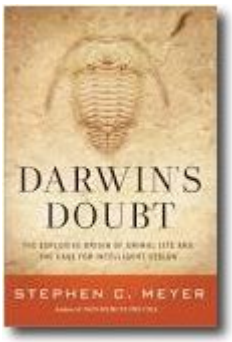
Darwin's Doubt

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.

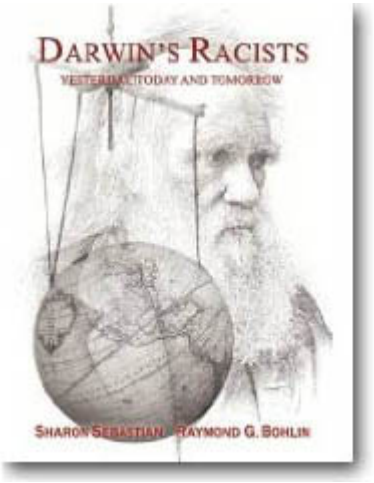
11. Ibid., p. 381.

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.

Animal/Human Hybrids

Editor's Note: The bulk of Heather Zeiger's study in bioethics has focused on the major issues addressed in American media, politics and science, such as stem cells, cloning and euthanasia, which is why she so anticipated this year's theme for the Center for Bioethics and Human Dignity Conference: Global Bioethics. The global context brought a broader perspective on the issues surrounding bioethics: India's medical tourism and black market organ donations, treating AIDS/HIV in Africa with limited resources, and euthanasia laws in Australia. One country that has been at the forefront of bioethics news is Great Britain because of their lenient legislation on issues concerning human dignity and "human exceptionalism" *(the idea that humans have a higher moral status than any other species). This is the first article emerging from her studies and experience at the Global Bioethics conference.*

Dr. Calum MacKellar of the Scottish Council on Human Bioethics, who has represented Scotland at the Council of Europe and UNESCO, discussed human/animal hybrids, which can be legally created for research purposes in Great Britain. This article reports the major points of Dr. MacKellar's lecture and unless otherwise noted, all facts and statistics are drawn from his extended report on the Scottish Council on Human Bioethics Web site (www.schb.org.uk).

What Are Hybrids? What Are the Possibilities?

True Hybrids are embryos formed when the gametes (egg and sperm) are from different species. For example a human/chimp hybrid would be formed from the combining of a human egg with a chimpanzee sperm, or vice versa. These true hybrids create a new entity or species. One familiar example brought about by breeding is a mule, which is produced from horse and donkey gametes. In nature animal/animal hybrids tend to be less fit than their parents. Experiments to combine human and animal gametes have not been successful.

Cybrids are formed when the nucleus of an egg from one species is removed and filled with the nuclear material of another species. This mimics the technology of cloning, except one is using nuclear material from one species and a cell from a different species. The term *cybrid* comes from the combination of "cytoplasmic hybrid" because the genetic material in this new embryo is 99.9% of the nuclear species and 0.01% of the species that donated the egg [Michael Cook, "Soft Cell: How Scientists Are Easing away Opposition to Animal-Human Hybrids" *Salvo,* Issue 4, Winter 2009]. Most genetic material is found in the nucleus, but a little bit is left in the cytoplasm of the egg. Scientists have been able to insert human genetics (a nucleus) into a cow's egg (an enucleated egg). The resulting embryo survived for twelve days. Other experiments have involved inserting human genetic material into a frog's egg and into a rabbit's egg. Neither of these survived beyond a week and never reached the blastocyst stage.

Chimeras (kī-'mir-uhz) are formed when the cells of one species are added to the embryo of another species. This results in an animal that has distinct parts from one species or the other. Think of the centaur in fantasy fiction. Fictional centaurs exhibit distinct parts that are human and distinct parts that are horse. This has actually been done in

the lab with a goat and sheep. The resulting animal did survive and had distinctive goat legs and a distinctive sheep head.

Transgenic embryos are created by adding a few genes from one species into the embryo of another species. However, only a few genes can be added before the embryo collapses, providing self-limitations for this technique. Scientists have inserted human genes into pigs to create human insulin for diabetes patients. Scientists have also attempted to replace damaged human heart valves with animal heart valves. This is using animal parts in a mechanistic sense, and is known as *xenotransplantation*.

Although the media and legislation discuss human/animal hybrids, they are really talking about human/animal cybrids. While there are examples of hybrids in nature, thus far all experiments with human/animal hybrids have proven unsuccessful, even using *in vitro* fertilization technology.

Is This Legal?

Very few countries have passed specific legislation pertaining to any kind of combination of human and non-human material. Most laws either single out humans or animals. However, several recent initiatives have been discussed:

• **Council of Europe: *Embryonic, Foetal and Post-natal Animal-Human Mixtures, Doc. 10716*** (October 11, 2005)—This document encourages the participating states to consider the ethical ramifications of creating human/animal hybrids, and also encourages the formation of a steering committee within the Council of Europe to address these ethical issues.

• **Canada: *Assisted Human Reproduction Act 2004*** —This act prohibits the creation of a chimera or a hybrid and prohibits the transfer of a chimera or hybrid into a human being or a non-human life form.

• **USA:** ***Draft Human Chimera Prohibition Act of 2005 (S.1373)*** —This draft, introduced by Senator Sam Brownback, would prohibit "any person to knowingly, in or otherwise affecting interstate commerce: (1) create or attempt to create a human chimera; (2) transfer or attempt to transfer a human embryo into a non-human womb; (3) transfer or attempt to transfer a non-human embryo into a human womb; or (4) transport or receive for any purpose a human chimera." In this case, some hybrids would fall under the category of chimera.

• **United Kingdom:** ***Human Fertilisation and Embryology Act (1990)***—This legislation states that the creation of human/animal entities would exist in a "legal vacuum" and hybrids could be formed if a proper license is obtained. The importance of this act is the fact that it makes it unclear whether the human/animal entities fall under human or animal legislation.

What Are the Consequences of Using This Technology?

Legal Consequences

There are several legal issues to consider, but probably the most troubling is whether the entity produced should fall under human or animal legislation. Several questions follow this, such as "What percentage of the being needs to be human to fall under human legislation? What if the human/animal entity began as 30% human and 70% animal, but the human cells grew faster and the entity ended up being 70% human and 30% animal?" Dr. MacKellar preferred erring on the side of caution and giving the entity the protection and dignity entitled to a human being, however this is only a protective declaration and does not solve the myriad legal issues surrounding the creation of this new entity.

Societal Consequences

The formation of an entity that is both animal and human raises questions of personhood and challenges our definition of humanness. These beings will inevitably be met with challenges that go beyond identification with a minority group. Would protections such as the Fourteenth Amendment apply to these creatures, and how human would they have to be for them to possess rights and privileges? Would society want to grant them rights and privileges? Would the military want to create a human/ape hybrid soldier in hopes that they would be bigger, stronger, and easier to feed? Given human history, the temptation to relegate these beings to a lower class would be inevitable.

There are risks associated with diseases that may cross the species barrier. As Dr. MacKellar pointed out, we have several examples of diseases crossing the species barrier including HIV, swine flu and bird flu. We also know that these diseases can sometimes be more harmful or even fatal to one species than they were to another. If an entity is part human and part animal, and a disease is very contagious among either type of animal it shares characteristics with, it will likely infect the hybrid. At this point, the disease may adapt to human DNA, posing a great health threat to all humans, not just hybrids.

Do Hybrids and Cybrids Have Souls?

I believe, from a biblical perspective, the creation of hybrids, cybrids, and chimeras is unethical. However, some instances of transgenic technology, namely *xenotransplantation*, may be ethical, especially since there are built-in biological limitations regarding how many genes can be inserted into another species.

Do these procedures violate the sanctity of human life? Several thoughts:

• Humans are created in God’s image (Gen 1:26);

• We were created separately (Gen 1:25, 26). We were created differently than the animals ("Let the earth bring forth living creatures…" Gen 1:24; "then the Lord God formed the man of dust from the ground and breathed into his nostrils the breath of life, and the man became a living creature" Gen 2:7);

• We humans were given dominion over the animals (Gen 1:29, 30). Therefore, these procedures do seem to violate the sanctity of human life as revealed in Scripture.

Are scientists attempting to bridge the gap in created kinds?

God directly created animals according to their kind, and it is implied in the flood account that He intended for them to reproduce according to their kind (Gen. 1:21; Gen. 8:17).

The Bible indicates that man has dignity and worth. If we try to create a being that might be less-than-human by combining it with animal cells or gametes, this would diminish such God-given qualities. It is from a naturalistic perspective that people believe animals are better than man because they seem to be stronger, faster, or heartier. This is not the Biblical perspective.

Do these procedures have something in common with bestiality?

One could argue that the creation of human/animal hybrids may constitute an instance of bestiality. Biblically, bestiality is a type of fornication with animals; it is a type of intimacy that perverts the real intimacy that God designed between a husband and wife. I find bestiality to be a particularly distasteful subject, and perhaps we get an indication of God's distaste for this since it is a sin that was punishable by death (Ex. 22:19; Lev. 18:23; Lev. 20:15, 16; Deut. 27:21). Procreation and consummation are not distinctly separate in the Bible. It is only through modern technology that procreation can occur in the laboratory apart from consummation. I think an argument could be made that

procreation with human and animal gametes is a connection with animals that man was not meant to experience.

But what about…?

This article is a short report on hybrids and variations on combining human and non-human species, but we have not even discussed the multiple questions that arise from this type of experiment, such as:

• Why are scientists doing this?

• What are the implications for common descent if human and animals can breed?

• How does this affect the definition of species?

Also, I did not really deal with whether hybrids have souls or not because we just don't know. Personally, I think it will be biologically impossible to create a true human/animal hybrid, but cybrids may be a possibility. I think that, much like clones, a cybrid that grows beyond the embryonic stage would be very unstable and unhealthy as well as incredibly expensive and inefficient to make. And much like clones, I can't answer if they would have a soul.

I am thankful for groups like the Scottish Council on Human Bioethics for addressing this topic in secular language within the public square, but with an underlying Biblical perspective. It is groups like this that enable us to interact in a well-informed way in our places of influence. Whether it is voting for legislation or simply talking with our friends at Starbucks, you don't have to work for the Council of Europe to champion the Biblical perspective within the public square.

You can find Dr. MacKeller's full report on the Scottish Council of Human Bioethics Web site: www.schb.org.uk.

The Effect of Origins on Society

Why Is the Subject of Origins Important?

Every worldview addresses the question, “Where did we come from?” The Christian worldview says that we are a special part of creation made in the image of God. A materialistic worldview says that we are the product of natural selection and random mutations acting on organisms. The Christian view of origins is called Creation; the materialistic view of origins is called Darwinism. The Christian worldview is based on faith in the creative work of God of the Bible. The materialistic worldview is based on faith in the creative power of natural selection acting on mutations.

There are evidences for and against these worldviews from scientific research being conducted in the areas of intelligent design, evolutionary biology, genetics, mathematics, astronomy, and many other fields. However, people will often confuse the worldview with the scientific evidence. Worldviews are a way of explaining the evidence. For example, we see that during a drought birds with longer beaks are selected over birds with shorter beaks. This is an observation. Saying that this is evidence for natural selection’s creative ability to make totally new types of creatures is an extrapolation based on a worldview. Just as there is a right and a wrong interpretation for observations, there are right and wrong worldviews. And one way to test for a worldview is whether or not it is livable.

So does your view of origins affect other areas of life than just science? Yes, these two views of origins have a profound

effect on how we value people and how we view personhood and personal responsibility. Using John West's book *Darwin Day in America* as a resource, we will look at how the materialistic worldview has trickled down into areas of society that affect us every day.

West argues in his book that the logical end materialistic worldview leaves nothing for an ethical standard other than to survive. The materialistic worldview says that non-living chemicals came together to make genetic material which then made an organism and that organism evolved until we got human beings. This view claims that man is made from chemicals and is no more valuable than any other animal. The logical end to this perspective is that everything a man does is a result of his genes and his environment. He therefore has no choices or free will of his own. His actions are the result of natural selection acting on him. This has important consequences for how we deal with crime, personhood, the embryo, the infirmed, and education.

West says, "Darwin helped spark an intellectual revolution that sought to apply materialism to nearly every area of human endeavor. This new, thoroughly 'scientific' materialism affected the entire span of culture, from economics and politics to education and the arts".{1} Darwin published *Origin of Species* one hundred fifty years ago, but it is in the mid-twentieth century that we begin to see how his theory has trickled down into society.

Crime and Responsibility

How does a materialistic worldview affect society? For one thing, a Darwinian view of man has changed our criminal justice system.

How are the courts and science related? In our culture, the scientists are the holders of truth and the courts are the

arbiters of law. And while the idea that law coincides with truth is good and even biblical, the idea that scientists, and only scientists, are the ones who dictate truth is a dangerous position. If the pervading worldview in science is materialism, then a materialistic view of man is reflected in the courts.

According to a materialistic worldview, man is the product of his genes and his environment with no real ability to act differently than what his genes and environment would have him do. If this is the case, then how can he be held responsible for his crimes? Why not just blame bad genes or a bad home life? Often this is what is argued in the courts.

West describes the crux of the problem. In order to provide protection and have an orderly society, the criminal justice system needs to punish wrong behavior. But from a materialistic worldview, there is no moral foundation for individual responsibility. A materialist perspective does not blame the individual but their genes or the way that they were raised (their environment). West outlines a history of criminals getting off in the name of very loose definitions of insanity, and other criminals undergoing treatment instead of punishment.{2} And the treatment, at times, amounts to something closer to coercion or torture.{3} Whether we are talking about being overly lenient by giving criminals excuses or coercing them to treatment, both diminish the value and dignity of the individual as a person.

The Christian view of man is that, although differences in our genetics or our environment may mean that we have different struggles or temptations than others, we are made in God's image. Therefore, just as God treats us with dignity by exacting punishment for our actions, so, too, do we treat people with inherent dignity by exacting punishment and allowing for atonement. The Darwinian view says that we are not responsible because we are a product of our genes, but it also says that we are not redeemable because we will remain

flawed.

Our entire criminal justice system is based on the idea that man can be held accountable for his crimes, that he has a choice in what he does. Furthermore, it is based on the inherent dignity that every individual has, so that a wrong done to one individual must result in the wrong-doer being punished. This maintains equal dignity and value in both individuals.{4} However, this system crumbles under a materialistic worldview.

So man is a product of his genes and his environment, a view which, taken to its logical end, has conflicting and dangerous results for exacting justice in society. Now we turn to how this view of man affects how we treat others that are different from us and how we define "normal."

Personhood

At the beginning of the twentieth century, during the rise of the scientific revolution, the idea of atonement for a guilty crime changed to an idea of fixing a broken machine. Criminals were treated as if they were machines with broken parts, instead of individuals with value and free will, because scientists had supposedly found a materialistic cause for crime. Something in their genetic code went wrong, so many were subjected to some kind of institutionalization or treatment. As John West points out in *Darwin Day in America,* the idea is if science can explain the problem, then science can fix it.{5} One way that scientists attempted to fix this problem was to try to breed out the bad traits. Scientists in the '30s, '40s and '50s reasoned that bad behavior, stupidity, and emotional instability were passed down from parent to child just like physical traits, and the only way to cleanse our society of these ailments was to sterilize those who carry these traits.

It began with criminals being sterilized; then it turned to those who were mentally handicapped; then those who were deemed less intelligent, poor, or unproductive in society were sterilized. In hindsight it is easy to see how this slippery slope happened. One group changes the standards by which we value other groups. No longer is the foundation in the Judeo-Christian concept that all individuals have inherent value, but in the Darwinian concept that some are less valuable than others and deemed less worthy of life than the more "fit" in society. This was the breeding ground for what would become the eugenics movement. [Editor's note: Eugenics is the idea that the human race can be improved by careful selection of those who mate and produce offspring. The word comes from the Greek word *eugenes*, "well-born, of good stock," from *eu*– "good" + *genos* "birth."]

We saw the logical end of the eugenics movement in Nazi Germany. Darwinism was not necessarily the cause for Nazi Germany, but eugenics was justified with a Darwinian view of man. This is an important picture of how one can promote one's worldview (and one's prejudices) in the name of science. Darwinism allows for race discrimination and even genocide. As West points out, "Historically speaking, the eugenics movement is important because it was one of the first—and most powerful—efforts to use science to expand the power of the state over social matters. Eugenists claimed that their superior scientific knowledge trumped the beliefs of nonscientists, and so they should be allowed to design a truly scientific welfare policy."{6}

Today this attitude is still seen when doctors, lawyers, and family members evaluate individuals based on their physical abilities and their cost to society. Oftentimes individuals are assessed based on their perceived "quality of life." Unfortunately, this usually reflects what the doctor, lawyer, or family member would hate to have happen to themselves than the actual desires of the individual in question. Judging

others unworthy of life based on physical features or capabilities ignores the inherent value and dignity God has given man as being made in His image.

The Beginning and End of Life

We have looked at how a society that promotes a materialistic worldview results in a degraded view of personhood. This degraded view includes basing a person's value on how well they physically function and how much they cost society. However, from a Christian view, humans were created with a purpose and in the image of God. They have inherent value beyond their physical bodies.

How does a Darwinian view of man's origin affect the way we look at the most vulnerable in society—the embryo and the aged or infirmed?

West traces a historical record of the legalization of abortion and demonstrates why we have the debate about embryonic stem cell research today.{7} Darwinism is not the cause of the legalization of abortion and destruction of embryos, but it provided an ideology that allowed people to justify it. It began with a scientist named Haeckel who influenced Darwin. Haeckel discussed how all embryos go through stages of development and how the earliest stages look very similar to each other. In his famous drawings, he shows how a human embryo goes from a small fish-like creature that looks similar to other animal embryos, to a human-looking embryo. He said that the fetus goes through a mini version of evolutionary development.{8}

What conclusions were drawn from this? If the fetus is no more than a fish, then it is as ethical to discard it as it would be to discard a fish. The only problem with this idea is that it is now well-documented that Haeckel's drawings were faked, and the similarities were more contrived than real. Despite

this finding, people still latched on to the concept and refused to accept that the fetus does not go through evolutionary stages. It is from this concept that many justify early stage abortion and embryonic stem cell research; the clump of cells or the mass does not look human.{9} This is an example of basing a person's value on their physical appearance and function.

Today we not only see this idea played out in the unborn, but also in the elderly and the infirmed. Many family members and doctors elect to end someone's life because they have deemed them less valuable. Again, the basis of this is on how well they physically function. One group is putting value on another group.

Both of these examples demonstrate how our culture has bought into a materialistic worldview which devalues the person that does not have certain physical characteristics. As Christians we value human life and believe that the embryo, the aged, and the infirmed have inherent dignity despite how they might function or appear.

Education

We have been looking at how a Darwinian view of man led to a slow and steady dehumanization of man. Our view of origins affects other areas of life as well. In this section, we will address how a Darwinian view of man has influenced how we educate our children. A Darwinian view says that there is no absolute authority; there is merely survival of the fittest. In academics that means teaching based on what works, not on what is right.

One of the biggest influences on our educational system, both in public and private schools, has been John Dewey. As Nancy Pearcey points out in her book *Total Truth*, Dewey thought education should be like biological evolution where students

construct their own answers based on what works best. Pearcey calls this "a kind of mental adaptation to the environment."{10} It is easy to see how this leads to moral relativism. Students are not taught character or values. Instead, they learn that an idea or a concept is deemed valuable if it works, not if it is right. Teachers are taught in certification classes to guide students along and help them to come up with their own moral code. Teachers are not allowed to punish students for wrongdoing, because they have no moral basis to do so, but are still expected to have an orderly classroom. In some cases teachers are not permitted to give a failing grade to a student who is genuinely failing. Also they are not permitted to give A's to good students for fear that they may not continue putting forth effort. Students are stripped of the concept of an objective standard or absolute morals, and by the time they are high school seniors, they are more educated in how to play the system than in reading, writing, or arithmetic. This is the very fruit of Dewey's pragmatism, and it continues through the university level. When students are stripped of any set of beliefs and a moral foundation, they are left empty and ready to be filled with the pervading worldview of academia. What we end up with is a fully indoctrinated student with a materialistic worldview.{11}

Contemporary materialism's view of origins, known as Darwinism, has profound effects on our society. As Christians we need to be a light unto the world by showing that human beings are more than their genes and environment, that they have inherent value, and that there are moral foundations beyond survival of the fittest.

Notes

1. John West, *Darwin Day in America* (Wilmington, DE: ISI Books, 2007), 41-42.
2. Ibid., 73.
3. Ibid., 79-101

4. For a good article on capital punishment and human dignity see Kerby Anderson, "Capital Punishment," Probe, 1992, www.probe.org/capital-punishment/.
5. West, *Darwin Day*, 80.
6. Ibid., 162.
7 . Ibid., 325-335.
8. See Jonathan Wells, *Icons of Evolution* (Washington, DC: Regency Publishing, 2000), chap. 5.
9. Ibid., 330.
10. Nancy Pearcey, *Total Truth* (Wheaton, IL: Crossway Books, 2005), 239.
11. See Don Closson, "Humanist Psychology and Education" Probe, 1991, www.probe.org/humanistic-psychology-and-education/; Closson, "Grading America's Schools," Probe, 2002, www.probe.org/grading-americas-schools/; and Kerby Anderson, "Cultural Relativism," Probe, 2004, www.probe.org/cultural-relativism/.

Is "Ida" a Missing Link?

On Tuesday, May 19, 2009, the very complete fossil of a small lemur-like animal, nicknamed Ida, was unveiled at the New York's American Museum of Natural History. The unveiling was accompanied by press releases touting a special to air on the History Channel on May 25th. Newspaper reports included headlines like, "Is 47 million year old fossil a missing link?" The History channel went even further in its hype:

> ***Scientists have discovered the oldest and most complete fossil of a human ancestor.***

> *An incredible 95 percent complete fossil of a 47-million-year-old human ancestor has been discovered and, after two years of secret study, an international team of scientists has revealed it to the world. The fossil's remarkable state of preservation allows an unprecedented glimpse into early human evolution. Discovered in Messel Pit, Germany, it represents the moment before anthropoid primates—the group that would later evolve into humans, apes and monkeys—began to split from lemurs and other prosimian primates. This groundbreaking discovery fills in a critical gap in human and primate evolution.{1}*

However, as is often the case, the facts behind the headlines and the advertising do not support all of the hyperbole. As reported in an AP story,

> *Experts not connected with the discovery said the finding was remarkably complete because of features like stomach contents. But they questioned the conclusions of Hurum (Jorn Hurum, of the University of Oslo Natural History Museum) and his colleagues about how closely it is related to ancestors of monkeys and humans.*
>
> *"I actually don't think it's terribly close to the common ancestral line of monkeys, apes and people," said K. Christopher Beard of the Carnegie Museum of Natural History in Pittsburgh.{2}*

So let's review the facts behind the hype based on the journal article written by the scientists who studied the fossil.{3}

In the late 1970's and early 1980's an area of Messel, Germany was being mined for oil shale. In the process of mining, workers uncovered fossils that were relatively well-preserved within this sediment. In 1983, a private group uncovered the lemur-like fossil that has now been classified as *Darwinius masillae*. *Darwinius massillae*, or Ida, was split into two

plates, one of which ended up in Wyoming and another was purchased by Hurum at the Oslo Natural History Museum in 2007. With access to both plates, a group of paleontologists used advanced techniques to analyze this specimen. The results showed very detailed features including food in her stomach and an outline of her soft-body form, including her fur.

This is truly a remarkable find because so much of the fossil is intact and many details are preserved. Furthermore, this provides an opportunity to study a fossil that paleontologists date at 47 million years old. The final conclusion of the journal article is, "*Darwinius masillae* is important in being exceptionally well preserved and providing a much more complete understanding of the paleobiology of an Eocene primate than was available in the past." They also indicate that she is important for classification purposes because there are so few fossils from this particular era and location. They hope that she will allow other paleontologists to have specific features to aid in classifying other fossils.

This is the extent to which the journal article discusses the significance of Ida. However, the authors and the media are painting a far different picture. The claims that Ida is the "missing link" in human evolution, or a "Rosetta stone" for understanding early branches in the human evolutionary tree, or the "eighth wonder of the world," are not reported in the peer-reviewed scientific journal. However, the authors of this journal are now marketing their find as such. In addition to The History Channel documentary, they have a book that will be coming out soon.

Whether it is "the bones of Jesus," global warming, or the latest "missing link" fossil fad, we recommend much discernment and discretion when reading about something that makes such grandiose claims as changing the world or solving some ancient mystery. This is plain old sensationalism and marketing to get famous and make money. This is an excellent fossil find that any paleontologist would love to study, but

this is not “proof” of evolution. Evolutionists have been engaging in a marketing blitz this year honoring Darwin’s 200th birthday and the 150th anniversary of the publication of *Origin of Species*. This fossil has been studied for two years. Just looking at the documentary, the book schedule, and the name, it is no coincidence that it came out this year at this time. The authors of the paper seem to be banking off of the Darwin hype.{4}

For a great article on why Ida is not the missing link, go to Access Research Network’s article “Ida: The Holy Grail of Missing Links?”.

Another interesting article with excellent points by Jonathan Wells can be found at *World Net Daily*’s article “Media Blitz; ‘We found missing link’”.

Slate has an article that discusses the media’s overuse of the term “missing link”: “How Many Times Will Paleontologists Find the ‘Missing Link’?”.

For a broader discussion of the relationship between fossils and the debate between Darwinian and creation-based models for the origins of life check out our section on “Origins” under the “Faith and Science” section of our website at www.probe.org .

Notes

1. www.history.com/content/the-link/about-the-link/the-link
2. Malcolm Ritter, The Associated Press, May 20, 2009.
3. For the entire journal article: www.plosone.org/article/info:doi/10.1371/journal.pone.0005723
4. online.wsj.com/article/SB124235632936122739.html; www.sciencedaily.com/releases/2009/05/090519104643.htm; www.guardian.co.uk/science/2009/may/19/ida-fossil-missing-link/print

Dr. Ray Bohlin Engages in Embryonic Stem Cell Debate

Dr. Ray Bohlin was recently (3/11/09) a guest on a radio talk show concerning President Obama's Executive Order expanding federal funding for embryonic stem cell research. This was on station KPFT in Houston, a "Progressive" (liberal) radio station. The other guest was Dr. P.Z. Myers, in his own words "a godless liberal," a biologist at the University of Minnesota at Morris. He hosts what is called the most popular science blog in the nation, Pharyngula. The host of the program, Geoff Berg, could probably also be described in the same way. The hour-long show is archived here. You might be interested to listen to Dr. Bohlin explain his viewpoint in a sometimes hostile environment.

Articles you may find helpful:

Human Embryonic Stem Cells Go to Human Trials [Heather Zeiger]

The Continuing Controversy over Stem Cells [Dr. Ray Bohlin]

Stem Cell Wars [Kerby Anderson Commentary]

Stem Cells and the Controversy Over Therapeutic Cloning [Dr. Ray Bohlin]

Stem Cell Commentary [Dr. Ray Bohlin]

Cloning and Genetics: The Brave New World Closes In [Dr. Ray Bohlin]

Darwin Day

February 12, 2009 is being promoted internationally as Darwin Day. Aside from being Abraham Lincoln's 200th birthday it is also Charles Darwin's 200th birthday. It's not too difficult a guess to say that the emphasis on Darwin is due in large part to the continuing success of groups around the world arguing that Darwinism is not all that it has been made out to be.

In America 40% of the general public still does not accept that a purely naturalistic process is responsible for all we see in the living world. This drives the community of evolutionary biologists and all humanist and atheist groups positively bonkers. They all but blame the decreasing enrollments in science programs in this country on this continuing reticence to accept Darwin.

Some see the need, therefore, to increase education on all things Darwin on the occasion of Darwin's anniversary and all the contributions of the man and the idea. We will hear how Darwin revolutionized biology. The often repeated quote of Theodosius Dobzhansky, a mid-20th century evolutionist, that "nothing in biology makes sense except in the light of evolution," will be repeated ad nauseum.

There is no doubt that Darwin made impressive contributions about the ubiquitous nature of small scale changes in biological populations over time. Not all things Darwin are to be considered suspect. But separating the good from the bad can be a daunting challenge at times.

The recent documentary film, *Expelled: No Intelligence Allowed*, received howls of protest at the accusation that Darwinism made a contribution to the Nazis' eugenics program and ideas of racial purity. Never mind that these connections

have been considered historical facts for decades. Richard Weikart's excellent book, *From Darwin to Hitler: Evolutionary Ethics, Eugenics, and Racism*, makes the case in great detail from the German literature of the early decades of the twentieth century. But casting aspersions on Darwin in a very public setting just isn't tolerated. People might get the wrong idea, you see, that Darwin is anything less than THE saint of modern biology.

You should also pay no attention to the fact that when the great Supreme Court Justice, Oliver Wendell Holmes, finished his soldiering in the Civil War, he became a convinced Darwinist after all the suffering he witnessed and participated in. This led to his rethinking about law in general. He soon realized that since all things biological change over time, so should the law that we govern ourselves by. Holmes was the original activist judge, making law instead of interpreting law. He firmly believed that law was a product of evolving cultures and traditions.{1}

The innovator in moral philosophy of education John Dewey was decidedly Darwinian. The originator of the still popular Values Clarification moral approach believed that moral values evolve just like biological features, and students must be free therefore to arrive at their own values. We simply can't know if our values are better or preferable than another's. When given a choice, most parents prefer their children be taught a clear system of right and wrong but most teachers prefer to teach a values clarification approach.{2}

If we're going to be bombarded with Darwiniana this month and for the rest of the year (since 2009 is also the 150th anniversary of the publication of Darwin's *On the Origin of Species*) let's appeal for some balance. Since even Abraham Lincoln is being reevaluated as perhaps not the great President many have idolized him to be, why not Darwin?

Check out Probe's numerous articles on the various problems

with Darwinian practice and thinking. Also stop by the Discovery Institute's website at www.discovery.org/csc to keep up with the latest news through articles, podcasts, and news briefs.

Let's teach more Darwin for sure. But let's try to tell the whole story and not just the laundered propaganda of the evolutionary elite.

Notes

1. Nancy Pearcey, *Total Truth* (Wheaton, IL: Crossway Books, 2004), p. 228-229, 237.
2. Ibid., 238-242.

The Texas State Board of Education and Public School Content

The Facts

The Texas State Board of Education is a group of fifteen individuals, representing various districts in Texas. One of their roles is to decide on standardized, statewide guidelines on public school contents for grades K-12. These guidelines are delineated in the Texas Essential Knowledge and Skills (TEKS), which dictate the content for every subject for every grade level that students must master in order to graduate from a Texas accredited public school. Importantly, these guidelines also dictate what textbooks are approved for classrooms and selection criteria for universities. While

these guidelines are not enforceable in the private school setting, private schools that are college preparatory must consider these guidelines in determining student advancement and subsequent collegiate eligibility.

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

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

The Contentious Issues

Those are the facts of the issue as best as we can describe them. However, these changes have created more than a little uproar from various groups that have a vested interest in how evolution is taught. The lines divided as such: advocates of the unquestioned teaching of evolution in public schools who were in favor of the new wording, and advocates of questioning certain aspects of evolutionary theory who were in favor of keeping the wording "strengths and weaknesses" within the TEKS. Many people that were for the new wording said that there were no weaknesses to evolutionary theory, or accused the other side of using this language of "weaknesses" to

somehow smuggle creationism into the classroom. Many people who wanted to keep the strengths and weakness language intact accused the other side of censorship and subversively teaching an ideology and abridging academic freedom.

The Texas State Board of Education hosted a public hearing on Wednesday, January 21 (2009), where they welcomed testimony from individuals. The hearing would close at 12:40 p.m., no matter how many testifiers were left on the schedule. With a list of nearly a hundred, the Board only got through thirty testifiers. Some provision was made for trading up and testifying earlier, and the Board members invited select individuals to testify at the public hearing. However the majority of people there to be heard, including me (spot thirty-nine), and my husband (a science teacher who has taught both in public high school and private middle school and was spot sixty-three) went unheard. While each testifier had a three-minute time limit, an obviously divided Board asked several questions, either for clarification or to be on public record for having asked.

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

Testimonies

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

For the Proposed Wording and Against "Strengths and Weaknesses" Wording

- *The old wording does not provide guidance to teachers,*

especially new teachers.

• Students are not necessarily capable of analyzing evolutionary theory, or are not necessarily capable of evaluating the current research.

• Academic freedom refers to the university level, and students do not have the same freedoms of speech as adults.

• The current draft has more specific wording.

• There is a possibility of litigation as has happened in other states.

• Students could fall behind if they are taught supposed weaknesses in evolutionary biology.

• "Strengths and Weaknesses" wording would block the publication and adoption of good textbooks. In fact, it could result in the adoption of subversive Creationist books designed to exploit this flaw in educational guidelines.

• These weaknesses are pseudoscience, or these weaknesses are from sources that engage ifn pseudoscience (no satisfactory definition of pseudoscience was given).

• The word "weaknesses" has changed in meaning due to the use of it for P.R. by certain Creationist groups, and therefore should not be included in the TEKS.

• Warning that people may doubt the integrity of Texas education if strengths and weaknesses are allowed.

• "Strengths and weaknesses" is inaccurate because there are no weaknesses. These supposed weaknesses are false and misleading information. Teaching weaknesses is likened to teaching that Grant surrendered to Lee.

• It's better to get your information from the National Academy of Sciences than from "creationist" sources [quotes

are mine].

• The peer review literature does not argue whether evolution happened, it is just researching how it happened. Whether it happened is not in question.

Against Proposed Wording and For "Strengths and Weaknesses" Wording:

• Even within the "strengths and weaknesses" wording, there has been silencing of students, and some teachers are intimidated to even broach the subject. Examples were cited by two of the testifiers.

• Cases of scientific hoaxes were cited by several people, including Piltdown Man and Haeckel's Embryos. These are significant because many evolutionists will not admit these were hoaxes/errors. While they could be examples of how theories grow and change (something they agree is part of science and should apply to evolution), they instead go unaddressed and worry those who respect true scientific research and achievement.

• No one area of science has answers to everything, so there are always weaknesses in theories.

• There has been no litigation in the last twenty years with the wording "strengths and weaknesses" and to say that this encourages pseudoscience, brings up the question as to whether Texas has been engaging in pseudoscience for the last twenty years.

• Standards should promote academic diversity and critical thinking. Some of the great minds in science were non-conformists.

• Children begin thinking abstractly at young adolescence, and their abstract and cognitive abilities continue to develop through high school. This stresses the importance of

including critical thinking skills in the TEKS. Teaching strengths and not weaknesses does not promote abstract thinking.

• Teaching strengths and weaknesses is more honest.

• Examples were cited of students who did learn strengths and weaknesses and it worked well.

• Real science deals with strengths and weaknesses of a theory; why should evolution be held to a different standard?

• We should not proclaim high school students too dumb to understand (my note: two of the testimonies were given by high school seniors).

• "Evolution" is a tricky term because when someone says "evolution" they may mean three different things, one of which is a fact and two of which are conjecture: 1) Microevolution (fact), 2) Common Descent (theory), 3) Natural Selection acting on mutations is how things evolve (theory). Student should distinguish this.

• Scientific consensus is only one part of science, the conclusion part. Students need to also know the scientific process.

• There is a difference between scientific law, theory and hypothesis.

• All theories are refined in the scientific process. Evolution does not have testable postulates. (This testimony was cut off due to time, but he was going to distinguish between origins and operations science).

Assessment

My husband David is a science teacher who has taught high school science in public school and now teaches middle school

science in a private, college-preparatory school. I have two degrees in science and am a research associate at Probe Ministries. Here is our assessment of the TEKS:

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

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

> *A. Identify how evidence for common ancestry among groups is provided by the fossil record, biogeography, and homologies including anatomical, molecular, and developmental;*
>
> *B. Recognize that natural selection produces change in populations, not individuals;*
>
> *C. Describe the elements of natural selection including inherited variation, the potential of a population to produce more offspring that can survive, and a finite supply of*

environmental resources resulting in differential reproductive success;

D. Recognize the relationship of natural selection to adaptation, and to the development of diversity in and among species; and

E. Recognize the effects of other evolutionary mechanisms including genetic drift, gene flow, mutation, and recombination.{3}

The action verb at the beginning of each of these points is important because each verb is intentionally chosen, and from an educator's perspective has a technical meaning. According to Bloom's taxonomy of educational activities, verbs such as "describe," "define," or "identify" represent a low level of cognizance, while words such as "explain," "recognize," "illustrate" and "predict" are mid-level, and words such as "compare" "analyze," "interpret" are higher level of cognizance.{4} In *all* of the other science concepts taught in biology, students are asked to "compare," "investigate," "predict," "analyze," and "interpret." However, evolution is kept at a purely definitional level, meaning that even though the proposed TEKS include "analyze and evaluate" within the general scientific process section, there is no opportunity to do this when the students get to the evolution section; they are only required to essentially memorize definitions or memorize what fossils lead to common descent. Many testifiers claimed that students were free and in fact encouraged to discuss evolutionary theory. They said the "strengths and weaknesses" language was being replaced by the better, more specific "analyze and evaluate." This is intentionally misleading. The general standards do read that way, but the evolution section itself is exempt from this rigid treatment in the new TEKS.

I was particularly unimpressed with Terrence Stutz's article

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

The Vote and Results:

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

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

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

> *(7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to:*
>
> > *(A) analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies including anatomical, molecular, and developmental;*

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

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

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

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

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

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

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

What was presented as a boring little tidbit in our biology books, actually is an entire field of inquiry. Chemical origins is just one area of evolutionary theory; and as we all know there are evolutionary biologists still researching these issues, which means that there are still challenges or unexplained parts of the theory to be investigated. The students that go into science, the ones I've worked with, are fascinated by the unexplained parts of a theory, by the mysteries. I think is a disservice to our children and to the scientific community to gloss over the places where a theory needs more work. We should encourage students to go on and become the next scientist to answer these questions in evolutionary theory. While the proposed draft does discuss strengths and limitations, in science, in general, it does not

leave the evolution section open to this, but keeps it at a definitional level. I therefore contend that the Biology TEKS, science concept seven (evolution) should be phrased in such a way that would go beyond the less interesting part of science, identification and description of terms. And hopefully, this will open classroom instruction to analysis and discussion of current strengths and weakness within this important theory.

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

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

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

their previous experience and training; and most importantly, how to be flexible enough to change their ideas when it turns out they were wrong.

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

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

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

Notes

1. 1998 TEKS, Section 112.43, (c), (3), (A).
2. Section 112.43 (c), (3), (A) of proposed TEKS
3. Proposed 2009 TEKS Section 112.43, (7)
4. www.teachervision.com
5. Terence Stutz, "Texas Board of Education votes against teaching evolution weaknesses," *Dallas Morning News*, January 24, 2009. tinyurl.com/bncw55
6. Theodosius Dobzhansky, "Nothing in biology makes sense except in the light of evolution," *American Biology Teacher*

1973, volume 35, pp. 125-129.
7. www.evolutionnews.org/2009/01/recap_texas_board_of_education.html
8. Ibid.
9. www.nsf.gov/statistics/seind04/c2/c2s3.htm

Human Embryonic Stem Cells Go to Human Trials

January 23, 2009

Just when we all thought that perhaps the wind in the sails of the human embryonic stem cell debate had abated, Geron Inc. announced that it was approved by the FDA to conduct an experimental procedure on human subjects who have suffered from a recent spinal cord injury. The procedure would involve the injection of neural cells derived from human embryonic stem cells into a spinal cord injury site. The patients would receive two months of immune suppressant drugs and will be closely monitored for a year. The stem cells were obtained from some of the oldest lines of human embryonic stem cells that were left over from in vitro fertilization procedures.

What if this doesn't work?

There are many human embryonic stem cell researchers who are worried about Geron doing the first human trials. Dr. Kessler, chairman of neurology and director of the stem cell institute at Northwestern University, is quoted in the *New York Times* as being skeptical that Geron's technique will work on human patients. In trials with mice, Geron showed that mobility increased in the tails and legs of mice with moderate spinal

cord damage. Also, the mice showed no formation of tumors, a problem with embryonic stem cell therapies. However, the mice had “moderate injuries,” and Kessler is skeptical that alleviating moderate injuries in mice will translate in the severe injuries in humans.

For those of us who are against the use of embryos for research purposes, this would be another example of the difficulty of using embryonic stem cells. This is just one more reason why more research and research dollars should be focused on adult stem cells. Adult stem cell research has been successfully used in humans for years, and is not ethically contentious.

As Christians, we also need to be mindful and prayerful of the fact that there are many people who have placed hope in embryonic stem cell research. The media has portrayed embryonic stem cells as the panacea for everything from spinal cord injuries to diabetes to Alzheimer’s. We need to be sensitive to the pain and disappointment that this could be for many people who have had to deal with permanent injuries or debilitating conditions.

What if this works?

First of all, even if this particular trial works, the scientists at Geron say that there is still many years of work to do. All they are testing now in Phase I clinical trials is if it is safe. Testing for efficacy comes later.

If this procedure works both safely and therapeutically, then we as Christians have the most difficult position. The fact that we believe the embryo is a person, and that it has value and dignity, does not change. Also, the fact that from a biblical perspective it is unethical for us to decide to destroy one life to save another, and to value one life over another, does not change. But anyone who is in this position or has a child, a spouse, or a loved one paralyzed due to a

spinal cord injury must make a decision, and no matter what decision they make there will likely be feelings of guilt, regret and temptations too. Consider two examples:

> *1) Your spouse is in a horrible car accident and suffers from a spinal cord injury which will likely leave him/her paralyzed. You have the option of doing embryonic stem cell therapy at the injured site, which may result in your spouse regaining some mobility. You don't think it is right to destroy an embryo because it is a person too, and is made in the image of God so it has inherent value. As you watch your spouse work with his/her injury, learning how to live life without mobility, how likely is it that you will ask yourself, "Did I do the right thing?" "If that embryo was going to die or be used in someone else anyway, why not my spouse?" How tempting would it be to carry that regret and guilt?*
>
> *2) As before, your spouse is in a horrible car accident and suffers from the same injuries. This time you elect to do the embryonic stem cell therapy. Your spouse regains some mobility, but how tempting would it be to wonder about the sacrifice that was made, and the guilt associated with compromising, or to look at your children knowing that they were embryos once too?*

These are not easy decisions. I will not pretend that even though as Christians we believe in the sanctity of human life, somehow it makes one decision any easier or the other decision any less tempting. Thankfully, we do not have to make these decisions at this time, and my prayer is that I hope we never do. It is said that a society can be judged by how they treat their most vulnerable. From the biblical perspective Jesus said, "Truly, I say to you, as you did it to one of the least of these my brothers, you did to me" (Matthew 25:40).

To give you two additional pieces of encouragement:

1) Adult stem cells have alleviated the effects of particular types of spinal cord injury in human patients (see www.discovery.org/a/2362 for a great article that was written in 2004, but seems quite timely now).

2) Desiring to alleviate the effects of the fall, including things like spinal cord injuries, is understandable. Whether or not we find a cure within someone's lifetime, we have hope in God's promise that he has conquered death and we will receive a resurrected body (1 Corinthians 15).

For more information on stem cells see these two articles from Probe.org:

www.probe.org/amniotic-stem-cells/

www.probe.org/the-continuing-controversy-over-stem-cells

Personhood and Origins

Does One's View of Origins Really Matter?

In the midst of carpools, meetings, appointments, and everything else that life throws at us, does it really matter whether someone is a Darwinist or a Creationist, or holds some position in between?

Whether we are aware of it or not, we all filter our life experiences through the lens of our worldview. Nancy Pearcey, author of *Total Truth*, describes a worldview as the "mental map that tells us how to navigate the world effectively."{1}

As technology advances, we find ourselves wading through very murky waters that deal with questions of personhood at the edges of life. Questions about embryos and human experimentation and euthanasia and physician-assisted suicide are no longer speculative theories for ethicists to ponder in their ivory towers, but something that ordinary people have to deal with either through voting or through very personal decisions. And it can be confusing—which is precisely why we need a map to guide us!

Consider this: The state of Washington recently passed a law approving physician-assisted suicide. Many are lobbying congress to vote on lifting restrictions on funding for embryonic stem cell research. Great Britain is voting on funding for research on human/animal hybrids. And many of us will have to make difficult decisions about a loved one in the hospital. Just last week, a British couple used in vitro fertilization to select from a group of their own embryos one who did not have the genetic markers for breast and cervical cancer which ran in the family, leaving the other embryos to be destroyed. One's view of origins, and particularly who man is within that view, has a profound impact on how we make decisions regarding such bioethical issues.

Characteristics of the Map

Pearcey says that every worldview, or mental map, has to answer these three questions: 1) How did we get here? 2) What happened to us? and, 3) How do we make things right? *Christian theism* answers these questions with the biblical record of:

> *1) Creation,*
> *2) Fall of mankind from favor and fellowship with God,*
> *3) Redemption of fallen mankind through salvation in Jesus Christ.*

Naturalism would answer these questions with:

1) Macro-evolution, natural selection randomly acting on chance variations, (no one to answer to)
2) No right or wrong, just "survival of the fittest," (no inherent law to be held to), and the
3) Evolving and passing on of our DNA (no over arching plan or ultimate meaning to life than to just continue living).

The answers to these questions directly affect our view of personhood. Both secularists and Christians would agree that "a person" is valued as having a right to life and in the United States; we would agree with our founding Fathers that they have certain inalienable rights. But the answer to the question "What is a person and how should they be treated?" is very different under each worldview, and will guide you to very different waters.

The Christian Theism Map

From the Christian view of origins, we find that man is created in the image of God{2} and that he is a special part of creation, above all other creatures.{3} Part of being made in the image of God is that humans are more than the sum of their physical parts. People are made up of both body and mind (or soul), and these physical and spiritual components are integral to a person's identity.{4} James 2:26 says that the body apart from the spirit is dead. The story of Jesus raising Jairus' daughter in Luke 8:55 makes clear that when her spirit returned to her body, she was once again alive. Also passages about the resurrection, such as 1 Corinthians 15, make a distinction between the spirit and the body.

If people are both spiritual and physical, then their value is not just placed in physical abilities or in their genetics. There is value beyond the body. We would still consider a disabled person, or a person in a coma, or a victim of a horrible accident as a valuable person. Even if their body became functionless or mangled, they would still be valued as

a person because their value and identity entails more than the physical self. The body is important and a crucial part of their identity, but it is not the only measure.

The Naturalism Map {5}

From the naturalistic view of origins, popularly embodied in Darwinism, man is part of a long heritage that began with natural selection acting first on chemicals, then cells, then simple animals, and now on the current assortment of animals, including *homo sapian*. Man is considered another animal, and does not necessarily deserve any more rights or privileges than any other animal. Because the naturalistic worldview denies the supernatural or spiritual, man is seen as merely a physical being. Therefore, his value stems entirely from in his physical capabilities and genetics.

This mental map has led to such murky waters as the *eugenics movement*, through which scientists engaged in sterilization of prisoners, the intellectually weak and the poor because they wanted to improve the human race and purge "bad genes" from the gene pool. They also considered certain races as more advanced, or more evolved, than other races. The logical end of the *eugenics movement* was realized in Nazi Germany. Darwinism is not necessarily the cause of eugenics, but eugenics is an unsurprising logical possiblility under that particular worldview.

From the naturalistic view of personhood, one man can value another man based solely on his physical appearance or capabilities. Logically, from the naturalistic worldview, one can justify almost any action because "survival of the fittest" is the reigning ethic.

The eugenics movement is widely considered a black mark on American history, and many would consider it long gone with our lessons learned. However, many bioethicists, doctors and medical health professionals still practice medicine and make

decisions based on a worldview and values that were used to justify eugenics. It is common to discuss a person's "quality of life" and make decisions on how to treat—or even if they should treat a patient—based on this measure. "Quality of life" criteria are often arbitrary measures of a person's worth based on how well they function physically and mentally compared to what is deemed "normal." Unfortunately, such subjective "quality of life" ratings and scales likely reflect what the doctors or authors' personally value more than the dignity or sanctity of the individual they are measuring. Quality of life measurements and our example of the Great Britain couple choosing an embryo based on its genetic markers are examples of people practicing a type of eugenics, whether they wish to call it that or not.

So Origins Does Matter. . .

These are two very different views of man, and lead to widely varying conclusions about personhood or the sanctity of human life.

The Bible may not contain the words "stem cells" or "euthanasia" but it does speak to the value and sanctity of human life. It also addresses how we should value one another and why it is so tempting to judge each other based on our own standards instead of God's standards. Whether we are talking about the Pharisee who was thankful he was not like the tax collector or the person who decides that embryos and the elderly should not continue living because they're worth more dead than alive, one person is placing a value on another person based on his own criteria of values as opposed to God's. In fact, he is putting himself in the place of God.

I am reminded of a passage when God was directing Samuel to anoint a new king. Samuel was judging the sons of Jesse based on physical standards only, "But the Lord said to Samuel, 'Do not look on his appearance or on the height of his stature, because I have rejected him. For the Lord sees not as man

sees: man looks on the outward appearance, but the Lord looks on the heart.'"{6} Samuel judged Jesse's sons based on their physical features, but God reminds him that he has standards that are beyond what man can see. The naturalistic worldview of personhood is similar to Samuel's standards of who would be a fitting king, but the Christian theistic worldview holds that it is God's standards, not man's, that dictate how we are to value a person. God values individuals despite their physical features and while we may not see their value right away (David was a young shepherd), God does. Thus, we must trust that what he values is what we should value.

Again, our worldview is like a mental map. Personally, if I had to navigate murky waters, I would rather have a map made by the Creator, himself—a God's—eye—view of the waters—than the limited perspective of someone standing right there in the middle of it. Whose map are you going to use?

Notes

1. Pearcey, Nancy, *Total Truth*, Crossway Books, 2005, p. 23. See Probe's review of *Total Truth* here: www.probe.org/total-truth.
2. "So God created man in his own image, in the image of God he created him; male and female he created them." Genesis 1:27 (ESV Bible).
3. "And let them have dominion over the fish of the sea and over the birds of the heavens and over the livestock and over all the earth and over every creeping thing that creeps on the earth." Genesis 1:26 (ESV); See also Genesis 1:28-30.
4. See Probe's article on The Spiritual Brain: www.probe.org/the-spiritual-brain.
5. For more information on Darwinism, see Probe's articles at: www.probe.org/category/faith-and-science/origins/.
6. 1 Samuel 16:7 (ESV Bible).