“Help Me Counter My Prof’s Teachings on Horse Evolution”

I’m a senior at _____ in Agricultural Business Management. In one of my Range classes the professor has laid the foundation for the entire class on evolution. Using the common picture of horse evolution (hyracotherium to equus) he is saying that rangeland plants and systems have co-evolved with large ungulates. I’m struggling on just how he can give the theory of evolution such validity, the difference between adaptation and evolution, and finding information that I can use to refute some of his ideas. I don’t want to argue with him but just want a chance to exchange ideas. If you can direct me to any information or resources on this specific topic, I would appreciate it. Thanks.

The best source of information on the horse series can be found in Jonathan Wells book, *Icons of Evolution* (2000) from InterVarsity Press. He has a full chapter on the subject as well as a chapter on Archeopteryx and the bird-like fossils. The book is easily obtainable at Amazon.com and some Christian Bookstores. Wells has also responded to some of his critics and negative reviews on the Discovery Institute’s website at www.discovery.org. He also has other material at Access Research Network, www.arn.org. I would check on both sites for other helpful material.

Respectfully,

Dr. Ray Bohlin
Probe Ministries

“Can You Recommend Good Books on Intelligent Design?”

Grace and peace to you, Dr. Bohlin:

I am a returning college student and a home-schooling parent. In my classes I find myself facing animosity toward those of us who reject evolution. I want to be able to defend myself in class as well as prepare my children to do the same. I want to be able to say to my children and in class, “I believe [THIS], because [of THIS]; and here’s the difference.” I know there is good information available on Intelligent Design and Creationism, but I simply do not have the ammunition of knowledge and information that I desire.

Unfortunately, with so many works available, I am at a loss as to where to begin. Thus, could you recommend a few? Are there any that force evolutionists to base their critical examinations mainly (or exclusively) upon emotional arguments? (I.e., points that naturalistic “science” cannot honestly ignore or refute.) Alternatively, could you recommend an assortment that, when combined, thwart the mass of evolutionist droning? (And a good order in which to read/study the works.)

I honor you for your desire to become more knowledgeable in this important arena. I wish there were more Christians like you.

Below is a brief annotated bibliography in the order I feel they should be read by someone just starting out.

> *1. For an overview of the many issues and publishing events surrounding this question, you can start with the Probe book Creation, Evolution, and Modern Science, (Kregel, 2000) which I edited. This will introduce you to several topics without going into too much depth. This link will give you some more*

information.

2. Darwin On Trial by Phillip Johnson (IVP 1991). Phil Johnson has emerged as the leader of the Intelligent Design movement and here lays out in logical manner some of the important evidential problems with evolution as well as the all important academic and educational problems. See this related article.

3. Reason in the Balance by Phillip Johnson (IVP 1995). Here Johnson lays out just what is at stake in this naturalism vs. theism clash within the culture in law, science, and education. Not his most popular book, but by his own admission, his most important book. See this related article.

4. Icons of Evolution by Jonathan Wells (Regnery, 2000). A superb expose' of the ten most popular evidences for evolution in high school biology textbooks. The evolutionary and educational communities are falling all over themselves trying to explain or discredit this book. They are looking more and more foolish as time goes on. See this related article.

5. Darwin's Black Box By Michael Behe (Free Press, 1996). This is a narrower work explaining the necessity of intelligent design in understanding the molecular workings of the cell. Not as technical as you think. I have a good review of it in Creation, Evolution and Modern Science. See this related article.

6. Intelligent Design by William Dembski (IVP, 2000). Dembski shows how important Design is within a broad perspective across disciplines while also demonstrating the academic rigor of a design hypothesis. See this related article.

7. Defeating Darwinism by Phillip Johnson (IVP, 1997). A short book for students, parents and teachers highlighting the critical thinking skills needed to weave through the mine fields of the creation/evolution controversy. See this

related article.

8. The Wedge of Truth by Phillip Johnson (IVP, 2000). Johnson's latest book, providing an update and analysis of the current controversy and an explanation of overall strategy (The Wedge). Insightful and quotable as always.

There are other books to help you in specific areas and anthologies to offer more technical perspectives of important aspects of the controversy, but these should get you started.

There are reviews of books 2-7 on our website in the science section. URLs listed at the end of each description.

Respectfully,

Ray Bohlin
Probe Ministries

Where Was God on Sept. 11? The Problem of Evil

Dr. Ray Bohlin explores the problem of evil in light of the terrorist attacks on the U.S. on Sept. 11, 2001.

Why Didn't God Prevent the Terrible Attacks?

The events of September 11th are indelibly etched in our hearts and minds. The horrible memories of personal tragedy and suffering will never really go away. As well they shouldn't. As Christians we were all gratified to see so many of our national, state, and local leaders openly participate

in prayer services and calling upon people of faith to pray for victims' families and injured survivors.

What was lost underneath the appearance of a religious revival was the clear cry of many that wondered if our prayers were justified. After all, if we pray to God in the aftermath and expect God to answer, where was He as countless individuals cried out to Him from the planes, the World Trade Center and the Pentagon? The skeptical voices were drowned out because of the fervent religious outcry seeking comfort and relief. But make no mistake; the question was there all the time. Where was God on September 11th? Surely He could have diverted those planes from their appointed destinations. Why couldn't the hijackers have been intercepted at the airports or their plots discovered long before their designed execution?

Why so many innocent people? Why should so many suffer so much? It all seems so senseless. How could a loving God allow it?

It is important to realize also that the suffering of those initial weeks is only the tip of the iceberg. There will be military deaths and casualties. The war on terrorism will be a long one with mounting personal and economic costs. The clean up will also continue to take its ever-mounting toll in dollars, lives, and emotional breakdowns.

Former pastor Gordon MacDonald spent time with the Salvation Army in caring for people and removing debris and bodies from the rubble of the World Trade Center. He relates this encounter from his journal of September 21 in *Christianity Today:*{1}

> "Later in the night, I wandered over to the first-line medical tent, which is staffed by military personnel who are schooled in battlefield casualties. The head of the team, a physician, and I got into a conversation.
>
> "He was scared for the men in the pit, he said, because he

> knew what was coming ‘downstream.’ He predicted an unusual spike in the suicide rate and a serious outbreak of manic depression. . . . Many of the men will be unable to live with these losses at the WTC. It’s going to take an unspeakable toll on them.”

So why would God allow so much suffering? This is an ancient question. The problem of reconciling an all-powerful, all-loving God with evil is the number one reason that people reject God. I will try to clarify the question, provide some understanding, and make some comparisons of other explanations.

Psalm 73 and Asaph’s Answer

The Bible answers the question of where God was on September 11 in many passages, but I would like to begin with the answer from Asaph in Psalm 73. My discussion will flow from the excellent discussion of the problem of evil found in Dr Robert Pyne’s 1999 book, *Humanity and Sin: The Creation, Fall and Redemption of Humanity.*{2}

In Psalm 73, Asaph begins by declaring that God is good. Without that assumption, nothing more need be said. He goes on in verses 2-12 to lament the excess and success of the wicked. In verses six and seven he says, “Therefore pride is their necklace; they clothe themselves with violence. From their callous hearts comes iniquity; the evil conceits of their minds know no limits.” (Psalm 73:6-7). From this point Asaph lets his feelings be known by crying out that this isn’t fair when he says in verse 13, “Surely in vain have I kept my heart pure; in vain have I washed my hands in innocence.”

The wicked seem to snub their noses at God with no apparent judgment, while Asaph strives to follow the Lord to no benefit. We have all experienced this in one form or another. Some things in this world simply aren’t fair. In the last ten verses of the psalm, Asaph recognizes that the wicked will

indeed realize their punishment in the future. God's judgment will come. He also realizes that God is always with him and that is sufficient.

18th century philosopher David Hume stated the classical problem of evil by saying that if God were indeed all powerful He would do something about evil, and that if He were all-loving He would want to do something about evil. Since evil exists, God must either not be able or not want to do anything about it. This makes God either malevolent or impotent or both. But Hume chooses to leave out the option, as Asaph resolves, that God is patient. Hume, like many before him and after him, grows weary with a God who is patient towards evil.

We long for immediate justice. But before we pray too earnestly for immediate justice, we'd better reflect on what that would be like. What would instant justice look like? Immediate justice would have to be applied across the board. That means that every sin would be proportionately and immediately punished. We soon realize that immediate justice is fine if applied to everybody else. Dr. Pyne quotes D. A. Carson as saying, "The world would become a searing pain; the world would become hell. Do you really want nothing but totally effective, instantaneous justice? Then go to hell."{3} I think we're all quite comfortable with a God that does not apply immediate justice.

Evil and the Sovereignty of God

Next, I want to focus on God's sovereignty. We understand that God knew what He was doing in creating people with the ability to choose to love Him or hate Him. In order for our love for Him to be real, our choice needed to be real and that means creating creatures that could turn from Him as well as love Him. In order to have creatures with moral freedom, God risked evil choices.

Some would go so far as to say that God couldn't intervene in

our evil choices. But in Psalm 155:3, Psalm 135:6, and in Nebuchadnezzar's words of praise in Daniel 4:34-37 we're told it is God who does whatever He pleases. However, God does perform acts of deliverance and sometimes He chooses not to. We are still left with the question "Why?" In the book of Job, Job basically proclaims his innocence and essentially asks why? God doesn't really give Job an answer, but simply reminds him who is in charge. (Job 38:2-4) "Who is this that darkens counsel by words without knowledge?" the Lord asks Job.

The parameters are clearly set. God in His power is always capable of intervening in human affairs, but sometimes He doesn't and we aren't always given a reason why. There is tension here that we must learn to accept, because the alternative is to blaspheme by assigning to God evil or malevolent actions. As Asaph declared, God is good!

This brings us to the hidden purposes of God. For although we can't always see God's purpose, we believe He has one in everything that occurs, even seemingly senseless acts of cruelty and evil. Here is where Jesus' sufferings serve as a model. The writer of Hebrews tells us that Jesus endured the cross for the joy set before Him. (Hebrews 12:1-3) So then, we should bear our cross for the eternal joy set before us. (Hebrews 12:11, 2 Corinthians 4:16-18) But knowing this doesn't always make us feel better.

When Jesus was dying on the cross all His disciples but John deserted Him. From their perspective, all that they had learned and prepared for over the last three years was over, finished. How could Jesus let them crucify Him? It didn't make any sense at all. Yet as we well know now, the most important work in history was being accomplished and the disciples thought God was absent. How shortsighted our perspective can be.

The Danger of a Nice Explanation

But with this truth comes the danger of a nice explanation. Even though we know and trust that there is a purpose to God's discipline and His patience towards ultimate judgment, that doesn't mean we should somehow regard evil as an expression of God's goodness. In addition, we can be tempted to think that if God has a purpose to evil and suffering, then my own sin can be assigned not to me but to someone else, namely God Himself because He had a purpose in it.

Dr. Robert Pyne puts it this way.

> We may not be able to fully resolve the problem of evil, and we may not be able to explain the origin of sin, but we can see the boundaries that must be maintained when addressing these issues. We share in Adam's guilt, but we cannot blame Him for our sin. God is sovereign, and He exercises His providential control over all things, but we cannot blame Him either. God permits injustice to continue, but He neither causes it nor delights in it.{4}

Another danger lies in becoming too comfortable with evil. When we trust in God's ultimate purpose and patience with evil we shouldn't think that we have somehow solved the problem and therefore grow comfortable in its presence. We should never be at peace with sin, suffering, and evil.

The prophet Habakkuk sparred with God in the first few verses of chapter 1 of the book bearing his name by recounting all the evil in Israel. The Lord responds in verses 6-11 that indeed the Babylonians are coming and sin will be judged. Habakkuk further complains about God's choice of the godless Babylonians, to which God reminds him that they too will receive judgment. Yet the coming judgment still left Habakkuk with fear and dread. "I heard and my inward parts trembled: at the sound my lips quivered. Decay enters my bones, and in my place I tremble. . . . Yet, I will exult in the Lord."

(Habakkuk 3:16-19.) Habakkuk believes that God knows what He is doing. That does not bring a smile to his face. But he can face the day.

“We are not supposed to live at peace with evil and sin, but we are supposed to live at peace with God. We continue to trust in His goodness, His sovereignty, His mercy, and we continue to confess our own responsibility for sin.”{5}

He Was There!

Though we have come to a better understanding of the problem of evil, we are still left with our original question. Where was God on September 11th?

While the Christian answer may not seem a perfect answer, it is the only one which offers truth, hope, and comfort. Naturalism or deism offers no real answers. Things just happen. There is no good and no evil. Make the best of it! Pantheism says the physical world is irrelevant or an illusion. It doesn’t really matter. Good and evil are the same.

To answer the question we need to understand that God does, in fact, notice when every sparrow falls and grieve over every evil and every suffering. Jesus is with us in all of our suffering, feeling all of our pain. That’s what compassion means, to suffer with another. So the suffering that Christ endured on the cross is literally unimaginable.

> “The answer is, how could you not love this being who went the extra mile, who practiced more than He preached, who entered into our world, who suffered our pains, who offers Himself to us in the midst of our sorrows?”{6}

We must remember that Jesus’ entire time on earth was a time of sacrifice and suffering, not just His trial and crucifixion. Jesus was tempted in the manner of all men and He bore upon Himself all our sin and suffering. So the answer is

quite simple. He was there!

He was on the 110th floor as one called home. He was at the other end of the line as his wife realized her husband was not coming home. He was on the planes, at the Pentagon, in the stairwells answering those who called out to Him and calling to those who didn't.

He saw every face, knew every name, even though some did not know Him. Some met Him for the first time, some ignored Him for the last time. He is there now.

Let me share with you one more story from Gordon MacDonald's experience with the Salvation Army during the initial clean up at the World Trade Center.

> "There is a man whose job it is to record the trucks as they leave the pit with their load of rubble. He is from Jamaica, and he has one of the most radiant smiles I've ever seen. He brings a kind of spiritual sunshine to the entire intersection. "I watch him—with his red, white, and blue hard hat—talking to each truck driver as they wait their turn to go in and get a load. He brightens men up. In the midst of those smells, the dust, the clashing sounds, he brings a civilizing influence to the moment.
>
> "Occasionally I go out to where he stands and bring him some water. At other times, he comes over and chats with us. We always laugh when we engage. "I said to him last night, 'You're a follower of the Lord, aren't you?' He gave me an enthusiastic 'Yes! Jesus is with me all the time!' "Somehow this guy represents to me the quintessential picture of the ideal follower of Christ: out in the middle of the chaos, doing his job, pressing a bit of joy into a wild situation." {7}

Notes

1. "Blood Sweat and Prayers," *Christianity Today,* Nov.

12,2001, p. 76.
2. Robert Pyne, *Humanity and Sin: The Creation, Fall and Redemption of Humanity,* pp. 193-209.
3. Pyne, p. 197.
4. Pyne, p. 204.
5. Pyne, p. 206.
6. Peter Kreeft, quoted in *The Case for Faith* by Lee Strobel, 2000, p. 45-46.
7. "Blood Sweat and Prayers," *Christianity Today*, p. 76.

Response to News Of First Human Clone

Today, December 27, 2002, it was announced that the first human clone was born at an undisclosed location. The announcement came from Brigitte Boisselier, the director of Clonaid, the research branch of the Raelian cult. Dr. Boisselier revealed that four other clones are expected by the end of January. The Raelians have been hinting for months that a successful cloned birth was expected. Two other independent researchers, Severino Antinori (an Italian working in an undisclosed Muslim country) and Panos Zavos (from Lexington, Kentucky) have also been hinting at human cloning success and suggesting that a birth will be announced soon.

As of yet there has been no independent verification that the baby girl, named Eve, is truly a clone. Eve was delivered by Caesarian section from her twin sister (the woman who donated the nuclear genetic material from which she was cloned also served as the surrogate mother). There is some reasonable doubt about either the information given the public at this

time or the legitimacy of the claim. Dr. Boisselier claimed at the press conference this morning that ten clones were implanted (no information if the ten clones were of the same individual or clones from ten different people). Five of the clones spontaneously aborted within three weeks while the other five have continued without complication. This is a 50% success rate. Normal success rates in other mammals are 2% at best. Even then, many of the clones which survive to birth develop complications in their first months of life, as high as 10% in cattle. This incredibly high 50% success rate for human cloning leaves most researchers believing that either this isn't really a clone or they simply aren't revealing all the other failures.

This announcement is no cause for rejoicing. This baby and the others to follow are human experiments with high odds to develop life-threatening complications. Not only that, but poor Eve, who I believe is a full human being with a soul, will be a research subject all her life, however long that is. Human cloning ought to be banned, both reproductive cloning and so-called therapeutic cloning—or as Stanford University recently referred to it, "human nuclear transplantation." Boisselier, Antinori, and Zavos are forging ahead at breakneck speed with only a thin veneer of compassion for childless couples. They are deliberately putting innocent human life at risk both medically and psychologically for personal fame and notoriety. This needs to be condemned before others follow suit, and stopped if at all possible. The Senate needs to act now to join the House in banning all human cloning within U.S. borders.

Other articles of interest from the Probe Web site:

Can Humans Be Cloned Like Sheep?

Cloning and Genetics: The Brave New World Closes In

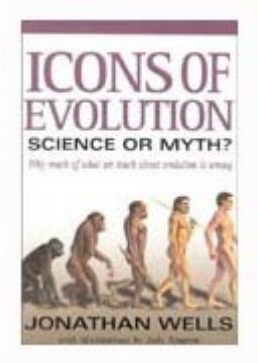
Stem Cells and the Controversy Over Therapeutic Cloning

Icons of Evolution

Dr. Ray Bohlin reviews Jonathan Wells' book Icons of Evolution, *which exposes the lies and distortions that constitute evolution's best textbook "evidence."*

This article is also available in Spanish.

Lies and Distortions Masquerading as Truth in the Halls of Science



Most everyone was required to take biology in high school, and many who went on to college likely took an introductory biology course as an elective, if not as a beginning course for a biology major. Required in most of these courses, mainly because of its inclusion in the textbook, was a section on evolution. Therefore, most people with a secondary education or above are familiar with the more popular evidences and examples of evolution nearly all textbooks have been using for decades. These include the peppered moth story of natural selection, Darwin's finches as an example of adaptive speciation, and the ubiquitous tree of life with its implied common ancestor to all life forms.

These familiar evidences of the creation story of our early 21st century culture are what Jonathan Wells (Ph.D., UC Berkeley, molecular and cell biology; Ph.D., Yale University, religious studies) refers to as the *Icons of Evolution* in his book by the same name (Regnery Publishing, 2000). Wells

focuses on ten of these icons and meticulously exposes them to be false, fraudulent or at best, misleading. Many of these difficulties have been pointed out before and are known to a few, but Wells adds a level of sophistication and packages them in a form certain to get the attention of everyone in the educational establishment. This book is not a plea for creation in the schools or a selective and picky rant against trivial details. It is a frontal assault against some of the most cherished and revered "proofs" of the evolution story. There will be no shortage of controversy around this extensively researched and well-written exposé. If these "Icons" are the best evidence for evolution, or at least the easiest evidence to explain, then one is left wondering what the future of evolutionary instruction could be. Even further, what future might there be for evolution itself?

Wells begins with an icon that itself starts at the beginning, the Miller-Urey experiment. This purports to show that molecules necessary for life could have arisen by simple chemical reactions on an early earth. The Miller-Urey experiment uses an atmosphere of reduced gases: ammonia, methane, water vapor, and hydrogen. Then it adds some energy in the form of sparks, and produces as Carl Sagan said, "the stuff of life." Dating back to 1953, this experiment has been around for nearly fifty years. The problem is that for at least the last twenty-five years origin of life researchers realized that this atmosphere does not reflect that of the early earth. Many textbooks will begrudgingly admit this, but include the experiment anyway. One can only guess the reason: no other simulated atmosphere works. I suppose that textbook writers would suggest that since we "know" some form of chemical evolution happened, they are justified in not representing the facts accurately!

Tree of Life, Homology, and Haeckel's

Embryos

The tree of life is ubiquitous in evolutionary literature. The notion that all of life is descended from a single common ancestor billions of years ago is how many would define evolution. But the actual evidence argues strongly against any such single common ancestor, and most animal life forms appear suddenly without ancestors in what is known as the Cambrian explosion of nearly 543 million years ago in evolutionary time. The Cambrian documents life forms so divergent that one would predict a fossil record covering hundreds of millions of years just to document the many transitions required from the first multicellular animal ancestor. Current estimates suggest this change took place in less than 5-10 million years. Yet the tree of life, documenting slow gradual changes, persists.

Another critical evidence for evolution over the years has been homologous structures. The forelimbs of all mammals, indeed all vertebrates, from bats to whales to horses to humans, possess the same basic bone structure. This is routinely held up as evidence of having descended from a common ancestor. The different forms simply tell of different adaptive stories, resulting in their unique functions relying on the same basic foundation. What becomes puzzling is, first, a confusion of definitions. *Homology* is **defined** as structures having arisen from a common ancestor.{1} But then homology cannot be used as an evidence of evolution. Something is very wrong, yet textbook orthodoxy concerning homology continues to perpetuate a myth that has been exposed for decades. Second, supposed homologous structures do not necessarily arise through common developmental pathways or similar genes.

Next, Wells turns his attention to perhaps the most inexcusable icon of all: similarities in vertebrate embryos originally pointed out by Ernst Haeckel in the 19th century and used by Darwin in *The Origin of Species* as a powerful evidence for common descent. Haeckel's vertebrate embryos are

shown passing through a remarkably similar stage early in development and only later diverging to the specific form. This passage through a common form early in development was seen as obvious evidence for a "community of descent." Yet, once again, the evidence gets in the way.

Since before the dawn of the 20th century, embryologists have known that Haeckel misrepresented the evidence. Vertebrate embryos never pass through a similar stage. What's more, Haeckel left out the fact that the earlier stages of embryonic development between classes of vertebrates pass through remarkably different pathways to arrive at this supposedly similar intermediate stage. The fraud was recently "rediscovered," though most embryologists have been aware of the inaccuracy all along. This shows the longevity of even falsified evidence, due to its persuasive appeal even in the hallowed halls of science. Perhaps scientists are human after all, seduced by a fraud simply because it makes such a good case for a treasured theory.

The Peppered Moth

Probably the granddaddy of all the icons of evolution is the peppered moth story. In pre-industrial England, the peppered moth was common in entomologists' collections. By the 1840s a dark or melanic form was increasing in frequency in populations across England. By 1900 the melanic form comprised as much as ninety percent of some populations. In the 1950s experiments by Bernard Kettlewell clearly established that this change in frequency from a peppered variety to a dark variety was due to two factors.

First, the surface of tree trunks had changed from splotchy, lichen-covered patchwork, to a uniform, dark complexion, due to increased levels of pollution. The pollution killed the lichens and covered the tree trunks with soot. Second, the peppered variety was camouflaged from predation by birds on the lichen-covered tree trunks, and the melanic variety was

camouflaged on the dark tree trunk. Therefore, the switch from peppered variety to melanic variety was due to natural selection, acting through selective bird predation as the trees changed from lichen-covered bark to soot-covered bark. Then with stricter air quality standards, the lichens are returning and the peppered variety is predictably coming back strong.

The peppered moth story became legendary as a classic example of Darwinian natural selection. But within 20 years of Kettlewell's work, cracks began to appear. It was soon noted that the characteristic switch from the peppered form to the dark form happened in areas where the lichens still grew on tree trunks. In other areas, the dark form began to decrease before the lichens began returning on trees. A similar pattern of a switch from a light form to a dark form was observed in ladybird beetles. Birds don't like ladybird beetles. Therefore, predation is ruled out as the selector. It all began to unravel when it was observed that peppered moths of both varieties **never** rest on tree trunks!

Essentially all photographs of moths on the trunks of trees were staged using dead or sluggish moths. They are not active during daylight. If that were the case, how could birds find them on tree trunks at all? Kettlewell released his moths in his mark-recapture-predation experiments in daylight hours, when the moths are naturally inactive. They simply found the nearest resting place (tree trunks in their sluggish state), and the birds gobbled up the non-camouflaged moths. We still don't know exactly where moths rest or whether lichens play any significant role in the story. Yet many biologists insist that the traditional story makes a good example of evolution in action. "To communicate the complexities would only confuse students," they say. Once again, flawed, yet cherished, examples persist because they are just too good **not** to be true!

Birds, Dinosaurs, Fruit Flies, and Human Evolution

The reptile-like bird, Archaeopteryx, has long been heralded as a classic example of a true ancestral transitional form. The improbable change from reptile to bird has been preserved in snapshot form in this remarkable fossil from Germany. Possessing a beautifully preserved reptilian skeleton with wings and feathers, Archaeopteryx was a paleontologist's dream. This would certainly explain why Archaeopteryx has found its way into just about every textbook. But Archaeopteryx has fallen on hard times. As happens with so many perceived transitions, it is universally viewed now as just an extinct bird, an early offshoot of the real ancestor.

Surprisingly, bird-like dinosaurs from much later geologic periods are hailed as the real ancestors. This is based on structural similarities despite their existence after Archaeopteryx. Never mind that the child exists before the parent. So enamored are some, that birds are just today's feathered dinosaurs. *National Geographic* was recently caught red-faced by perpetrating a fraudulent dinosaur/bird fossil as the real thing in its pages. Scientists have even accepted molecular evidence indicating an *identical* match between turkey DNA and Triceratops DNA. Never mind that the identical DNA match is more likely the result of contamination from a turkey sandwich in the lab and that Triceratops is in the wrong dinosaur family for bird evolution. Such is the power of *wanting* to believe your theory is true.

In the next four chapters, Wells visits the familiar icons of Darwin's finches, fossil horses, mutant four-winged fruit flies, and the ultimate icon, diagrams of the progressive change from ape-like creatures to full human beings. Like the others above, these icons turn out to be far less than what the textbooks suggest. In each case, as in the six discussed above, there are plenty of experts willing to expose the lack

of evidence for each icon. But they remain staples in the arsenal of evidences of the evolutionary process. Fossil horses and human evolution turn out also to be indicators of the difficulty evolution has in separating philosophical preferences from conclusions drawn from the evidence.

Textbook writers are either ignorant of current data, which prompts one to be skeptical of the accuracy of the rest of the textbook, or they are willfully misrepresenting the evidence in order to present a united front on the factualness of evolution. Unfortunately for our children, Wells is able to provide direct quotes indicating that at least some see no problem with including misleading or false data in order to make a point. After all, we know evolution is true, so just because we don't have easy simple stories to tell, doesn't mean they aren't out there waiting to be discovered.

The Scientific Academia Reacts

The reasoning behind these *Icons of Evolution* exposes much of the standard story of evolutionary theory to be mythology rather than science. And if these ten icons have been viewed as the best evidence for evolution, the entire theory needs to be questioned and made accountable to the evidence. It will be interesting to watch the evolutionary community react to these revelations. Evolutionary propagandist Eugenie Scott has already reportedly predicted that the book will be a "royal pain in the fanny" for biology teachers. Will the scientific community be able to respond with an appropriate *mea culpa,* or will there be a battery of excuses and obfuscations? I predict the latter. In the last ten years, the evolutionary establishment has been exerting a great deal of effort to demonstrate that evolution is confirmed to such a degree as to be beyond rational dissent. Organizations such as the National Academy of Sciences, the National Association of Biology Teachers, and the National Center for Science Education have

lobbied long and hard for the scientific integrity of the standard evolutionary story. They have held up most, if not all, of these ten icons as the principal pillars of the unassailable evidence for evolution.

Evolution is the principal foundation of the naturalistic world view, presented by many in academia as the only scientific, and therefore, objective, view of reality. Without evolution, metaphysical naturalism cannot stand. As Richard Dawkins has said, Darwin made it possible to be an intellectually fulfilled atheist.{2} Without evolution, the naturalistic worldview is in serious trouble. Therefore, the scientific community can be expected to rally fiercely behind the evolution story. Just how they do it will prove interesting indeed. *Icons of Evolution* will help draw the evolutionary establishment out from behind the protective bulwark of its authority and force it to defend its theory on the basis of the evidence. This is a fight I believe it must eventually lose in the court of scientific and public opinion.

There are two minor, yet unfortunate, problems with the text. The first, actually a book design problem, regards the difficulty finding the legends for some figures and distinguishing them from the regular text. The second involves an unnecessarily inflammatory discussion of the monetary support evolution receives from the U.S. tax-supported National Institutes of Health and National Science Foundation. While Wells' discussion is accurate, it comes across as sour grapes and may provide a convenient target for evolutionary propagandists to dismiss the book without dealing with the evidence.

These problems aside, *Icons of Evolution* is a landmark work and deserves to be read and studied by all who have an interest in the controversy surrounding not only the teaching of evolution, but also the very theory of evolution itself.

Notes

1. “The term ‘explosion’ should not be taken too literally, but in terms of evolution it is still very dramatic. What it means is rapid diversification of animal life. ‘Rapid’ in this case means a few million years, rather than the tens or even hundreds of millions of years that are more typical. . .” Simon Conway Morris, *Crucible of Creation*, (Oxford: Oxford University Press) 1998, p. 31.

2. Richard Dawkins, *The Blind Watchmaker*, New York, NY: W. W. Norton, 1986, p. 6.

“Where DID Cain Get His Wife?”

“Where DID Cain Get His Wife?”

That’s a long standing question that unfortunately, most commentaries don’t offer much help answering. I assume a literal Adam and Eve as the first humans. Therefore for several generations the family tree has only one trunk. Seth and Cain could only have married daughters of Adam and Eve, their sisters.

That always causes some severe consternation. Francis Collins, an evangelical Christian and the new head of NIH, has written that that solution goes against numerous Old Testament laws. How could the God of the Bible allow for such things? Collins opts for an evolved human race and a figurative Adam and Eve. He also seems to think, though he doesn’t explain, that Cain marrying his sister goes against the plain reading of the text.

The main societal taboo against incest is a practical one since offspring from these unions, even among distant cousins, carry an increased risk of birth defects. This is a well-known result of what geneticists call inbreeding. BUT Adam and Eve were completely without genetic mutation, the source of inbreeding birth defects. Therefore there was no biological risk from sister/brother marriages.

In the time of Abraham, Isaac, and Jacob, it was still the practice of marrying within one's family, at least twenty generations after Adam and Eve if you assume no extra generations in the genealogies of Genesis 5 and 11.

In Genesis 20:12 Abraham tells Abimelech that he was not completely lying when he told Abimelech that Sarah was his sister; "Besides, she really is my sister, the daughter of my father though not of my mother." Sarah was Abraham's half-sister.

When Isaac needed a wife, Abraham tells his servant to go to his country and even his own family to find a suitable wife for Isaac (Genesis 24:4). Genesis 24:15 tells us that Rebekah was the daughter of Bethuel, who is the son of Nahor, Abraham's brother.

Isaac then tells Jacob to seek a wife from the daughters of Laban, Rebekah's brother. (Genesis 28:2). So Jacob married two of his first cousins, Leah and Rachel.

Before the Law of Moses, these kinds of unions were the norm. But over 400 years later, mutations have accumulated in all populations and such marriages are quite risky. Therefore, I think, that is why you read in Leviticus 20:17 that if you marry your sister who is either the daughter of your father or the daughter of your mother (thus including half-siblings) they shall be cut off. So a marriage like Abraham and Sarah's was specifically outlawed in the Law of Moses. I think times have changed and the offspring of these once-normal

arrangements are at significant risk.

Also, there still may have been a reticence to marry a brother or sister with whom one grows up. But when you realize that Seth was born when Adam was 130 years old, certainly there were many more children between Cain and Abel, and Seth. Therefore Cain very conceivably could have married a sister who was twenty or thirty years younger than he was, and therefore they did not grow up together, so there wasn't the same degree of familiarity as with a same-age sibling.

Bottom-line, I find no difficulty either theologically or biologically with Cain and Seth marrying their sisters. Marrying within the family remained the normal practice for over twenty generations.

Respectfully,

Ray Bohlin
Probe Ministries

Global Warming

Fossil fuel emissions are unfairly being blamed for global warming. The Kyoto Protocol is based on questionable science, and will cause unnecesssary economic hardship.

What is Global Warming?

Over the last few months, dating back to the 2000 election, we have been bombarded with the news of global warming. Unfortunately, this issue has become highly polarized politically. Some scientists and politicians believe the warming has been fully documented as being caused by human interference and drastic measures are necessary to bring it

under control, while others just as strenuously maintain that nothing has been proven and drastic measures will only ruin our economy for no reason. What are we to think?

First, let me say at the start of this article that I have been what some would call an environmentalist since high school. I cooperate fully with the recycling program offered by my city: collecting all newspaper, glass, aluminum cans, and certain plastics for pick-up every other week. I don't buy Styrofoam plates or cups since it is not reusable or biodegradable.

I have long been a nature enthusiast, previously as an avid bird-watcher and feeder. Zoos have always been an attraction for me, but even better are opportunities to see God's creatures in their natural habitat. A jog in the woods is more preferable to a run down the street, even with no traffic.

I drive a small fuel-efficient car and as soon as it is practicable for my family financially, I intend to purchase one of those new cars run by both battery and gasoline, which gets close to 60 miles to the gallon.

I think stewardship of God's creation is a good thing and I think we (meaning humans) have often sought our own needs to the unnecessary detriment of the rest of creation. So with this as a background, what do I think of global warming? I'm afraid that my position will not totally satisfy either of the extremes mentioned earlier. For I don't think global warming requires the drastic action being required by the United Nations' Intergovernmental Panel on Climate Change (IPCC). But neither do I believe that the signs of global warming can be totally ignored, as some economists and political conservatives would have us think.

For instance, it does seem that there is credible evidence that both Arctic and Antarctic ice is receding, most glaciers worldwide appear to be in retreat, and sea levels are rising.

The important question, however, is whether global warming is responsible for these events. And perhaps even more importantly, what can we realistically do about it even if rising global temperatures are even partly responsible for these disturbing trends?

In this article I will be examining the evidence for a human component to the increasing temperatures and whether the proposed remedies offered by the IPCC are the best means of effecting real change for the future.

Global Warming and the Kyoto Protocol

The issue of global warming has become a lightning rod issue the world over. When President Bush recently indicated that he would hold back on setting carbon dioxide limits for U.S. power plants, environmentalist groups around the world immediately demonized him. A campaign was put in motion to flood the White House with e-mails condemning his action.

To help understand this issue let’s investigate the basics of the greenhouse effect on our planet and see what the fuss is all about. The greenhouse effect simply refers to the ability of some gases in our atmosphere to absorb and hold heat better than others. This creates a warming blanket around the earth without which life would be much more difficult for all life forms on earth.

It’s similar to the effect produced by actual greenhouses with walls and ceilings of glass. Glass allows certain wavelengths of light and radiation in, but traps certain others from getting out. Leave your car in the full sun, even on a pleasant day, and you can later enter the car to blast furnace temperatures. That’s a greenhouse effect.

Of great concern today is the fact that some greenhouse gases, such as carbon dioxide, are increasing in the atmosphere and the average temperature of the earth at ground level has

increased by about a full degree Fahrenheit since 1900 (0.5 degrees Celsius). Many have become convinced that the increase in carbon dioxide and the increase in temperature are cause and effect respectively.

Further, many believe that the increased carbon dioxide is due to the burning of fossil fuels. Some global climate computer models predict that this is only the beginning of the rise of global temperatures and that by the end of the 21st century, average global temperatures could rise by as much as seven degrees Fahrenheit (3.5 degrees Celsius). As a result, the United Nations Framework Convention on Climate Change, based on the work of the Intergovernmental Panel on Climate Change, issued the Kyoto Protocol in December of 1997.

Simply put, the Kyoto protocol calls on all agreeing nations to reduce their fossil fuel emission by at least five percent below their estimated 1990 levels by around 2010. Most nations were actually assigned reductions of 7-8 percent, including the United States. Now that doesn't sound like much at first glance. However, it is widely recognized, that with the growth in the U.S. economy since 1990, this would amount to as much as a 30 percent actual reduction in fossil fuel use by 2010. To achieve such a drastic reduction would require major shifts in U.S. energy policy and the economy. We'd better make sure it's worth it.

Next we'll look at the science of global warming.

Scientific Problems with Global Warming

Now I want to discuss some of the problems with the scientific evidence that purports to show that human produced carbon dioxide is responsible for global warming.{1} As I mentioned earlier, levels of carbon dioxide are increasing in the atmosphere and ground stations have reported a slight warming in this century. Many believe that the increase in carbon dioxide has caused the slight rise in temperature, and they

fear this is only the modest beginning of more significant temperature increases in the 21st century. I think there are several reasons to strongly doubt this conclusion.

First, we need to consider the influence of long-term trends. The last ice age ended about 11,000 years ago by most estimates, and the planet has been warming ever since. Sea levels have been rising at the rate of 7-8 inches every 100 years. Therefore, the fact that sea levels are rising is not necessarily due to humanly caused global warming. There was a significant warming trend from around 900 A.D. to 1300 A.D. Greenland was actually green on its coasts at one time. This was followed by what is referred to as the “Little Ice Age” from about 1450 to 1850. Both of these trends occurred without human influence and the current warming trend could just be stabilization from this last Little Ice Age.

I have mentioned that the warming trend has been measured from ground stations. This distinction has been added because there is conflicting data from weather balloon and satellite data. The most significant warming has been measured in the last two decades. However the temperature of the atmosphere has remained constant over the last twenty years.

How can the ground temperatures increase and the atmospheric temperatures stay the same? To be honest, nobody really knows for sure, but there is evidence that the ground based temperatures are in error. This could be due to what is called the heat island effect. It has been noticed that urban measured temperatures have increased faster than rural temperatures. The concrete, asphalt, factories, motor vehicles, and population density of large cities may be biasing these readings and giving a false warming trend.

If the warming trend is real, there may be another significant factor involved that has nothing to do with human interference: the sun. A measurement of solar activity in terms of the sunspot cycle length shows a strong correlation

with global temperatures over the last 100 years: including the rise from 1920-1940, the dip from 1940 to 1980, and the rise over the last twenty years.

All these data seem to indicate that global warming, if it exists, is not likely to be due to human action.

The Economic Effects of the Kyoto Protocol

Knowing that the science is highly questionable raises severe concerns about the Kyoto Protocol, which calls for at least a 30 percent reduction in U.S. fossil fuel use by 2010. Not only is this drastic reduction unnecessary to combat global warming, but also its effects on the U.S. economy could be catastrophic.

First, let me point out that some warming is not such a bad thing. It is widely recognized that increased carbon dioxide is good for plants. They grow faster and require less water. A slightly longer growing season is not a negative either. It is simply not factual to suggest that global warming is responsible for increases in severe weather, including hurricanes, tornados, floods, and droughts. Storms, in particular, have not shown any real increase in frequency or intensity.

John Christy, professor of atmospheric science at the University of Alabama and one of the lead authors of the IPCC report, said, “Hurricanes are not increasing. Tornados are not increasing. Storms and droughts do not show any pattern of increasing or decreasing . . . . Variations of climate have always occurred, even when humans could not have had any impact.”{2}

Beyond these observations is the realization that the implementation of the Kyoto Protocol would have severe economic consequences. Our own U.S. Energy Information

Administration (EIA) says Kyoto could drain more than $340 billion a year from the U.S. economy ($1,500 per person), double electricity prices, and cause the price per gallon to soar 65 cents for gasoline, 88 cents for diesel, and 90 cents for home heating oil. What is most significant about these rises in energy prices is that they would affect low-income families most severely. Upper and middle-income families can better shift resources to meet rising energy costs than the poor or the elderly on fixed incomes. Yet no one has talked about this.

The EIA also calculates that the Kyoto treaty could cost 3.2 million American jobs. An exhaustive study commissioned by a coalition of minority business groups concluded that 1.4 million of those lost jobs would be in our Black and Hispanic communities. And average annual family incomes in those communities would decline by between $2,000 and $3,000 under Kyoto.{3}

What is most disconcerting is that all this economic impact would be essentially for nothing, because not only is the science of human caused global warming suspect, but even if the Kyoto Protocol is followed, it would result in less than one-half of one degree reduction in global temperature by 2050. It hardly seems worth it.

So What Do We Do?

After exploring the question of global warming, we've found the science behind it to be questionable at best and the economic impact unnecessarily severe, particularly for minority families and businesses. This may raise a question in some people's minds as to why this is being pushed so uncritically by other world governments and by the media.

Well, the first clue comes from a quick perusal down the list of nations from the Kyoto Protocol itself. Some countries like the Russian Federation are simply asked to hold their

emissions at 1990 levels with no reduction. Countries from Latin America, Asia, Africa, and Polynesia, including China and India aren't even on the list (except Japan)! The reason is that these countries are still developing their economies and will need unrestricted energy use. However, as these populous nations grow economically, they may well exceed the emissions output of western nations altogether.

Implicitly, this affirms the necessity of fossil fuel energy for healthy economies. This treaty may be little more than a tax on western nations, not a policy for climate change. The late Aaron Wildavsky, professor of political science at UC Berkeley, wrote, "Warming (and warming alone), through its primary antidote of withdrawing carbon from production and consumption, is capable of realizing the environmentalist's dream of an egalitarian society based on the rejection of economic growth in favor of smaller population's eating lower on the food chain, consuming a lot less, and sharing a much lower level of resources much more equally."{4}

Now I don't think all those things are bad in and of themselves. But I don't like the idea of being forced into it in the name of avoiding climate change. A recent *Time* cover story, apart from a wholly typical and irresponsible scare article promoting the myth of human induced global warming, actually provided some common sense activities for responsible environmental activities that save resources and money.{5}

Among them were: running your dishwasher only when it's full, replacing air-conditioning and furnace air filters regularly, and adjusting your thermostat to a little warmer in summer and a little cooler in winter. You can also set your water heater to no higher than 120 degrees (F); it saves money and is safer. Try low-flow showerheads to use less hot water and wash clothes in warm or cold water. Most detergents today clean just as well in cooler temperatures. Use energy efficient light bulbs. Improve your home insulation. And seal up all the cracks.

Since all of these save electricity, they save not only resources, but also money for you. It just makes sense.

Increased energy prices, which should occur as demand for oil and gas increases and supply remains steady temporarily but begins to drop in 20 to 40 years, will spur development for more renewal energy sources such as solar, wind, and geothermal power. Also, research is progressing in stimulating the ocean to be more biologically productive through seeding with iron to act as a sink for carbon dioxide, if levels are shown to be affecting the general climate.

But where is the voice of the church? For too long we have been silent on environmental issues. As Christians we should lead the way in care for the environment, since we claim to be rightly related to its Creator in the first place.

Notes

1. S. Fred Singer, 1997, 1999, "The Scientific Case Against the Global Climate Treaty," http://www.sepp.org/GWbooklet/withfigures.html. All of the scientific evidences in this section can be found in this fair and reasoned report. Singer is a retired climatologist from the University of
Virginia and has formed The Science and Environmental Policy Project (SEPP) to help educate the public on global warming. This website is a great resource for up-to-date information on the global warming controversy. The report above is available with and without figures, but I reference and recommend the version with the figures copied with permission from peer-reviewed science journals for the full effect.
2. Quoted by James K. Glassman, in "Administration in the Balance," March 8, 2001, *Wall Street Journal.*
3. Paul Driessen, 2000, "Navigating the Treacherous 'Seven Cees' of Climate Care," The Issue Archive of CFACT (Committee for a Constructive Tomorrow) at

http://www.cfact.org/Issues.htm.
4. Quoted by James K. Glassman, in "Administration in the Balance," March 8, 2001, *Wall Street Journal.*
5. "What Can You Do?" *Time*, April 9, 2001, p. 39.

The Controversy Over Stem Cell Research

What Are Stem Cells and Why Are They Important?

President Bush recently decided to allow the use of federal funds to research the therapeutic properties of privately produced human embryonic stem cells (ES). President Bush clearly maintained the prohibited use of federal monies to produce human ES cells, since the procedure requires the destruction of the embryo to obtain them, which is currently prohibited by federal law. To fully understand the ramifications of this decision, I will discuss the nature of stem cells and their potential to treat disease.

Most of the more than one trillion cells that form the tissues of our bodies possess a limited potential to reproduce. If you remove some live human skin cells, they may divide in culture (laboratory conditions) five or six times and then die. Special cells in the underlying skin layers are what produce new skin cells. These cells' sole function is to churn out replacement cells. These are known as stem cells. Most tissues of our bodies possess stem cells that can reproduce the different cells required in that tissue. Bone marrow stem

cells can produce the many different cells of the blood. They are called stem cells, since they are seen as the stem of a plant that produces all the “branches and leaves” of that tissue.

What I’ve described is referred to as adult stem cells. There is no controversy revolving around the use of human adult stem cells in research, since they can be retrieved from the individual requiring the therapy. The promise of adult stem cells has increased dramatically in recent years. Stem cells have even been found in tissues previously thought to be devoid of them, such as neural tissue. It has recently been shown that certain types of stem cells are not limited to producing cells for the tissue in which they reside. For instance, bone marrow stem cells can produce skeletal muscle, neural, cardiac muscle, and liver cells. Bone marrow stem cells can even migrate to these tissues via the circulatory system in response to tissue damage and begin producing cells of the appropriate tissue type.{1}

In addition to the advantages of previously unknown adult stem cells and their unexpected ability to produce numerous types of cells, adult stem cells carry the added potential of not causing any immune complications. Conceivably adult stem cells could be harvested from the individual needing the therapy, grown in culture to increase their number, and then be reinserted back into the same individual. This means the treatment could be carried out with the patient’s own cells, virtually eliminating any rejection problems. Adult stem cells may also be easier to control since they already possess the ability to produce the needed cells simply by being placed in the vicinity of the damaged tissue.

Human Embryonic Stem Cells

The advances in adult stem cell research has only come about in the last three years. Traditionally it was thought that ES cells carried the greatest potential to treat wide-ranging

degenerative diseases such as diabetes, Parkinson's, multiple sclerosis, spinal chord injuries, and Alzheimer's. Since ES cells derive from the inner cell mass of the early embryo (5-7 day old blastocyst), they are capable of forming all the tissues of the body. Therefore, researchers have long felt that human ES cells hold the greatest potential for treatment of degenerative diseases.

While the potential has always existed, the problem has been that in order to obtain these human ES cells, the embryo is destroyed during the harvesting procedure. In addition, while ES cells had been obtained and grown successfully in culture from several mammals, including mice, efforts at producing ES cells from other mammals had failed. Nobody was sure human ES cells could even be successfully produced until November 1998 when James Thomson from the University of Wisconsin announced the establishment of five independent human ES cell lines.{2} (A cell line is a population of cells grown from a single cell that has been manipulated to continue growing indefinitely in culture, while maintaining its cellular integrity.) Geron Corporation funded Thomson's work, so it did not violate the federal ban on government funds being used for such purposes. But his announcement immediately opened up a desire by federally funded researchers to use his already established human ES cells.

But there are potential problems and uncertainties in both adult and ES cells. While the ethical difficulties are non-existent for adult stem cells, they may not prove as helpful as ES cells. ES cells have the potential for universal application, but this may not be realized. As stated earlier, establishing ES cell lines requires destruction of human embryos. An ethical quagmire is unavoidable.

Whereas adult stem cells can be coaxed into producing the needed cells by proximity to the right tissue, the cues needed to get ES cells to produce the desired cells is not known yet. Some in the biotech industry estimate that we may be twenty

years away from developing commercially available treatments using ES cells.{3} Clinical trials using adult stem cells in humans are already under way.

In August of 2000, NIH announced new guidelines allowing federally funded researchers access to human ES cell lines produced through private funding. The Clinton administration hailed the new guidelines, but Congressional pro-life advocates vowed a legal confrontation claiming the new guidelines were illegal.

The Options for President Bush

This was the situation facing President Bush when he took office. The pressure to open up federally funded human ES cell research mounted from patient advocacy groups for diabetes, spinal chord injuries, Parkinson's disease, and Alzheimer's. Additional pressure to reject federal funding of human ES cell research came from traditional pro-life groups including National Right to Life and the Catholic Church, with personal lobbying from Pope John Paul II.

One option open to the President and advocated by the scientific community was to free up all research avenues to fully explore all possibilities from ES cells regardless of their source. This would include federal funding for ES cells derived from embryos specifically created for this purpose. Few openly advocated this, but the oldest fertility clinic in the U. S. (in Virginia) announced recently that they were doing just that. Few within the government or research communities offered much protest.

Another option on the opposite end of the spectrum would have been to not only prohibit all federal funding on the creation and use of ES cells, but to also propose a law which would effectively ban all such research in the U. S., regardless of the funding source. Because of my view of the sanctity of human life from the moment of conception, this would be the

ideal solution. However, this is not practical, since Roe v. Wade still is the rule of law in the U. S. This means that by law, a mother can choose to do with her embryo whatever she wants. If she wishes to end its life by abortion or by donation for research as a source of ES cells, she is free to do so.

A third option open to the President, and the one advocated by most in the research community, was to open up federal funding for the use and creation of ES cells derived from leftover embryos destined for destruction at fertility clinics. Some have estimated that there are over 100,000 such embryos in frozen storage in the U. S. alone. The intent is to find some use or ascribe some value to these leftover embryos. It is common practice in fertility clinics to fertilize 8-9 eggs at a time to hedge your bet against failure and to minimize expenses. As many as half of these embryos are left over after a successful pregnancy is achieved. These embryos are either left in frozen storage or destroyed at the request of the parents. So why not use them for research?

Other Options Available to President Bush

Advocates for ES cell research argue that if the embryos left over from infertility clinics are going to be wasted anyway, why not put them to some use and allow their lives to be spent helping to save someone else? The first mistake was to generate extra embryos without a clear intent to use all of them or give them up for adoption. Second, these tiny embryos are already of infinite value to God. We’re not going to redeem them by killing them for research. Each embryo is a unique human being with the full potential to develop into an adult. Each of us is a former embryo. We are not former sperm cells or egg cells.

Third, this is essentially using the dangerous ethical maxim that “the end justifies the means.” A noble end or purpose does not justify the crime. Just because a bank robber wants

to donate all the money to charity doesn’t make the bank heist right. Nazi researchers gained valuable information through their many life- threatening experiments on Jews and other “undesirables” in the concentration camps of WWII. But most would not dignify these experiments by examining and using their findings.

A fourth option that I prefer is to close off all federal funding for human ES cell research. This would allow private dollars to fund human ES cell research, and federal dollars can be used to vigorously pursue the ethically preferable alternative offered by adult stem cells, which have shown great promise of late.

This would undoubtedly slow the progress on human ES cells and some researchers. Because of their dependence on federal research grants, they would not be able to pursue this line of research. But nowhere is it written that scientists have a right to pursue whatever research goals they conceive as long as they see a benefit to it. For years the U. S. Congress passed the Hyde Amendment that prohibited the use of federal funds for abortions, even though abortions were legal. The creation of human ES cells may be legal in the U. S. but that doesn’t mean researchers have a right to government monies to do so.

The President did decide to allow the use of federal funds only for research involving the 60 already existing human ES cell lines. The President expressly prohibited the use of government dollars to create new ES cell lines, even from leftover embryos. Researchers and patient advocates are unhappy, because this will limit the available research if these already existing ES cell lines don’t work out. Pro-life groups are unhappy, because the decision implicitly approves of the destruction of the embryos used to create these ES cell lines.

Stem Cells in the News Since the President's Decision

When the President decided to open up federal funding for research on already existing human embryonic stem cell lines, just about everybody was unhappy. Researchers and patient advocates were unhappy, because this will limit the available research if these already existing cell lines don't work out. The supply just might not meet the research demand. Pro-life groups were unhappy, including myself, because the decision implicitly approves of the destruction of the embryos used to create these ES cell lines. They will cost researchers at least $5,000 per cell line. Therefore, to purchase them for research indirectly supports their creation. Since both sides are unhappy, it was probably a good political decision even if it was not the right decision.

We certainly haven't heard the end of this debate. Members of Congress are already positioning to strengthen or weaken the ban by law. Either way, the policy of the United States has clearly stated that innocent human life can be sacrificed without its consent, if the common good is deemed significant enough to warrant its destruction. I fully believe that this is a dangerous precedent that we will come to regret, if not now, then decades into the future. The long predicted ethical slippery slope from the abortion decision continues to threaten and gobble up the weak, the voiceless, and the defenseless of our society.

What has alarmed me the most since the President's decision is the full assault in the media by scientists to gain even greater access to more human embryonic stem cells, regardless of how they are produced. The ethical question virtually dropped from the radar screen as scientists debated whether the existing cell lines would be enough.

This attitude is reflected in the increasing attention given

to potential benefits, while downplaying the setbacks and problems. The scientists speaking through the media emphasize the new therapies as if they are only a few years down the road. The more likely scenario is that they are decades away. Your grandmother isn't likely to be helped by this research.

Virtually nobody knows about the failure of human fetal cells to reverse the effects of Parkinson's disease in adults. About 15 percent of patients from a recent trial were left with uncontrollable writhing and jerking movements that appear irreversible. The others in the study weren't helped at all.{4} Chinese scientists implanted human embryonic stem cells into a suffering Parkinson's patient's brain only to have them transform into a powerful tumor that eventually killed him.{5}

Research with mouse embryonic stem cells has not faired much better. Scientists from the University of Wisconsin recently announced success in tricking human embryonic stem cells into forming blood cell-producing stem cells. Enthusiastic claims of future therapies overshadowed the reality that the same procedure has been successful in mice, except that when these cells are transplanted into mice, nothing happens. They don't start producing blood cells and nobody knows why.{6}

This debate will continue. Stay tuned.

Notes

1. H. M. Blau, T. R. Brazelton, and J. M. Weiman, 2001, "The evolving concept of a stem cell:entity or function," *Cell* Vol. 105 (June 29, 2001), p. 829-841.

2. James A. Thomson, et al., 1998, "Embryonic stem cell lines derived from human blastocysts." *Science* Vol. 282 (November 6, 1998): 1145-1147. Also in same issue see Perspective article by John Gearhart, "New potential for human embryonic stem cells," p. 1061-1062.

3. David Hamilton and Antonio Regaldo, 2001, “Biotech industry – unfettered, but possibly unfilfulled,” *Wall Street Journal*, August 13, 2001, p. B1.

4. Tracy Maddox, 2001, Fetal tissue fails to cure Parkinson’s patients. http://www.pointofview.net/ar_fetal.html. 3/21/01.

5. Charles Krauthammer, 2001, “The great stem cell hoax,” *The Weekly Standard*, August 20/August 27, 2001, p. 12

6. Nicholas Wade, 2001, “Blood cells from stem cells,” *Dallas Morning News,* September 4, 2001, p. A1. The article was a New York Times News Service report.

Stem Cells and the Controversy Over Therapeutic Cloning

Dr. Ray Bohlin explains stem cells and where they come from, insisting the potential of stem cell therapy must be weighed against the personhood of the embryo.

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What I've described is referred to as adult stem cells. There is no controversy revolving around the use of human adult stem cells in research, since they can be retrieved from the individual requiring the therapy. The promise of adult stem cells has increased dramatically in recent years. Stem cells have even been found in tissues previously thought to be devoid of them, such as neural tissue. It has recently been shown that certain types of stem cells are not limited to producing cells for the tissue in which they reside. For instance, bone marrow stem cells can produce skeletal muscle, neural, cardiac muscle, and liver cells. Bone marrow stem cells can even migrate to these tissues via the circulatory system in response to tissue damage and begin producing cells of the appropriate tissue type.{1}

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grown in culture to increase their number, and then be reinserted back into the same individual. This means the treatment could be carried out with the patient's own cells, virtually eliminating any rejection problems. Adult stem cells may also be easier to control since they already possess the ability to produce the needed cells simply by being placed in the vicinity of the damaged tissue.

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human ES cells.

But there are potential problems and uncertainties in both adult and ES cells. While the ethical difficulties are non-existent for adult stem cells, they may not prove as helpful as ES cells. ES cells have the potential for universal application, but this may not be realized. As stated earlier, establishing ES cell lines requires destruction of human embryos. An ethical quagmire is unavoidable.

Whereas adult stem cells can be coaxed into producing the needed cells by proximity to the right tissue, the cues needed to get ES cells to produce the desired cells is not known yet. Some in the biotech industry estimate that we may be twenty years away from developing commercially available treatments using ES cells.{3} Clinical trials using adult stem cells in humans are already under way.

In August of 2000, NIH announced new guidelines allowing federally funded researchers access to human ES cell lines produced through private funding. The Clinton administration hailed the new guidelines, but Congressional pro-life advocates vowed a legal confrontation claiming the new guidelines were illegal.

The Options for President Bush

This was the situation facing President Bush when he took office. The pressure to open up federally funded human ES cell research mounted from patient advocacy groups for diabetes, spinal chord injuries, Parkinson's disease, and Alzheimer's. Additional pressure to reject federal funding of human ES cell research came from traditional pro-life groups including National Right to Life and the Catholic Church, with personal lobbying from Pope John Paul II.

One option open to the President and advocated by the scientific community was to free up all research avenues to

fully explore all possibilities from ES cells regardless of their source. This would include federal funding for ES cells derived from embryos specifically created for this purpose. Few openly advocated this, but the oldest fertility clinic in the U. S. (in Virginia) announced recently that they were doing just that. Few within the government or research communities offered much protest.

Another option on the opposite end of the spectrum would have been to not only prohibit all federal funding on the creation and use of ES cells, but to also propose a law which would effectively ban all such research in the U. S., regardless of the funding source. Because of my view of the sanctity of human life from the moment of conception, this would be the ideal solution. However, this is not practical, since Roe v. Wade still is the rule of law in the U. S. This means that by law, a mother can choose to do with her embryo whatever she wants. If she wishes to end its life by abortion or by donation for research as a source of ES cells, she is free to do so.

A third option open to the President, and the one advocated by most in the research community, was to open up federal funding for the use and creation of ES cells derived from leftover embryos destined for destruction at fertility clinics. Some have estimated that there are over 100,000 such embryos in frozen storage in the U. S. alone. The intent is to find some use or ascribe some value to these leftover embryos. It is common practice in fertility clinics to fertilize 8-9 eggs at a time to hedge your bet against failure and to minimize expenses. As many as half of these embryos are left over after a successful pregnancy is achieved. These embryos are either left in frozen storage or destroyed at the request of the parents. So why not use them for research?

Other Options Available to President Bush

Advocates for ES cell research argue that if the embryos left over from infertility clinics are going to be wasted anyway, why not put them to some use and allow their lives to be spent helping to save someone else? The first mistake was to generate extra embryos without a clear intent to use all of them or give them up for adoption. Second, these tiny embryos are already of infinite value to God. We're not going to redeem them by killing them for research. Each embryo is a unique human being with the full potential to develop into an adult. Each of us is a former embryo. We are not former sperm cells or egg cells.

Third, this is essentially using the dangerous ethical maxim that "the end justifies the means." A noble end or purpose does not justify the crime. Just because a bank robber wants to donate all the money to charity doesn't make the bank heist right. Nazi researchers gained valuable information through their many life- threatening experiments on Jews and other "undesirables" in the concentration camps of WWII. But most would not dignify these experiments by examining and using their findings.

A fourth option that I prefer is to close off all federal funding for human ES cell research. This would allow private dollars to fund human ES cell research, and federal dollars can be used to vigorously pursue the ethically preferable alternative offered by adult stem cells, which have shown great promise of late.

This would undoubtedly slow the progress on human ES cells and some researchers. Because of their dependence on federal research grants, they would not be able to pursue this line of research. But nowhere is it written that scientists have a right to pursue whatever research goals they conceive as long as they see a benefit to it. For years the U. S. Congress passed the Hyde Amendment that prohibited the use of federal

funds for abortions, even though abortions were legal. The creation of human ES cells may be legal in the U. S. but that doesn’t mean researchers have a right to government monies to do so.

The President did decide to allow the use of federal funds only for research involving the 60 already existing human ES cell lines. The President expressly prohibited the use of government dollars to create new ES cell lines, even from leftover embryos. Researchers and patient advocates are unhappy, because this will limit the available research if these already existing ES cell lines don’t work out. Pro-life groups are unhappy, because the decision implicitly approves of the destruction of the embryos used to create these ES cell lines.

Stem Cells in the News Since the President’s Decision

When the President decided to open up federal funding for research on already existing human embryonic stem cell lines, just about everybody was unhappy. Researchers and patient advocates were unhappy, because this will limit the available research if these already existing cell lines don’t work out. The supply just might not meet the research demand. Pro-life groups were unhappy, including myself, because the decision implicitly approves of the destruction of the embryos used to create these ES cell lines. They will cost researchers at least $5,000 per cell line. Therefore, to purchase them for research indirectly supports their creation. Since both sides are unhappy, it was probably a good political decision even if it was not the right decision.

We certainly haven’t heard the end of this debate. Members of Congress are already positioning to strengthen or weaken the ban by law. Either way, the policy of the United States has clearly stated that innocent human life can be sacrificed

without its consent, if the common good is deemed significant enough to warrant its destruction. I fully believe that this is a dangerous precedent that we will come to regret, if not now, then decades into the future. The long predicted ethical slippery slope from the abortion decision continues to threaten and gobble up the weak, the voiceless, and the defenseless of our society.

What has alarmed me the most since the President's decision is the full assault in the media by scientists to gain even greater access to more human embryonic stem cells, regardless of how they are produced. The ethical question virtually dropped from the radar screen as scientists debated whether the existing cell lines would be enough.

This attitude is reflected in the increasing attention given to potential benefits, while downplaying the setbacks and problems. The scientists speaking through the media emphasize the new therapies as if they are only a few years down the road. The more likely scenario is that they are decades away. Your grandmother isn't likely to be helped by this research.

Virtually nobody knows about the failure of human fetal cells to reverse the effects of Parkinson's disease in adults. About 15 percent of patients from a recent trial were left with uncontrollable writhing and jerking movements that appear irreversible. The others in the study weren't helped at all.{4} Chinese scientists implanted human embryonic stem cells into a suffering Parkinson's patient's brain only to have them transform into a powerful tumor that eventually killed him.{5}

Research with mouse embryonic stem cells has not faired much better. Scientists from the University of Wisconsin recently announced success in tricking human embryonic stem cells into forming blood cell-producing stem cells. Enthusiastic claims of future therapies overshadowed the reality that the same procedure has been successful in mice, except that when these

cells are transplanted into mice, nothing happens. They don't start producing blood cells and nobody knows why.{6}

This debate will continue. Stay tuned.

Notes

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5. Charles Krauthammer, 2001, "The great stem cell hoax," *The Weekly Standard*, August 20/August 27, 2001, p. 12.

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Human Genome Project

Dr. Ray Bohlin takes a brief look at the accomplishment, purpose and consequence of the Human Genome Project.

 *This article is also available in Spanish.*

What's All the Fuss About the Human Genome Project?

In February of 2001, virtually every media outlet, whether TV news, newspapers, radio, Internet news services, or news magazines, was all worked up about the announcement of the completion of the Human Genome Project. In this article we will explore this monumental achievement and what it means for the future of medicine and our understanding of ourselves.

To appreciate this important accomplishment, we need to review a little basic genetics. It may actually astonish most adults just how much genetics the National Institutes of Health assumes we know about our genetic heritage. The educational video from the HGP includes a three-minute review of basic genetic processes like DNA packaging, transcription of DNA into message RNA, and the translation of message RNA into protein. It's no exaggeration to say that when I played this short piece during a lecture for high school students and their parents, mom and dad were left in the dust.

Honestly, I did that intentionally; because we are only in the beginning stages of a genetic revolution that will transform the way we diagnose and treat disease and how we may even alter our genetic structure. These new technologies bring with them numerous ethical and moral dilemmas we have only begun to address and for which there may not be simple answers. If we don't take the time to familiarize ourselves with genetic research and its implications, we risk responding out of fear and ignorance and potentially throwing away crucial medical

advances.

I have contended for a long time that we can no longer afford to remain ignorant of genetic technologies. They simply harbor far too great a power for both tremendous good and tremendous evil. We must work hard to take every thought captive to Christ and see what there is of benefit and what avenues of research and application we need to avoid to preserve human freedom and dignity.

Well let's talk about our genome, the sum total of all our genes. In most of the 100 trillion cells of our body are 46 chromosomes. These chromosomes are tightly coiled and packed strings of a remarkable molecule called DNA (Deoxyribonucleic Acid). DNA is a polymer, a repetitive sequence of four molecules, which I will only refer to by their one-letter abbreviations, A, G, C, and T. The human genome sequence is simply the sequence of these four molecules in DNA from all our chromosomes. If you laid out the DNA from all our chromosomes in each of our cells end to end, it would stretch six feet long.

A gene is a segment of DNA that contains the precise coding sequence for a protein. And proteins do all the real work in our cells. By looking at our completed sequence, it is predicted that our genome consists of 30,000 to 45,000 genes in each of our cells. So, now that we have the sequence, what does it mean? We'll begin answering that question in the next section.

What Does the Human Genome Project Hope to Accomplish?

The National Institutes of Health in cooperation with several international research organizations began the HGP in 1990 in the U.S. There were four primary objectives among the many goals of the HGP{1}.

The first and primary goal of the HGP was to map and sequence the entire human genome. There is a critical and significant difference between a map and the sequence. There are over three billion letters, or base pairs, in the human genome, spread out over 23 pairs of chromosomes. Trying to locate a sequence of say 1,000 letters, the code for a large protein, is a one in a million task. Therefore, researchers needed a refined roadmap to the genome. The map entails particular sequences that can be used like signs on a road map. If the trait a scientist is studying always seems to be present with this marker, the gene involved is probably nearby. In 1995, a detailed map was published with over 15,000 markers, one for every 200,000 base pairs. This will aid greatly in associating genes with particular diseases. And now with the sequence nearly complete, with over 99% accuracy, determining the precise effect of this gene on disease will be even easier.

A second critical goal was to map and sequence the genomes of several important model organisms: specifically, the bacterium E. coli, yeast, the roundworm, fruit fly, and mouse. This information is helpful, because each of these organisms have been used for laboratory studies for decades. Being able to coordinate knowledge of their genomes with cellular and biological processes will certainly inform our study of the human genome and its various functions.

The third important objective of the HGP was to systemize and distribute the information it gathered. Any sequence over 2,000 base pairs is released within 24 hours. The sequence and map data is contained in publicly accessible databases on the Internet. The HGP has also been creating software and other tools for large-scale DNA analysis.

The fourth and final primary goal of the HGP was to study the ethical, legal, and social implications of genetic research. A full 5% of all funds appropriated for the HGP have been earmarked for these kinds of considerations. There are many concerns revolving around the use of genetic sequence data.

Not the least of which are worries about ownership, patenting, access to personal sequence data by insurance companies, potential for job discrimination based on personal sequence data, and the prospects for genetic screening, therapy, and engineering. In the next section we'll begin investigating how the HGP thinks this information can be used.

What are the Long Term Hopes for the HGP?

The completion of the sequence was announced jointly in February 2001 in the journals *Nature*{2} and *Science*{3}. Both *Science* and *Nature* have made these landmark issues available, without subscription, on their websites.

The importance of recognizing the sequence of a particular gene has three important ramifications.{4} The first is diagnosis. Over the last few years, single genes have been found leading to deafness and epilepsy. Numerous genes, however, will influence most diseases in complex ways. Recently, genetic influences have been found in many forms of hypertension, diabetes, obesity, heart disease, and arteriosclerosis{5}. Genetic analysis of cancer tumors may someday help determine the most effective drug therapy with the fewest side effects. Genetic diagnosis has the potential to more precisely prescribe treatments for many medical conditions.

Second, diagnosing ailments with more precision with genetics will also lead to more reliable predictions about the course of a disease. Genetic information about an individual's cholesterol chemistry will aid in predicting the course of potential heart disease. Obtaining a genetic fingerprint of a cancerous tumor will provide information concerning its degree of malignancy. Third, more precise genetic information will also lead to the development of better strategies for prevention of disease.

Many more ailments in newborns can eventually be screened more

specifically to avoid disorders later in life. Currently, babies in the U.S. and other countries are routinely screened for PKU, a metabolic disorder that prevents the breakdown of a specific amino acid found in proteins. This condition becomes toxic to the nervous system, but can be prevented and managed with appropriate diet. Without dietary changes, affected babies face extreme mental retardation. Hopefully, the number of conditions this type of screening applies to can be expanded.

Screening can also be done for adults, to see if they may be carriers of potential genetic conditions. Certain Jewish and Canadian populations regularly obtain voluntary screening for Tay-Sachs disease, a known child-killer. This information has been used to help make decisions about future marriage partners.

Perhaps the greatest benefit will come from what is called gene-based therapy. Understanding the molecular workings of genes and the proteins they encode will lead to more precise drug treatments. The more precise the drug treatment, the fewer and milder will be the side effects.

Actual gene therapy, replacing a defective gene with its normal counterpart, is still very experimental. There are still many hurdles to overcome involving how to deliver the gene to the proper cells, controlling where that gene is inserted into a chromosome, and how it is activated.

Not surprisingly, some have seen the human genome sequence as a vindication of Darwin. We'll examine that contention next.

Did the Human Genome Sequence Vindicate Darwin?

Amid the controversy and exultation over the release of the near complete human genome sequence has been a not so quiet triumphal howling from evolutionary biologists. The similarity

of many genes across boundaries of species, the seemingly messy patchwork nature of the genome, and the presence of numerous apparently useless repetitive and copied sequences all have been laid out for us as clear validations of evolution. Really!

If Darwin were alive today, he would be astounded and humbled by what we now understand about the human genome and the genomes of other organisms.

Let's take a closer look at the claims of one bioethicist, Arthur Caplan{6}, who thought the major news story was missed. So let's just pick a few of the more glaring statements to help us understand that little in his comments should be trusted.

First, Caplan says, "Eric Lander of the Whitehead Institute in Cambridge, Mass., said that if you look at our genome it is clear that evolution must make new genes from old parts."

While it may be true that we can see some examples of shared sequences between genes, it is by no means true that we see wholesale evidence of gene duplication throughout the genome. According to one group of researchers,{7} less than 4,000 genes share even 30% of their sequences with other genes.

Over 25,000 genes, as much as 62% of the human genes mapped by the Human Genome Project, were unique, i.e., not likely the result of copying.

Second, Caplan says, "The core recipe of humanity carries clumps of genes that show we are descended from bacteria. There is no other way to explain the jerry-rigged nature of the genes that control key aspects of our development."

Not everyone agrees. The complexity of the genome does not mean, necessarily, that it has been jerry-rigged by evolution. There is still so much we do not know. Caplan is speaking more out of ignorance and assumption than data. Listen to this

comment from Gene Meyers, one of the principal geneticists from Celera Genomics, from a story in the *San Francisco Chronicle*:

> *'What really astounds me is the architecture of life,' he said. 'The system is extremely complex. It's like it was designed.'*
>
> *My ears perked up. 'Designed? Doesn't that imply a designer, an intelligence, something more than the fortuitous bumping together of chemicals in the primordial slime?'*
>
> *Myers thought before he replied. 'There's a huge intelligence there. I don't see that as being unscientific. Others may, but not me.'{8}*

Jerry-rigged? Hardly! Confusing at the moment? Certainly! But more likely to reveal hidden levels of complexity, rather than messy jerry-rigging.

It will take more than bluster to convince me that our genome is solely the result of evolution. The earmarks of design are clear, that is, if you have eyes to see.

What are the Challenges of the Human Genome Project?

In closing, I would like to address what are many people's concerns about the potential for abuse of this information. While there is great potential for numerous positive uses of the human genome, many fear unintended consequences for human freedom and dignity.

Some are justifiably worried about the rush to patent human genes. The public consortium, through the National Institutes of Health, has made all its information freely available and intends to patent nothing. However, there are several patent requests pending on human genes from the time before the HGP

was completed.

It is important to realize that these patents are not necessarily for the genes themselves. What the patent does protect is the holder's right to priority to any products derived from using the sequence in research. With the full sequence fully published, this difficult question becomes even more muddled. No one is anxious for the courts to try its hand at settling the issue. Somehow companies will need some level of protection to provide new therapies based on genetic information without hindering the public confidence and health.

Another concern is the availability of information about individual genetic conditions. There are legitimate worries about employers using genetic information to discriminate over whom they will hire or when current employees will be laid off or forced into retirement. Upwards of 80-90% of Americans believe their genetic information should be private and obtained or accessed only with their permission. The same fears arise as to the legality of insurance companies using private genetic information to assess coverage and rates. A recent bill (June 29,2000) before Congress to address these very concerns was amended to the Health and Human Services appropriations bill, but was removed in committee. The bill will be reintroduced this session.{9} I would be very surprised if some level of privacy protection is not firmly in place by 2002.

Moreover, many are apprehensive about the general speed of discovery and the very real possibilities of genetic engineering creating a new class, the genetically enhanced. Certainly, there is cause for vigilance and a watchful eye. I have said many times that we can no longer afford to be ignorant of genetic technologies. And while I agree that the pace of progress could afford to slow down a little, let's be careful not to throw the baby out with the bathwater.

After a series of lectures on genetic engineering and human cloning at a Christian high school, one student wrote me to say:

> *I am a senior, in an AP Biology class, and I find genetics absolutely fascinating. It's both fascinating and scary at the same time. . . . [You have inspired me] to not be afraid of the world and science in particular, but to take on its challenge and trust God.*

Amen to that!

Notes

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