionaries seeing very large reptile-like creatures out in the swamps. We have cave paintings from South America of dinosaur-like creatures. We have legends from all over the world about dragons, in China and the East and in Europe during the Middle Ages. We seem to have it in our heads that big reptiles are out there somewhere. It is a lot easier to think of them as being left-overs from the flood rather than having existed in small pockets for sixty or so million years since they became extinct in an evolutionary perspective. It is also feasible that dinosaurs could be mentioned in the Bible.

You mean under a different name?

Yes. For instance, Job 40 talks of a creature called "behemoth" in verses 15 to 24. He feeds on grass, he has strength in his loins,

What we have tried to do in this discussion is help parents understand the biblical accounts of creation in the early earth so that they can explain it to their children. Although we have presented a few options instead of absolutes, we can still tell our kids that God is the Creator and Sustainer of all things, and that the flood was a real event, although some of the details of how these things happened may escape us at this time. This approach allows us to communicate clear biblical truth while at the same time encouraging a child's curiosity and desire to investigate God's world. This is our Father's world, and it delights Him when His children want to discover it and search out the mysteries of the past, of history, of His story.

Notes

1. David Raup, "Conflicts Between Darwin and Palentology," *Field Museum of Natural History Bulletin*, vol. 30, no. 1 (1979): 25.

2. Kraus Dose, "The Origin of Life: More Questions Than Answers," *Interdisciplinary Science Review* 13 (1988): 348-56.
3. Stephen J. Gould, *The Panda's Thumb* (New York: Norton, 1980), 181.
4. Kenneth Miller and Joseph Levine, *Biology* (Englewood Cliffs, N.J.: Prentice-Hall, 1991), 335.

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See Also:

- [Pictures and Account of Ray and Sue Bohlin's Visit to the Galapagos Islands](#)
- [All the Probe articles on Origins](#)

Apologetics and the Age of the Universe

Appendix B: Apologetics and the Age of the Universe

Note: This is one of two appendices for Steve Cable's article [Are We Significant in This Vast Universe?](#)

Is the apparent age of the universe a critical issue for Christian apologetics? I would argue that when we make it a critical issue, we are likely to add another barrier to belief rather than tearing down barriers against belief in Jesus Christ as our Savior.

How should we look at the age of the universe in applying emerging scientific observations in defending our faith? In this appendix, we will take a brief look at this question.

The vast majority of theologians and researchers agree that the actions of the inorganic world are normally governed by a set of physical laws and forces: e.g. gravity, subatomic forces, magnetism, and light waves. By understanding these laws, we can predict both the future and past behavior of physical objects ranging from galaxies to our solar system to airplanes to golf balls. As Christians, we recognize that our Creator God can and does intervene at times to suspend or alter these laws in order to accomplish His purpose: e.g. Jesus walking on the water, healing of the sick. Thus, one of the ways to recognize the presence of our Creator is when we use our understanding of these laws to model backward from our present state and we come to a state in the past that is inconsistent with our current reality. In other words, it appears that some power must have intervened with the natural processes we currently observe because it would be practically impossible to get to our present state simply through natural processes.

Following this logic, there is a growing body of evidence from scientific observation consistent with the following two hypotheses:

1. Life as it exists on this earth is the result of the intentional work of an intelligent designer
2. Humans are significant to the designer of this universe

These two hypotheses are obviously consistent with the Bible. As apologists these hypotheses are very important because they support a biblical prerequisite for coming to God:

And without faith it is impossible to please Him, for he who comes to God must believe that He is and that He is a rewarder of those who seek Him (Heb 11:6).

According to this passage, in order to come to God, we must believe that a God exists and that He wants us to seek Him. In many cases, if we can debunk the popular notion that science

proves that there is no Creator God who cares about us, we can open the door to see what the Bible tells us about Jesus Christ, His death and resurrection.

The empirical evidence supporting these two hypotheses is strong whether the earth is 13.7 billion years old or 6,000 years old. However, some of the evidence for the significance of life on earth is based on looking at what it would take to get from an ancient creation event, e.g. big bang, to the current, observable universe. Should we ignore that evidence because it does not assume a young universe interpretation of Genesis 1? Or should we use this evidence to show that even the oldest estimated age for our universe still demands a transcendent Creator to account for life on this earth? I suggest that we don't have to make the age of the universe the central point in defending our faith against those who do not believe in our Creator God and who need to understand that God sacrificed His Son, Jesus to provide for their redemption from this decaying universe.

One of the areas where this tension between fixed physical laws and supernatural intervention applies is in scientific theories for the origin of the universe. The prevailing scientific view is that the universe is expanding at an increasing rate. Combining this view with what we know about the relevant natural forces implies that all the matter in the universe began expanding from a single point approximately 13.7 billion years ago. If we take as an axiom that the correct interpretation of general revelation through scientific observation and special revelation through the Bible must be consistent, there are three possible situations consonant with that axiom:

1. The scientific data is incomplete, corrupted, or misinterpreted. There are many instances where the current prevailing view of science has been shown by new evidence to be wrong, so this is a definite possibility.

2. The universe is indeed expanding, but it is much less than 13.7 billion years old because it was created at a point where it was already spread out to near its current volume. This is the apparent age argument, i.e., when God creates a living being such as Adam, Adam is going to appear to be physically mature even when he was only seconds old. There are issues with applying this apparent age concept to the age of the universe. For example, we can observe supernovae that are hundreds of thousands of light years away. If the earth is less than 10,000 years old, then we are observing the explosions of stars that never really existed. Why would God want to confuse us in this way? Perhaps because these “past” supernovae are consistent with what would have happened to create the current state of our universe.

3. The interpretation of Genesis 1 as defining the time from the beginning of the universe to the creation of Adam as literally 120 hours is not actually the intent of that passage. This interpretation issue is a continuing topic of debate among evangelical scholars who believe that the Bible is God’s inerrant special revelation.

I can appreciate those who consider finding out which of these three alternatives is correct to be an important life issue. But, it seems clear that selecting the right answer is not a prerequisite for salvation (e.g. see Romans 10:9-10). I encourage Christians to understand how the current state of scientific knowledge can be used as a bridge to share the gospel. For a more detailed discussion of contrasting Christian views on the origins of the universe, see the article [“Christian Views of Science and Earth History”](#) on our website.

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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,

[0]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.

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What Do We Make of the Stem Cell Debate? A Biblical Perspective

Heather Zieger looks at the stem cell debate from a biblical worldview perspective. This Christian perspective recognizes the true source of life and the difficulties with destroying many young lives for the hope of being able to save a few older lives.

What Are Stem Cells?

If science had a tabloid magazine, then stem cells would grace the cover. And much like the Hollywood celebrities, stem cells are at the center of controversy. How is a Christian to respond to conflicting reports and confusing science? In this article we will discuss the differences between adult and embryonic stem cells, look at some media myths, and evaluate the worldview issues behind the controversy.

First, let's define stem cells. Stem cells are cells that

serve as the body's carpenters and mechanics to other cells. Their name comes from the stem of a plant. Think of a rose. From the stem grow the leaves, the thorns, and the flower. The flower does not produce leaves, nor do the thorns produce a flower, but the stem produces all of these things. However, the stem of the rose is still part of the plant. In the same way, stem cells are themselves cells and they produce other cells.

Stem cells can be found throughout our body. Think about when you give blood. Your body will resupply the blood that you lost. It does this by using blood stem cells. When your body needs more blood, signals tell the blood stem cells to make red blood cells, white blood cells and plasma cells. Another example is our skin. We lose skin every day, but our body has very active skin stem cells that grow new layers. Keep skin stem cells in mind, because scientists have been able to do some amazing things with skin stem cells.

Blood and skin stem cells are examples of adult stem cells, which are different from another type of stem cell called embryonic stem cells. Embryonic stem cells are only found in the inner cell mass of a 5- to 8-day-old embryo. These cells end up making every cell in the human body and can divide indefinitely. They are believed to be much more versatile than adult stem cells. Because of this ability, scientists describe embryonic stem cells as *pluripotent*. Adult stem cells are programmed to only make certain types of cells (like our example of blood stem cells), and adult stem cells have a limited number of cell divisions. Because of this, they are described as *multipotent*.

As we look at some of the scientific research on stem cells, we will find that adult stem cells are more versatile than we once thought, and embryonic stem cells have limitations that scientists still need to overcome. [\[1\]](#)

Adult Stem Cells: The Underreported Medical Successes

One of the two main types of stem cells is adult stem cells. Adult stem cells are named for their abilities, not for their source. We find very helpful adult stem cells in umbilical cord blood and the placenta even though these sources are not from adults. One of the most studied adult stem cell sources is bone marrow. The first bone marrow transplant was performed in 1968. But it wasn't until 1988 that scientists identified the stem cells within bone marrow that caused the transplants to work.[{2}](#)

Bone marrow transplants demonstrate one of the biggest advantages of adult stem cells. Scientists did not know what a stem cell was, let alone how they worked, but the bone marrow transplants were still successful. The stem cells knew where to go in the body to repair the right tissues. This ability to automatically go to the location of repair is characteristic of all adult stem cells.

Bone marrow transplants also demonstrate one disadvantage to adult stem cell therapy. Just like an organ transplant, the stem cell donor must be an exact match to the patient. And the patient will need to take immuno-suppressant drugs for the rest of his life.

However, recent findings with umbilical cord blood have shown that the donor does not have to be an exact match when cord blood is used, meaning that a patient has a better chance of finding a donor. One of the first umbilical cord treatments was for sickle cell disease in a twelve-year-old boy.[{3}](#) He responded so well to treatment that a year later doctors declared him cured of sickle cell disease. He does have to take immune suppressant drugs, but does not display sickle cell symptoms.

One way around the donor problem is to use the patient's own

healthy stem cells to repair other damaged cells. Parents now have the choice to bank their child's umbilical cord blood in the event that the child may need it. This technique was successfully used to help a child with her cerebral palsy symptoms.[{4}](#) Other adult stem cell successes include rebuilding bone, alleviating some cancers and auto-immune diseases, relieving Parkinson's symptoms, and treatments for Type I diabetes.[{5}](#)

All of these therapies have happened in real people using stem cells that do not involve the destruction of an embryo, and would be perfectly ethical within a Christian worldview.

What is the Promise of Embryonic Stem Cells?

The second type of stem cell is embryonic stem cells. Embryonic stem cells come from the inner cell mass of a 5- to 8-day-old embryo. Embryos are formed after the egg and sperm have united, which initiates a directional process that, given proper conditions, can eventually form a baby. At the 5- to 8-day stage, there are only a few cells within the embryo, but these cells are capable of making all of the cells in the human body. To obtain these cells, scientists penetrate the outer protective layer of the embryo and remove the cells. This procedure destroys the embryo.

It is still only a theoretical possibility that human embryonic stem cells can cure diseases. There is one FDA approved human trial that was announced in January 2009 for patients with a recent spinal cord injury.[{6}](#) We will have to wait to find out the results of this treatment. In other parts of the world, people have sought embryonic stem cell therapy as a desperate measure. One man in China had embryonic stem cells injected into his brain to relieve his Parkinson's symptoms. Unfortunately, the cells spun out of control and continued to make new cells of varying cell types. They

eventually formed a large brain tumor consisting of different kinds of cells [a teratoma], such as skin cells, hair cells, and blood cells.[{7}](#) Another boy in Israel had a disease that attacked his spinal cord. His parents took him to Russia for several treatments with embryonic stem cells. Four years later, doctors found tumors in his spine that they confirmed came from the embryonic stem cell therapy.[{8}](#)

One of the most difficult hurdles for embryonic stem cell research is trying to program the stem cell to become the particular cell type that they need. The second hurdle is then telling the cell to stop multiplying before it forms a tumor. The signals and mechanisms for this are still being researched; however, one recent study involving the rebuilding of mouse muscles using embryonic stem cells shows some progress in this area.[{9}](#)

While embryonic stem cells may theoretically have promise, they have not shown this in reality. Time will tell if they actually deliver. However, the ethical issue from a Christian perspective is not whether this research has a practical use, but whether we want to go down the path of using the parts of one human being, deemed less worthy of life, for another.

Media Myths

Unfortunately, the stem cell debate has turned into a media poster child for the next big scientific miracle. And stem cells have been hot science topics in the political realm. What is striking in all of this are the misconceptions that are repeated in the media.

Let's go over three media myths in the stem cell debate.

The first myth is that President Bush restricted stem cell research. Actually, President Bush was the first president to specifically allow federal funding for embryonic stem cell research.[{10}](#) However, he did put limits on how far they can

take that funding. Furthermore, what is often omitted is that private companies have always been allowed to invest in embryonic stem cell research.

The second myth often repeated by the media is that embryonic stem cells have the potential to cure all types of diseases including spinal cord injuries,[{11}](#) Parkinson's and Alzheimer's. So far, the only successful stem cell treatments of spinal cord injuries or of Parkinson's symptoms[{12}](#) have been with adult stem cells.

I want to emphasize that *Alzheimer's will never be cured by stem cell therapy of any kind*. Alzheimer's causes the death of many types of brain tissues. Stem cells might be able to replace some dead tissue, but tissue death is a symptom, not the cause. Alzheimer's affects the whole brain so deeply and quickly that it really isn't an issue of replacing cells. Therefore, scientists must look to other areas for cures for Alzheimer's.[{13}](#) The perpetuation of the myth that stem cells will cure Alzheimer's is either a cruel misrepresentation in order to sell a story, or else demonstrates a complete lack of understanding on the subject.

The third misrepresentation is the blatant lack of media coverage for adult stem cells. There have been over 70 different diseases, disorders, or injuries that have been helped or cured with adult stem cells in human trials,[{14}](#) yet this has hardly been covered by the media. We have discussed the successes of bone marrow and umbilical cord blood, but where is the media coverage of the latest findings with skin stem cells?[{15}](#) Scientists have found ways to coax a patient's own skin stem cells into acting just like an embryonic stem cell. In other words, these cells have the potential to become almost any cell in the body and they are from the patient's skin. No use of embryos, no immuno-suppressant drugs, and the technique has been refined for patient safety.[{16}](#)

Why this bias? There is a worldview issue at the heart of the

matter.

Stem Cells from a Christian Worldview

We have looked at the differences between embryonic and adult stem cells. We have seen the double standard the media has in reporting these types. But the question remains, with all of the successes of adult stem cells, including the ability to create embryonic-like stem cells from the patient's own skin, why insist on continuing embryonic stem cell research? Why does the debate continue?

I believe a major part of the problem is the answer to the question, Who is in authority? There are two broad options: a God-centered authority or a man-centered authority. The man-centered authority in this case is called scientism. It is the idea that science will save us from our problems and tell what we need to know about life, including what is right and wrong.

Don't misunderstand me, I am trained as a scientist, and I think studying nature and pursuing scientific questions is important. But when we prioritize science as the only means of gaining knowledge and make it the guide for our lives and the decisions we make, we aren't studying the world around us, we have essentially invented a religion.

The other perspective is a God-centered authority. In this case all of nature, technology and our decisions are under God's authority. In other words, we determine what is right and wrong from the Bible because it is God's revealed word.

Scientists want to continue studying embryonic stem cells, because they want to explore all possibilities, and they see no reason why they shouldn't. From their worldview, they are in authority. There is no reason to put moral limitations on research. Many people latch onto this idea because they believe science will save them. They have faith in science. Some even believe this to the point of claiming stem cells

will cure diseases and ailments that no stem cell therapy could ever do.[{17}](#)

Some scientists argue that we need to study embryos to better understand how a disease can develop in the earliest cells. These studies have been done in animals, but scientists would prefer to use humans because there are several developmental differences between humans and other animals.[{18}](#)

As Christians, we believe scientific study and finding cures for diseases is a great endeavor. But just because we *can* do something, doesn't always mean we *should*. We know what we should do from God's word. He values the unborn, and values human beings as having inherent dignity because we are made in his image. We therefore cannot judge some humans less valuable than others, and we certainly cannot destroy them for research observations or for removal of their parts. From this perspective, adult stem cell research is ethical, but embryonic stem cell research is not.

Notes

1. An excellent documentary on the basics of stem cells and the controversy around embryonic and adult stem cells: *The Lines that Divide: The Great Stem Cell Debate*. Dir. Brian Godwana. The Center for Bioethics and Culture Network, 2009. See this link for a clip:

www.thecbc.org/redesigned/research_display.php?id=373.

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4. www.foxnews.com/story/0,2933,392061,00.html

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7. "Survival and proliferation of non neural tissues, with obstruction of cerebral ventricles in a Parkinsonian patient treated with fetal allografts." *Neurology*, Vol 46, Issue 5,

May 1, 1996.

8.

www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000029

9. "Functional skeletal muscle regeneration from differentiating embryonic stem cells." *Nature Medicine* 14, 134-143, 2008.

10. See Executive Order 13435; for an excellent article on the politics of stem cell research from a Christian worldview, see "Responsible Science & ESCR" by Greg Koukl in *Solid Ground* May/June 2009 (a publication of Stand to Reason).

11. www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1864811 (*Journal of Spinal Cord Medicine* 29, 191-203, July 2006).

12. www.lifenews.com/bio2751.html;

www.bio-medicine.org/medicine-technology-1/Groundbreaking-Paper-Publishes-Long-Term-Results-of-a-Successful-Phase-I-Clinical-Trial-Using-Autologous-Neural-Stem-Cells-to-Treat-Parkinsons-Disease-3848-1/;

www.bentham-open.org/pages/content.php?TOS CJ/2009/00000001/00000001/20TOS CJ.PDF

13. For an excellent overview of Alzheimer's, see the Alzheimer's association website at www.alz.org; for their statement on stem cell research see:

www.alz.org/national/documents/statements_stemcell.pdf.

14. "A 37-year-old-spinal-cord-injured female patient, transplanted of multipotent stem cells from hum UC blood, with improved sensory perception and mobility, both functionally and morphologically: a case study." *Cytherapy* 7, Issue 4, 368-373, 2005.

15. One person in the popular media who did mention skin stem cells was Dr. Mehmet Oz on the Oprah Winfrey Show:

www.youtube.com/watch?v=lDFJ0zu9SyM.

16. K. Takahashi, et al., *Cell* doi: 10.1016/j.cell.2007.11.019; 2007;

J. Yu, et al., *Science* doi:

10.1126/Science.1151526; 2007.

17. See Joseph Bottum and Ryan T. Anderson's article in *First Things* for an excellent reference on the history of stem cell

research:

www.firstthings.com/article.php?year=2008&month=10&title_link=001-stem-cells-a-political-history-27. Also see Anderson's

article in the *Weekly Standard* for reasons scientists still want to study embryonic stem cell research:

www.weeklystandard.com/Content/Public/Articles/000/000/016/258hdaij.asp?pg=1.

18. The scientists who conducted the research on skin stem cells that were coaxed into acting like embryonic stem cells did use knowledge from embryonic stem cell research to help identify the general markers for pluripotency. However, it is unclear that it is necessary to use human embryonic stem cells for this, because the markers for pluripotency were first identified in mouse embryonic stem cells.

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Darwin's Doubt

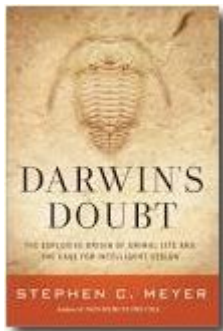
Dr. Ray Bohlin reviews Stephen Meyer's book Darwin's Doubt, showing that the sudden appearance of complex animal forms in the Cambrian cannot be explained by evolutionary mechanisms.

The Essence of the Cambrian Explosion



The fossil record of the Cambrian Period has been known as a problem for evolutionary theory since Darwin's *Origin of Species* in 1859. Darwin was aware of the sudden appearance of complex animal forms in the Cambrian from his own collecting

in northeastern Wales. Complex animal forms such as trilobites seemed to appear with geological suddenness with no apparent ancestors in older rocks below them.



In his 2013 book, *Darwin's Doubt: The Explosive Origin of Animal Life and the Case for Intelligent Design*^[1], Stephen Meyer quotes Darwin from the *Origin of Species*: “To the question of why we do not find rich fossiliferous [fossil-bearing] deposits belonging to these assumed earliest periods prior to the Cambrian system, I can give no satisfactory answer. . . . The case at present must remain inexplicable; and may truly be urged as a valid argument against the views here entertained.”^[2]

Meyer provides some of the historical context of this period and Darwin's disagreement with the eminent paleontologist of his day, Louis Agassiz of Harvard. Darwin's solution to his dilemma was to suggest that the fossil record is incomplete and that he fully expected that abundant fossils would be found to indicate the evolutionary origin of these Cambrian animals. However, in the intervening century and a half, the problem has not been resolved. If anything, as we have gained more knowledge of animal life and development and found numerous deposits of periods just prior to the Cambrian, the problem is worse than Darwin perceived.

Early in the 20th century, a rich Cambrian deposit was found in the Canadian Rockies, the Burgess Shale. Entirely new organisms were found exquisitely preserved, many with soft-body parts well preserved. Then in the mid-1980s, an even earlier Cambrian deposit was found in Chengjiang, China. This deposit revealed an even richer diversity of organisms than the Burgess Shale, and even finer soft-body preservation—even down to eyes, intestines, sensory organs and stomach contents.

Later work in different parts of the world had timed the Cambrian explosion to a roughly 5-10 million year time frame

around 530 million years ago [with the Cambrian period itself beginning 543 million years ago] in the evolutionary time frame. Though that's a very long time, even for evolution, it's practically instantaneous when discussing the origin of entirely new body plans. As Meyer faithfully recounts, Darwin's dream of an ever-increasing rise in complexity and diversity is shattered by the geologically abrupt appearance of both complexity and diversity.

What has been referred to as "Darwin's doubt" could be more aptly referred to as "Darwin's headache." In this article I will explore some of the additional problems this sudden explosion of animal body plans poses for evolution. While committed evolutionary materialists pretend to not be disturbed by these developments, those with open minds are questioning this long-held theory and giving new consideration to Intelligent Design.

Evolutionary Explanations of the Cambrian Explosion

Even Darwin recognized the Cambrian as a puzzle for his theory. Darwin hoped that further exploration of fossil-bearing strata would reveal the ancestors of the Cambrian animals.

In the early 20th century, Harvard paleontologist, Charles Walcott, found a new Cambrian deposit in the Canadian Rockies, the Burgess Shale. The Burgess Shale contained new creatures never seen before and was able to preserve some soft-body parts, also never seen before. This proposed an even greater problem than Darwin knew. Older deposits were still not revealing the ancestors of the Cambrian, but now there was even more diversity and novelty than anyone had imagined. The discovery of a predator, the up-to-meter-long *Anomalocaris*, demonstrated there was a well-defined ecosystem with plant producers, plant consumers and carnivores.

The origin of the Cambrian fauna seemed to turn Darwin's theory on its head. Darwin expected all animal life forms to be descended from a single common ancestor through a lengthy process of descent with ever-so-slight modification. But these Cambrian novelties appeared quite suddenly with no ancestors. That is not evolution as Darwin envisioned it. Walcott suggested two reasons for the disparity. First, he suggested that the immediate Pre-Cambrian deposits containing the Cambrian ancestors were to be found on the ocean floor. Subsequent off-shore drilling for oil provided a unique opportunity to test this hypothesis. But most of the sea floor is much younger than the Cambrian. If there were Pre-Cambrian deposits, they no longer exist.

Walcott also tended to be a "lumper" in taxonomic terms. That means he fit fossils into already existing categories whether they fit well or not. This appeared to minimize the explosive part of the Cambrian. But additional field excavations in the Burgess Shale, as well as in different parts of the world, revealed that many of these Cambrian creatures were unique and that their descendants are not known today—they are extinct. The novelty of Cambrian forms is more pronounced than ever.

The late Stephen J. Gould of Harvard famously described the uniqueness of these Cambrian creatures when he said; "Imagine an organism built of a hundred basic features, with twenty possible forms per feature. The grab bag contains a hundred compartments, with twenty different tokens in each. To make a new Burgess creature, the Great Token-Stringer takes one token at random from each compartment and strings them together. Voila, the creature works—and you have nearly as many successful experiments as a musical scale can build catchy tunes." [\[3\]](#)

Fossils have been found in sediments older or below the Cambrian but these fossils do not appear to be ancestors of the Cambrian creatures. They were also quite unique and most are now extinct. The mystery remains.

Libraries of New Genetic Information Needed: Pronto!

All Darwin had to examine were the unique animals found in Cambrian deposits. He knew nothing of genetics and the need for new genetic information.

Paleontologist James Valentine has gone so far as to say that probably all the living animal phyla had their beginning in the Cambrian period, over 500 million years ago. We do find multi-celled animal fossils 20-30 million years before the Cambrian, but only sponges seem to resemble anything we find in these deposits.

A phylum is an upper level of classification. For instance, all vertebrates are in the same phylum. Insects, crustaceans, and spiders are also in the same phylum. The phylum represents organisms with a distinct body plan though there may be many variations on that theme. In order to have all these new body plans or phyla appear in the Cambrian in a geological instant, you need a lot of new genes or genetic information. Different types of cells are needed. New genes are needed to grow new body plans out of a single-celled fertilized egg. With different cell types come different kinds of functions and cell types each needing specific gene products to give them their unique functions.

When protein sequence and gene sequence comparisons were begun in the late 70s, there was an expectation that comparing gene sequences would solve relational puzzles among living organisms but that by comparing genes from different phyla, it could be determined how phyla were related. The Cambrian fossils offer no such clues since most animal phyla appear at nearly the same time. But several decades of gene sequence comparison studies have revealed no consistent evolutionary scheme. As Meyer summarizes, "Many other studies have thrown their own widely varying numbers into the ring, placing the

common ancestor of animals anywhere between 100 million years and 1.5 billion years before the Cambrian explosion.”[\[4\]](#)

Meyer does a great job of articulating why there would need to be an information explosion along with the Cambrian explosion. Accounting for all this new information, in a relatively short period of time, by known processes is a herculean task. If evolution solely depends on a Darwinian model, then mutation and natural selection must be able to account for the explosive rise of new genes and regulatory gene networks during the Cambrian. Meyer spends several chapters working this through. Achieving the extreme specificity of proteins through the slow, plodding, processes of mutation and natural selection appears impossible.

In the next section I address an even greater difficulty of the Cambrian explosion. Darwinism has always needed a slow gradual accumulation of genetic change. However, with the relatively quick appearance of very different forms of animals in the Cambrian, is Darwinism up to the task?

The Exasperating Problem of New Body Plans

Darwin understood nothing about how animal body plans are laid out and built in the early embryo.

Since Darwin's time we have learned a great deal. And none of what we have learned offers any help in deciphering how all these new body plans originated in such a short geological time period in the early Cambrian. The overall structure and shape of an organism is laid out early in embryonic development. Particular genes necessary for development are tightly controlled in when and how they are expressed. These genetic regulatory programs operate only in early development and they limit the possibilities of the final form of the organism.

Biologists use a classification term, phylum, to refer to the largest category of animals and plants. Humans belong to the Phylum Chordata, which includes all the vertebrates. Insects are in the Phylum Arthropoda, which includes crustaceans and spiders. These two phyla possess very different body plans, and the genetic programs to build these plans are very different in the earliest stages, even in the first few divisions of the fertilized egg. The Cambrian demonstrates that these very different body plans arise in less than ten million years of time geologically. Is that possible? All Darwinism has to work with as the source of genetic variation, are mutations.

In 1977, French evolutionist Pierre Paul Grassé noted that mutations don't provide any real evolutionary change. Mutations only seem to provide only a slightly different variety of what already existed.[\[5\]](#) Twenty years later, a trio of developmental biologists noted that modern evolutionary theory explained well how the already fit survive and reproduce. But just how organisms came to be that way, the modern theory seemed silent.[\[6\]](#) Evolutionary biologist Wallace Arthur explained that modern textbooks told the same stories about how finch beaks and the color of moths changed to suit their environment, but nowhere was it discussed how the organism as a whole came to be so integrally functional.[\[7\]](#)

These problems have been further addressed in recent years but nothing seems to propose any clear answers as to how new body plans could have appeared in such a short span of evolutionary time.

Steve Meyer summarizes his review of these difficulties in the light of the Cambrian saying, "The Cambrian explosion itself illustrates a profound engineering problem the fossil data does not address—the problem of building a new form of animal life by gradually transforming one tightly integrated system of genetic components and their products into another."[\[8\]](#)

An Opportunity for Intelligent Design

I have documented how the sudden appearance of new forms in the Cambrian creates mysteries in terms of the fossils, genetics and developmental biology.

In chapter 18, Meyer turns his attention from the observation that modern evolutionary theories do not explain the sudden appearance of all the major animal groups in a short burst of geologic time, to what can explain the Cambrian Explosion. He carefully argues that Intelligent Design has all the causal power to bring about what is needed in the Cambrian.

Initially he summarizes the conclusions of two important evolutionary students of the Cambrian, Douglas Erwin and Eric Davidson. Together these scientists have listed a few of the observations any evolutionary cause must explain. First, whatever the cause of the Cambrian Explosion, it must be able to generate what is referred to as a top-down pattern. That is, the broad general categories of animals appear before there is any refinement in these characters. Second, the cause must be capable of generating new biological forms relatively rapidly. Third, this cause must be capable of constructing, not just modifying, complex genetic regulatory circuits.

They also note, as Meyer reports, that no existing theory of evolutionary change can accomplish any of these necessary events. [\[9\]](#) Davidson and Erwin are quite insistent that the processes operating in the early Cambrian were fundamentally different from anything operating in nature today. That's a tall order. But Meyer adds a few more prerequisites for a cause for the Cambrian Explosion. In addition to the need for rapid development of a top-down pattern, new body forms and creation of new genetic regulatory circuits, Meyer observes that this cause also needs to generate new digital information in the DNA and new structural information that cells use routinely. There also needs to be the development of new types of information that are

precisely coordinated to specify brand new body plans.[{10}](#)

A designing intelligence may be the only sufficient cause that can accomplish all of these events within any time frame, let alone the 5-10 million years of the Cambrian Explosion. Meyer concludes the chapter by writing, “The features of the Cambrian event point decisively in another direction—not to some as-yet-undiscovered materialistic process that merely mimics the powers of a designing mind, but instead to an actual intelligent cause.”[{11}](#)

Clearly when all the evidence is reviewed as Meyer does, the conclusion of Intelligent Design is nearly impossible to avoid. To ask how a designing intelligence did all this is to insist on a materialistic explanation for an immaterial cause. More is yet to be discovered, but if the pattern holds, Intelligent Design will become even more robust in the future.

Notes

1. Stephen C. Meyer, *Darwin's Doubt: The Explosive Origin of Animal Life and the Case for Intelligent Design* (New York: HarperCollins, 2013).
2. Charles Darwin, *The Origin of Species*, Chapter X (pp. 235, 252-254), quoted in *Darwin's Doubt*.
3. Stephen J. Gould, *Wonderful Life: The Burgess Shale and the Nature of History* (New York: W.W. Norton & Co., 1989), p. 217.
4. *Darwin's Doubt*, pp. 105-106.
5. Pierre-Paul Grassé, *Evolution of Living Organisms* (New York: Academic Press, 1977), p. 87.
6. S. Gilbert, J. Optiz, and R. Raff, “Review—Resynthesizing Evolutionary and Developmental Biology,” *Developmental Biology* 173 (1996): 361. “The Modern Synthesis (Neo-Darwinism) is a remarkable achievement. However, starting in the 1970's, many biologists began questioning its adequacy in explaining

evolution . . . Microevolution looks at adaptations that concern only the survival of the fittest, not the arrival of the fittest.”

7. Wallace Arthur, *Biased Embryos and Evolution*, (Cambridge: Cambridge University Press, 2004), p. 36. “Textbooks of evolutionary biology have for years trotted out the usual old stories about how birds’ beaks evolve to match their food items, or how moths’ colours evolve to match their background. But where are the equally detailed studies about the importance of one body part matching another.”

8. *Darwin’s Doubt*.

9. *Ibid.*, p. 355.

10. *Ibid.*, p. 358.

11. *Ibid.*, p. 381.

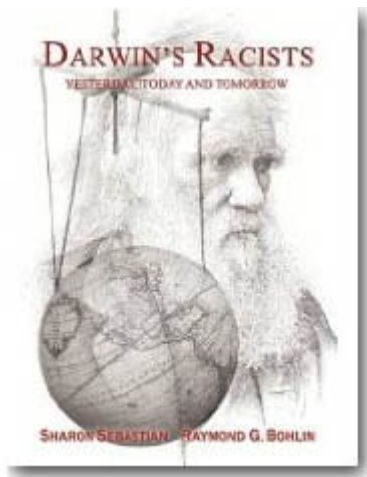
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Was Darwin a Racist?

In some circles to even ask this question and impugn Darwin’s integrity conjures up charges of secular blasphemy. After all, Darwin is well documented as holding views on slavery commensurate with the great William Wilberforce himself. Darwin was repulsed by any cruelty of humans on humans.

Darwin was by all accounts an affectionate husband, loving father, defender of the oppressed, and just an all round good and decent man. So how could one accuse him of racism? You simply need to read his second major work on evolution, *The Descent of Man*.

As Benjamin Wiker makes clear in his recent biographical book, *The Darwin Myth: The Life and Lies of Charles Darwin*, Darwin insisted that his theory of natural selection and evolution be understood as a purely natural and undirected process. Consequently, he could only see humans and apes as the result of a real struggle for survival. By all accounts, humans were winning. There was also a severe struggle going on between the races of man.



I recently coauthored a book with Sharon Sebastian entitled *Darwin's Racists: Yesterday, Today, and Tomorrow*. In chapter three we discuss Darwin's explanation of the differences between men and apes from *The Descent of Man*.

In Chapter 6, On the Affinities and Genealogy of Man, Darwin argues that he expected the civilized races of men to fully exterminate the savage races of men in just a few centuries. He also expected the anthropomorphous apes [Ed. note: those most like humans] (gorillas and chimpanzees) to become extinct. As a result, he believed that the gap between humans and animals would eventually be much greater than exists. Darwin postulated that this higher form of man would come from the current Caucasian race. In his book, Darwin states that the current gap between apes and humans is between the gorilla, on the ape side, and the Negro or Australian aborigine, on the human side:

The break will then be rendered wider, for it will intervene

between man in a more civilized state, as we may hope, than the Caucasian, and some ape as low as a baboon, instead of as present between the Negro or Australian and the gorilla.

Darwin's foremost German disciple, Ernst Haeckel, made even more dramatic statements. According to Haeckel, if you want to draw a sharp boundary between the human races and the apes, "you must draw it between the most highly developed civilized people on the one hand and the crudest primitive people on the other, and unite the latter with the apes." Elsewhere Haeckel identifies these cruder and primitive races as the Australian aborigines and the South African Bushmen, which he says, still live in herds, climb trees and eat fruit. According to Haeckel, certain more primitive groups of "people" are more ape than human.

Darwin certainly did not invent racism. Prejudice because someone is "other" than us has always been a part of human existence. What Darwin did provide was a scientific rationale that justified racial prejudice. Implicit in Darwin's struggle for existence is that some forms of a species would be more fit for the current environment than others. From Darwin's vantage point, the Caucasian or European race was well underway to surpassing the other "human" races because of their intelligence, culture, and superiority in war as demonstrated routinely in conflicts between Europeans and any other race or culture to that point.

Darwin's ideas were used to launch the first eugenics society in Britain headed by his cousin, Francis Galton. Darwin's son, Leonard, later served as President of the same society. Margaret Sanger drew her inspiration for what became Planned Parenthood from Darwin and saw a need to control the breeding of poorer and less fit humans.

If humans are a part of a naturalistic struggle for existence, then it logically follows that some tribes and races of humans will be more fit than others. And since with Darwin's help, we

now understand this struggle, why not help it along by slowing down the breeding of those less fit? Or, as Hitler rationalized, eliminate them altogether.

To be sure, Darwin himself would likely have been horrified by the excesses of the early 20th century eugenics societies and the national excesses of Nazi Germany, Stalinist Russia, Mao's Cultural Revolution and Pol Pot's regime of extermination. But they all thought they were simply aiding and abetting the process of natural selection.

You can order [a copy of the book](#) at the Probe Online Store.

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