Christian Views of Science and Earth History – A Balanced Perspective

Dr. Ray Bohlin and Rich Milne consider the three primary views held by Christians regarding the age of the earth and how the universe, life and man came to be: young earth creationism, progressive creationism, and theistic evolution. After considering the case for each one, they conclude with a call to work together for the cause of Christ.

 *This article is also available in Spanish.*

Introduction of Three Views

How old is the earth? Did men live with dinosaurs? Are dinosaurs in the Bible? Where do cave men fit in the Bible? Did the flood cover the whole earth? How many animals were on Noah's Ark? What does the word *day* in Genesis chapter one mean?

These are all common and difficult questions your children may have asked, or maybe they are questions you have. What may surprise you is that evangelical Christians respond with numerous answers to each question. In reality, answers to the preceding questions largely depend on the answer to the first one. How old is the earth?

The diversity of opinion regarding this question inevitably leads to controversy, controversy that is often heated and remarkably lacking in grace and understanding. For those Christians who are practicing scientists, there is much at stake. Not only is one's view of Scripture on the firing line, but one's respect and job security in the scientific community is also at risk.

But we must say up front, that as important as this question is, it is of secondary importance to the quest of defeating Darwinism as currently presented to the culture. Educational leaders and evolutionary scientists are determined to present a fully naturalistic evolution as the only reasonable and scientific theory that can be discussed in the public education system. All Christians, whether old earth or young earth, should find common cause in dethroning philosophical naturalism as the reigning paradigm of education and science.

Returning to the age of the earth question, we would like to survey three general categories of response to this question that can be found among Christians today. For each of these three views, we will discuss their position on Genesis chapter one, since theological assumptions guide the process of discovering a scientific perspective. We will also discuss the basics of the scientific conclusions for each view. Finally, we will discuss the strengths of each view and what those holding the other two views think are the other's limitations.

The first view of science and earth history we will discuss is the recent or literal view. This position is often referred to as scientific creationism, creation science, or young earth creationism. Young earth creationists believe that the earth and the universe are only tens of thousands of years old and that Genesis gives us a straightforward account of God's creative activity.

The second position, progressive creationism or day-age creationism, holds that the earth and the universe are billions of years old. However, progressive creationists believe that God has created specifically and *ex nihilo* (out of nothing), throughout the billions of years of earth history. They do not believe that the days of Genesis refer to twenty-four hour days, but to long, indefinite periods of time.

A view traditionally known as theistic evolution comprises the

third position. Theistic evolutionists essentially believe that the earth and the universe are not only billions of years old, but that there was little, if any, intervention by God during this time. The universe and life have evolved by God-ordained processes in nature. Theistic evolutionists, or evolutionary creationists as many prefer to be called, believe that the first chapter of Genesis is not meant to be read historically, but theologically. It is meant to be a description of God as the perfect Creator and transcendent over the gods of the surrounding ancient Near Eastern cultures.

Before we consider each position in greater detail, it is important to realize two things. First, we will paint in broad strokes when describing these views. Each has many sub-categories under its umbrella. Second, we will describe them as objectively and positively as we can without revealing our own position. We will reveal our position at the conclusion of this article.

Recent or Literal Creation

Having introduced each position, we would like to review the theological and scientific foundations for the first one: recent or young earth creationism.

The young earth creationist firmly maintains that Genesis chapter one is a literal, historical document that briefly outlines God's creative activity during six literal twenty-four hour days. If one assumes that the genealogies of Genesis chapters five and eleven represent a reasonable pre-Israelite history of the world, then the date of creation cannot be much beyond thirty thousand years ago.{1}

A critical theological conclusion in this view is a world free of pain, suffering, and death prior to the Fall in Genesis chapter three. God's prescription in Genesis 1:29 to allow only green plants and fruit for food follows along with this

conclusion.

The universal flood of Noah, recorded in Genesis chapters six through nine, is also a crucial part of this view. On a young earth, the vast layers of fossil-bearing sedimentary strata found all over the earth could not have had millions of years to accumulate. Therefore, the majority of these sedimentary layers are thought to have formed during Noah's flood. Much research activity by young earth creationists is directed along this line.{2}

Young earth creationists also maintain the integrity of what is called the Genesis kind, defined in Genesis 1:11, 12, and 21. The dog kind is frequently given as an example of the Genesis kind. While this is still a matter of research, it is suggested that God created a population of dog-like animals on the sixth day. Since then, the domestic dog, wolf, coyote, African wild dog, Australian dingo, and maybe even the fox have all descended from this original population. Young earth creationists suggest that God created the individual kinds with an inherent ability to diversify within that kind. But a dog cannot cross these lines to evolve into say, a cat.

The literal view of Genesis chapter one has been predominant throughout Church history and it proposes a testable scientific model of the flood and the Genesis kind. Critics point out that there are immense difficulties explaining the entire geologic record in terms of the flood.{3} Principal among these problems is that it appears there are many more animals and plants buried in the rocks than could have been alive simultaneously on the earth just prior to the flood.

Progressive Creationism

The next view to discuss is progressive creationism. The progressive creationist essentially believes that God has intervened throughout earth history to bring about His creation, but not all at once over six literal twenty-four

hour days. The progressive creationist will accept the long ages of the earth and the universe while accepting that there is some historical significance to the creation account of Genesis.

A popular view of Genesis chapter one is called the day-age theory. This view agrees that the events described in the first chapter of Genesis are real events, but each day is millions, perhaps billions of years in duration. The Hebrew word for day, *yom*, can mean an indefinite period of time such as in Genesis 2:4. This verse summarizes the first thirty-four verses of the Bible by stating, "This is the account of the heavens and the earth when they were created, in the *day* that the Lord God made the earth and the heaven" (emphasis added). In this case, the word *day* refers to the previous seven days of the creation week. Consequently, the progressive creationist feels there is justification in rendering the days of Genesis chapter one as indefinite periods of time.{4}

Therefore, the progressive creationist has no problem with the standard astronomical and geological ages for the universe and the earth. A universe of fifteen billion years and an earth of 4.5 billion years are acceptable. In regard to evolution, however, their position is similar to the young earth creationists'. Progressive creationists accept much of what would be called microevolution, adaptation within a species and even some larger changes. But macroevolutionary changes such as a bird evolving from a fish are not seen as a viable process.{5}

These are the basic beliefs of most progressive creationists. What do they think is the predominant reason for holding to this perspective? Most will tell you that the evidence for an old universe and earth is so strong that they have searched for a way for Genesis chapter one to be understood in this framework. So the agreement with standard geology and astronomy is critical to them. Progressive creationists also find the biblical necessity for distinct evidence for God's

creative activity so strong that the lack of macroevolutionary evidence also dovetails well with their position.

The most difficult problem for them to face is the requirement for pain, suffering, and death to be a necessary part of God's creation prior to Adam's sin. The atheistic evolutionist, Stephen J. Gould, from Harvard, commented on this problem of God's design over these many millions of years when he said, "The price of perfect design is messy relentless slaughter."{6} There are also major discrepancies with the order of events in earth history and the order given in Genesis. For instance if the days of Genesis are millions of years long, then when flowers were created on day three, it would be millions of years before pollinators, such as bees, were created on days five and six.

Theistic Evolution

Having covered young earth creationism and progressive creationism, we will now turn to the view called theistic evolution and then discuss our own position with a call to mark the common enemy of the evangelical community.

Most theistic evolutionists see little, if any, historical significance to the opening chapters of Genesis. They suggest that the Genesis narrative was designed to show the Israelites that there is one God and He has created everything, including those things which the surrounding nations worshipped as gods. In essence, Genesis chapter one is religious and theological, not historical and scientific.{7}

Another view of the account of creation according to Genesis that has become popular with progressive creationists as well as theistic evolutionists is the structural framework hypothesis.{8} This literary framework begins with the earth formless and void as stated in Genesis 1:2. The first three days of creation remove the formlessness of the earth, and the last three days fill the void of the earth. On days one

through three God creates light, sea and sky, and the land. On days four through six, God fills the heavens, sky, sea, and land. There was a pattern in the ancient Near East of a perfect work being completed in six days with a seventh day of rest. The six days were divided into three groups of two days each. In Genesis chapter one we also have the six days of work with a seventh day of rest, but the six days are divided into two groups of three days. So maybe this was only meant to say that God is Creator and His work is perfect.

Essentially, theistic evolutionists accept nearly all the scientific data of evolution including not only the age of the cosmos, but also the evolutionary relatedness of all living creatures. God either guided evolution or created the evolutionary process to proceed without need of interference.

Theistic evolutionists maintain that the evidence for evolution is so strong that they have simply reconciled their faith with reality. Since reading Genesis historically does not agree with what they perceive to be the truth about earth history, then Genesis, if it is to be considered God's Word, must mean something else. They do believe that God is continually upholding the universe, so He is involved in His creation.

Theistic evolution suffers the same problem with pain, suffering, and death before the Fall that progressive creation endures.{9} In addition, the many problems cited concerning the origin of life, the origin of major groups of organisms, and the origin of man remain severe problems for the theistic evolutionist as well as the secular evolutionist.{10} Some theistic evolutionists also quarrel with a literal Adam and Eve. If humans evolved from ape-like ancestors, then who were Adam and Eve? If Adam and Eve were not literal people, then is the Fall real? And how is redemption necessary if they are imaginary?

Call for Caution and Discussion

We have discussed the biblical and scientific foundations of three different Christian views of science and earth history. In so doing, we have tried to convey a sense of their strengths and limitations. The issue of the age of the earth is very controversial among evangelicals, particularly those who have chosen some field of science as their career.

Our intention has been to present these perspectives as objectively as possible so you, the reader, can make an informed decision. We have purposefully kept our own views out of this discussion until now. We would like to take a moment and explain the reasoning behind our position.

We have studied this issue for over twenty years and have read scholars, both biblical and scientific from all sides of the question. For some ten years now, we have been confirmed fence sitters. Yes, we are sorry to disappoint those of you who were waiting for us to tell you which view makes more sense, but we are decidedly undecided. This is by no means a political decision. We are not trying to please all sides, because if that were the case, we know we would please no one. The fact is, we are still searching.

Biblically, we find the young earth approach of six consecutive 24-hour days and a catastrophic universal flood to make the most sense. However, we find the evidence from science for a great age for the universe and the earth to be nearly overwhelming. We just do not know how to resolve the conflict yet. Earlier, we emphasized that the age question, while certainly important, is not the primary question in the origins debate. The question of chance versus design is the foremost issue. The time frame over which God accomplished His creation is not central.

Such indecision is not necessarily a bad thing. Davis Young in his book *Christianity and the Age of the Earth*, gives a wise

caution. Young outlines that both science and theology have their mysteries that remain unsolvable. And if each has its own mystery, how can we expect them to mesh perfectly?{11} The great 20th century evangelist, Francis Schaeffer said:

> We must take ample time, and sometimes this will mean a long time, to consider whether the apparent clash between science and revelation means that the theory set forth by science is wrong or whether we must reconsider what we thought the Bible says. {12}

"What we thought the Bible says"? What does *that* mean?



In the sixteenth century, Michelangelo sculpted Moses coming down from Mount Sinai with two bumps on his head. The word which describes Moses' face as he came off the mountain, we now know means shining light, meaning Moses' face was radiant from having been in God's presence. But at that time it was thought to mean "goat horns."

So Michelangelo sculpted Moses with two horns on his head. That is what they thought the Bible literally said. Now we know better, and we changed our interpretation of this Scripture based on more accurate information. We believe we need even more accurate information from both the Bible and science to answer the age of the earth question.



The question concerning the age of the earth comes down to a matter of interpretation, both of science and the Bible. Ultimately, we believe there is a resolution to this dilemma. All truth is God's truth. Some suggest that perhaps God has created a universe with apparent age. That is certainly possible, but certain implications of this make us very uncomfortable. It is certainly true that any form of creation out of nothing implies some form of apparent age. God created Adam as an adult who appeared to have been alive for several decades though only a few seconds into his existence.

Scientists have observed supernova from galaxies that are hundreds of thousands of light years away. We know that many of these galaxies must be this distant because if they were all within a few thousand light years, then the nighttime sky would be brilliant indeed. These distant galaxies are usually explained in terms of God creating the light in transit so we can see them today. These observed star explosions mean that they never happened in an apparent age universe. Therefore, we are viewing an event that never occurred. This is like having videotape of Adam's birth. Would supernovas that never happened make God deceptive?

Therefore, we believe we must approach this question with humility and tolerance for those with different convictions. The truth will eventually be known. In the meantime, let us search for it together without snipping at each other's heels.

Notes

1. Henry Morris, *The Genesis Record* (Grand Rapids, MI: Baker Book House, 1976), 37-81.
2. Steven A. Austin, ed., *Grand Canyon: Monument to Catastrophe* (Santee, CA: Institute for Creation Research, 1994), 284.
3. Daniel E. Wonderly, *Neglect of Geologic Data: Sedimentary Strata Compared with Young-Earth Creationist Writings* (Hatfield, PA: Interdisciplinary Biblical Research Institute, 1987), 130. Howard J. Van Till, Robert Snow, John Stek, and Davis A. Young, *Portraits of Creation: Biblical and Scientific Perspectives on the World's Formation* (Grand Rapids, MI: Eerdmans Pub. Co, 1990), 26-125.
4. Hugh Ross, *Creation and Time* (Colorado Springs, CO: NAVPRESS, 1994), 45-72.
5. Ibid., 73-80.
6. Stephen Jay Gould, "Darwin and Paley Meet the Invisible Hand," *Natural History* (November 1990):8. Mark Van Bebber and Paul S. Taylor, *Creation and Time: A Report on the Progressive Creationist Book by Hugh Ross* (Mesa, AZ: Eden Communications, 1994), 128.
7. Van Till, et al., *Portraits of Creation*, 232-242.
8. Umberto Cassuto, *A Commentary on the Book of Genesis: Part 1: From Adam to Noah*, trans. Israel Abrahams (Jerusalem Magnum Press, 1978), 12-17. Henri Blocher, *In the Beginning: The Opening Chapters of Genesis*, trans. David G. Preston (Leciester Press and Downers Grove: InterVarsity Press, 1984), 49-59.
9. Ken Ham, *Evolution: The Lie* (El Cajon, CA: Creation-Life Pub., 1987).
10. Phillip E. Johnson, *Darwin on Trial*, 2nd ed. (Downers Grove, IL: InterVarsity Press, 1993), 15-112, 166-170.
11. Davis A. Young, *Christianity and the Age of the Earth* (Grand Rapids: Zondervan, 1982), 158.
12. Francis Schaeffer, *No Final Conflict* (Downers Grove: InterVarsity Press, 1975), 24.

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Euthanasia: A Christian Perspective

Kerby Anderson looks at euthanasia from a distinctly Christian perspective. Applying a biblical view gives us clear understanding that we are not lord of our own life or anyone elses.

 *This article is also available in Spanish.*

Debate over euthanasia is not a modern phenomenon. The Greeks carried on a robust debate on the subject. The Pythagoreans opposed euthanasia, while the Stoics favored it in the case of incurable disease. Plato approved of it in cases of terminal illness.(1) But these influences lost out to Christian principles as well as the spread of acceptance of the Hippocratic Oath: "I will neither give a deadly drug to anybody if asked for it, nor will I make a suggestion to that effect."

In 1935 the Euthanasia Society of England was formed to promote the notion of a painless death for patients with incurable diseases. A few years later the Euthanasia Society of America was formed with essentially the same goals. In the last few years debate about euthanasia has been advanced by two individuals: Derek Humphry and Dr. Jack Kevorkian.

Derek Humphry has used his prominence as head of the Hemlock Society to promote euthanasia in this country. His book *Final Exit: The Practicalities of Self-Deliverance and Assisted Suicide for the Dying* became a bestseller and further

influenced public opinion.

Another influential figure is Jack Kevorkian, who has been instrumental in helping people commit suicide. His book *Prescription Medicide: The Goodness of Planned Death* promotes his views of euthanasia and describes his patented suicide machine which he calls "the Mercitron." He first gained national attention by enabling Janet Adkins of Portland, Oregon, to kill herself in 1990. They met for dinner and then drove to a Volkswagen van where the machine waited. He placed an intravenous tube into her arm and dripped a saline solution until she pushed a button which delivered first a drug causing unconsciousness, and then a lethal drug that killed her. Since then he has helped dozens of other people do the same.

Over the years, public opinion has also been influenced by the tragic cases of a number of women described as being in a "persistent vegetative state." The first was Karen Ann Quinlan. Her parents, wanting to turn the respirator off, won approval in court. However, when it was turned off in 1976, Karen continued breathing and lived for another ten years. Another case was Nancy Cruzan, who was hurt in an automobile accident in 1983. Her parents went to court in 1987 to receive approval to remove her feeding tube. Various court cases ensued in Missouri, including her parents' appeal that was heard by the Supreme Court in 1990. Eventually they won the right to pull the feeding tube, and Nancy Cruzan died shortly thereafter.

Seven years after the Cruzan case, the Supreme Court had occasion to rule again on the issue of euthanasia. On June 26, 1997 the Supreme Court rejected euthanasia by stating that state laws banning physician-assisted suicide were constitutional. Some feared that these cases (*Glucksburg v. Washington* and *Vacco v. Quill*) would become for euthanasia what Roe v. Wade became for abortion. Instead, the justices rejected the concept of finding a constitutional "right to die" and chose not to interrupt the political debate (as *Roe*

v. Wade did), and instead urged that the debate on euthanasia continue “as it should in a democratic society.”

Voluntary, Active Euthanasia

It is helpful to distinguish between mercy-killing and what could be called mercy-dying. Taking a human life is not the same as allowing nature to take its course by allowing a terminal patient to die. The former is immoral (and perhaps even criminal), while the latter is not.

However, drawing a sharp line between these two categories is not as easy as it used to be. Modern medical technology has significantly blurred the line between hastening death and allowing nature to take its course.

Certain analgesics, for example, ease pain, but they can also shorten a patient’s life by affecting respiration. An artificial heart will continue to beat even after the patient has died and therefore must be turned off by the doctor. So the distinction between actively promoting death and passively allowing nature to take its course is sometimes difficult to determine in practice. But this fundamental distinction between life-taking and death- permitting is still an important philosophical distinction.

Another concern with active euthanasia is that it eliminates the possibility for recovery. While this should be obvious, somehow this problem is frequently ignored in the euthanasia debate. Terminating a human life eliminates all possibility of recovery, while passively ceasing extraordinary means may not. Miraculous recovery from a bleak prognosis sometimes occurs. A doctor who prescribes active euthanasia for a patient may unwittingly prevent a possible recovery he did not anticipate.

A further concern with this so-called voluntary, active euthanasia is that these decisions might not always be freely made. The possibility for coercion is always present. Richard

D. Lamm, former governor of Colorado, said that elderly, terminally ill patients have “a duty to die and get out of the way.” Though those words were reported somewhat out of context, they nonetheless illustrate the pressure many elderly feel from hospital personnel.

The Dutch experience is instructive. A survey of Dutch physicians was done in 1990 by the Remmelink Committee. They found that 1,030 patients were killed without their consent. Of these, 140 were fully mentally competent and 110 were only slightly mentally impaired. The report also found that another 14,175 patients (1,701 of whom were mentally competent) were denied medical treatment without their consent and died.(2)

A more recent survey of the Dutch experience is even less encouraging. Doctors in the United States and the Netherlands have found that though euthanasia was originally intended for exceptional cases, it has become an accepted way of dealing with serious or terminal illness. The original guidelines (that patients with a terminal illness make a voluntary, persistent request that their lives be ended) have been expanded to include chronic ailments and psychological distress. They also found that 60 percent of Dutch physicians do not report their cases of assisted suicide (even though reporting is required by law) and about 25 percent of the physicians admit to ending patients’ lives without their consent.(3)

Involuntary, Active Euthanasia

Involuntary euthanasia requires a second party who makes decisions about whether active measures should be taken to end a life. Foundational to this discussion is an erosion of the doctrine of the sanctity of life. But ever since the Supreme Court ruled in *Roe v. Wade* that the life of unborn babies could be terminated for reasons of convenience, the slide down society’s slippery slope has continued even though the Supreme Court has been reluctant to legalize euthanasia.

The progression was inevitable. Once society begins to devalue the life of an unborn child, it is but a small step to begin to do the same with a child who has been born. Abortion slides naturally into infanticide and eventually into euthanasia. In the past few years doctors have allowed a number of so-called "Baby Does" to die—either by failing to perform lifesaving operations or else by not feeding the infants.

The progression toward euthanasia is inevitable. Once society becomes conformed to a "quality of life" standard for infants, it will more willingly accept the same standard for the elderly. As former Surgeon General C. Everett Koop has said, "Nothing surprises me anymore. My great concern is that there will be 10,000 Grandma Does for every Baby Doe."(4)

Again the Dutch experience is instructive. In the Netherlands, physicians have performed involuntary euthanasia because they thought the family had suffered too much or were tired of taking care of patients. American surgeon Robin Bernhoft relates an incident in which a Dutch doctor euthanized a twenty-six-year-old ballerina with arthritis in her toes. Since she could no longer pursue her career as a dancer, she was depressed and requested to be put to death. The doctor complied with her request and merely noted that "one doesn't enjoy such things, but it was her choice."(5)

Physician-Assisted Suicide

In recent years media and political attention has been given to the idea of physician-assisted suicide. Some states have even attempted to pass legislation that would allow physicians in this country the legal right to put terminally ill patients to death. While the Dutch experience should be enough to demonstrate the danger of granting such rights, there are other good reasons to reject this idea.

First, physician-assisted suicide would change the nature of the medical profession itself. Physicians would be cast in the

role of killers rather than healers. The Hippocratic Oath was written to place the medical profession on the foundation of healing, not killing. For 2,400 years patients have had the assurance that doctors follow an oath to heal them, not kill them. This would change with legalized euthanasia.

Second, medical care would be affected. Physicians would begin to ration health care so that elderly and severely disabled patients would not be receiving the same quality of care as everyone else. Legalizing euthanasia would result in less care, rather than better care, for the dying.

Third, legalizing euthanasia through physician-assisted suicide would effectively establish a right to die. The Constitution affirms that fundamental rights cannot be limited to one group (e.g., the terminally ill). They must apply to all. Legalizing physician-assisted suicide would open the door to anyone wanting the "right" to kill themselves. Soon this would apply not only to voluntary euthanasia but also to involuntary euthanasia as various court precedents begin to broaden the application of the right to die to other groups in society like the disabled or the clinically depressed.

Biblical Analysis

Foundational to a biblical perspective on euthanasia is a proper understanding of the sanctity of human life. For centuries Western culture in general and Christians in particular have believed in the sanctity of human life. Unfortunately, this view is beginning to erode into a "quality of life" standard. The disabled, retarded, and infirm were seen as having a special place in God's world, but today medical personnel judge a person's fitness for life on the basis of a perceived quality of life or lack of such quality.

No longer is life seen as sacred and worthy of being saved. Now patients are evaluated and life-saving treatment is frequently denied, based on a subjective and arbitrary

standard for the supposed quality of life. If a life is judged not worthy to be lived any longer, people feel obliged to end that life.

The Bible teaches that human beings are created in the image of God (Gen. 1:26) and therefore have dignity and value. Human life is sacred and should not be terminated merely because life is difficult or inconvenient. Psalm 139 teaches that humans are fearfully and wonderfully made. Society must not place an arbitrary standard of quality above God's absolute standard of human value and worth. This does not mean that people will no longer need to make difficult decisions about treatment and care, but it does mean that these decisions will be guided by an objective, absolute standard of human worth.

The Bible also teaches that God is sovereign over life and death. Christians can agree with Job when he said, "The Lord gave and the Lord has taken away. Blessed be the name of the Lord" (Job 1:21). The Lord said, "See now that I myself am He! There is no god besides me. I put to death and I bring to life, I have wounded and I will heal, and no one can deliver out of my hand" (Deut. 32:39). God has ordained our days (Ps. 139:16) and is in control of our lives.

Another foundational principle involves a biblical view of life- taking. The Bible specifically condemns murder (Exod. 20:13), and this would include active forms of euthanasia in which another person (doctor, nurse, or friend) hastens death in a patient. While there are situations described in Scripture in which life-taking may be permitted (e.g., self-defense or a just war), euthanasia should not be included with any of these established biblical categories. Active euthanasia, like murder, involves premeditated intent and therefore should be condemned as immoral and even criminal.

Although the Bible does not specifically speak to the issue of euthanasia, the story of the death of King Saul (2 Sam. 1:9-16) is instructive. Saul asked that a soldier put him to

death as he lay dying on the battlefield. When David heard of this act, he ordered the soldier put to death for “destroying the Lord’s anointed.” Though the context is not euthanasia per se, it does show the respect we must show for a human life even in such tragic circumstances.

Christians should also reject the attempt by the modern euthanasia movement to promote a so-called “right to die.” Secular society’s attempt to establish this “right” is wrong for two reasons. First, giving a person a right to die is tantamount to promoting suicide, and suicide is condemned in the Bible. Man is forbidden to murder and that includes murder of oneself. Moreover, Christians are commanded to love others as they love themselves (Matt. 22:39; Eph. 5:29). Implicit in the command is an assumption of self-love as well as love for others.

Suicide, however, is hardly an example of self-love. It is perhaps the clearest example of self-hate. Suicide is also usually a selfish act. People kill themselves to get away from pain and problems, often leaving those problems to friends and family members who must pick up the pieces when the one who committed suicide is gone.

Second, this so-called “right to die” denies God the opportunity to work sovereignly within a shattered life and bring glory to Himself. When Joni Eareckson Tada realized that she would be spending the rest of her life as a quadriplegic, she asked in despair, “Why can’t they just let me die?” When her friend Diana, trying to provide comfort, said to her, “The past is dead, Joni; you’re alive,” Joni responded, “Am I? This isn’t living.”(6) But through God’s grace Joni’s despair gave way to her firm conviction that even her accident was within God’s plan for her life. Now she shares with the world her firm conviction that “suffering gets us ready for heaven.”(7)

The Bible teaches that God’s purposes are beyond our understanding. Job’s reply to the Lord shows his

acknowledgment of God's purposes: "I know that you can do all things; no plan of yours can be thwarted. You asked, 'Who is this that obscures my counsel without knowledge?' Surely I spoke of things I did not understand, things too wonderful for me to know" (Job 42:2-3). Isaiah 55:8-9 teaches, "For my thoughts are not your thoughts, neither are your ways my ways, declares the Lord. As the heavens are higher than the earth, so are my ways higher than your ways and my thoughts than your thoughts."

Another foundational principle is a biblical view of death. Death is both unnatural and inevitable. It is an unnatural intrusion into our lives as a consequence of the fall (Gen. 2:17). It is the last enemy to be destroyed (1 Cor. 15:26, 56). Therefore Christians can reject humanistic ideas that assume death as nothing more than a natural transition. But the Bible also teaches that death (under the present conditions) is inevitable. There is "a time to be born and a time to die" (Eccles. 3:2). Death is a part of life and the doorway to another, better life.

When does death occur? Modern medicine defines death primarily as a biological event; yet Scripture defines death as a spiritual event that has biological consequences. Death, according to the Bible, occurs when the spirit leaves the body (Eccles. 12:7; James 2:26).

Unfortunately this does not offer much by way of clinical diagnosis for medical personnel. But it does suggest that a rigorous medical definition for death be used. A comatose patient may not be conscious, but from both a medical and biblical perspective he is very much alive, and treatment should be continued unless crucial vital signs and brain activity have ceased.

On the other hand, Christians must also reject the notion that everything must be done to save life at all costs. Believers, knowing that to be at home in the body is to be away from the

Lord (2 Cor. 5:6), long for the time when they will be absent from the body and at home with the Lord (5:8). Death is gain for Christians (Phil. 1:21). Therefore they need not be so tied to this earth that they perform futile operations just to extend life a few more hours or days.

In a patient's last days, everything possible should be done to alleviate physical and emotional pain. Giving drugs to a patient to relieve pain is morally justifiable. Proverbs 31:6 says, "Give strong drink to him who is perishing, and wine to him whose life is bitter." As previously mentioned, some analgesics have the secondary effect of shortening life. But these should be permitted since the primary purpose is to relieve pain, even though they may secondarily shorten life.

Moreover, believers should provide counsel and spiritual care to dying patients (Gal. 6:2). Frequently emotional needs can be met both in the patient and in the family. Such times of grief also provide opportunities for witnessing. Those suffering loss are often more open to the gospel than at any other time.

Difficult philosophical and biblical questions are certain to continue swirling around the issue of euthanasia. But in the midst of these confusing issues should be the objective, absolute standards of Scripture, which provide guidance for the

Notes

1. Plato, *Republic* 3. 405.

2. R. Finigsen, "The Report of the Dutch Committee on Euthanasia," *Issues in Law and Medicine*, July 1991, 339-44.

3. Herbert Hendlin, Chris Rutenfrans, and Zbigniew Zylicz, "Physician-Assisted Suicide and Euthanasia in the Netherlands: Lessons from the Dutch," *Journal of the American Medical Association* 277 (4 June 1997): 1720-2.

4. Interview with Koop, “Focus on the Family” radio broadcast.

5. Robin Bernhoft, quoted in *Euthanasia: False Light*, produced by IAETF, P.O. Box 760, Steubenville, OH 43952.

6. Joni Eareckson, *Joni* (Grand Rapids: Zondervan, 1976).

7. Joni Eareckson, *A Step Further* (Grand Rapids: Zondervan, 1978).

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Genetic Engineering

Kerby Anderson provides a biblical look at genetic engineering. Christians would be wise to distinguish between two types of research: genetic repair (acceptable) and the creation of new forms of life (unacceptable).

Genetic Diseases

The age of genetics has arrived. Society is in the midst of a genetic revolution that some futurists predict will have a greater impact on the culture than the industrial revolution. So, in this essay we are going to look at the area of genetic engineering.

The future of genetics, like that of any other technology, offers great promise but also great peril. Nuclear technology has provided nuclear medicine, nuclear energy, and nuclear weapons. Genetic technology offers the promise of a diverse array of good, questionable, and bad technological applications. Christians, therefore, must help shape the ethical foundations of this technology and its future

applications.

How powerful a technology is genetic engineering? For the first time in human history, it is possible to completely redesign existing organisms, including man, and to direct the genetic and reproductive constitution of every living thing. Scientists are no longer limited to breeding and cross-pollination. Powerful genetic tools allow us to change genetic structure at the microscopic level and bypass the normal processes of reproduction.

For the first time in human history, it is also possible to make multiple copies of any existing organism or of certain sections of its genetic structure. This ability to clone existing organisms or their genes gives scientists a powerful tool to reproduce helpful and useful genetic material within a population.

Scientists are also developing techniques to treat and cure genetic diseases through genetic surgery and genetic therapy. They can already identify genetic sequences that are defective, and soon scientists will be able to replace these defects with properly functioning genes.

At this point, let’s take a look at the nature of genetic diseases. Genetic diseases arise from a number of causes. The first are single-gene defects. Some of these single-gene diseases are dominant and therefore cannot be masked by a second normal gene on the homologous chromosome (the other strand of a chromosome pair). An example is Huntington’s chorea (a fatal disease that strikes in the middle of life and leads to progressive physical and mental deterioration). Many other single-gene diseases are recessive and are expressed only when both chromosomes have a defect. Examples of these diseases are sickle-cell anemia, which leads to the production of malformed red blood cells, and cystic fibrosis, which leads to a malfunction of the respiratory and digestive systems.

Another group of single-gene diseases includes the sex-linked diseases. Because the Y chromosome in men is much shorter than the X chromosome it pairs with, many genes on the X chromosome are absent on the homologous Y chromosome. Men, therefore, will show a higher incidence of genetic diseases such as hemophilia or color blindness. Even though these are recessive, males do not have a homologous gene on their Y chromosome that could contain a normal gene to mask it.

Another major cause of genetic disease is chromosomal abnormalities. Some diseases result from an additional chromosome. Down's syndrome is caused by trisomy-21 (three chromosomes at chromosome twenty-one). Klinefelter's syndrome results from the addition of an extra X chromosome (these men have a chromosome pattern that is XXY). Other genetic defects result from the duplication, deletion, or rearrangement (called translocation) of a gene sequence.

Genetic engineering offers the promise of eventually treating and curing these genetic defects. Although this is a promise in the future, we are already involved in genetic counseling and the significant ethical concerns it presents. Let's turn now to look at the topic of genetic counseling.

Genetic Counseling

As scientists have learned more about the genetic structure of human beings, they have been able to predict with greater certainty the likelihood of a couple bearing a child with a genetic disease. Each human being carries approximately three to eight genetic defects that might be passed on to their children. By checking family medical histories and taking blood samples (for chromosome counts and tests for recessive traits), a genetic counselor can make a fairly accurate prediction about the possibility of a couple having a child with a genetic disease.

Most couples, however, do not seek genetic counsel in order to

decide if they should have a child, but instead seek counsel to decide if they should abort a child that is already conceived. In cases in which the mother is already pregnant, the focus is not whether to prevent a pregnancy but whether to abort the unborn child. These circumstances raise some of the same ethical concerns as abortion.

Major deformities can be discovered through many advanced new techniques. One is ultrasound, which uses a type of sonar to determine the size, shape, and sex of the fetus. An ultrasound transducer is placed on the mother's abdomen and sound waves are sent through the amniotic sac. The sonar waves are then picked up and transmitted to a video screen that provides important information about the characteristics of the fetus.

Another important tool is laparoscopy. A flexible fiber optic scope is inserted by the doctor through a small incision in the mother's abdomen. This tool allows the doctor to probe into the abdominal cavity.

Genetic defects can be detected in the womb through various prenatal tests. These tests can detect approximately two hundred genetic disorders. In the mid-1960s physicians began to use amniocentesis. A doctor inserts a four-inch needle into a pregnant woman's anesthetized abdomen in order to withdraw up to an ounce of amniotic fluid. As the fetus grows, cells are shed from the skin of the fetus, and these can be collected from the fluid and used to discover the sex and genetic make-up of the fetus.

For years, doctors used this procedure to identify congenital defects by the twentieth week of pregnancy. Now more doctors use another technique called chorionic villus sampling (CVS), which can produce the same information at ten weeks. Doctors also use a blood test known as maternal serum alfa-fetoprotein (MSAFP). This test, usually done between the fifteenth and twentieth week, can detect a neural tube defect of the spinal cord or brain, such as spina bifida or Down's syndrome.

The newest procedure is called BABI (blastomere analysis before implantation). Using reproductive technologies, a couple can conceive several embryos in test tubes and discard those exhibiting known defects. A doctor gives a woman a drug to stimulate ovulation, then extracts eggs from her ovaries and mixes them with her husband’s sperm. So far, the procedure has been used to test embryos for such hereditary diseases as Tay-Sachs and Duchenne muscular dystrophy.

Using these techniques to give genetic information to couples is not wrong in itself. But, since most of these genetic diseases cannot be cured, the tacit assumption is that abortion will be used if any defects are found. Many doctors and clinics will not do genetic tests unless a couple gives prior consent to abortion. Thus genetic counseling can often raise ethical questions, and this is especially true when abortion is involved.

Next, we’ll look at the future promise of genetic engineering found in gene splicing.

Gene Splicing: Scientific Benefits and Concerns

For the remainer of this essay, I would like to focus on the issue of gene splicing, also known as recombinant DNA research. This new technology began in the 1970s with new genetic techniques that allowed scientists to cut small pieces of DNA (known as plasmids) into small segments that could be inserted in host DNA. The new creatures that were designed have been called DNA chimeras because they are conceptually similar to the mythological Chimera (a creature with the head of a lion, the body of a goat, and the tail of a serpent).

Gene splicing is fundamentally different from other forms of genetic breeding used in the past. Breeding programs work on existing arrays of genetic variability in a species, isolating specific genetic traits through selective breeding. Scientists

using gene splicing can essentially “stack” the deck or even produce an entirely new deck of genetic “cards.”

But this powerful ability to change the genetic deck of cards also raises substantial scientific concerns that some “sleight-of-hand” would produce dangerous consequences. Ethan Singer said, “Those who are powerful in society will do the shuffling; their genes will be shuffled in one direction, while the genes of the rest of us will get shuffled in another.” Also there is the concern that a reshuffled deck of genes might create an Andromeda strain similar to the one envisioned by Michael Crichton is his book by the same title. A microorganism might inadvertently be given the genetic structure for some pathogen for which there is no antidote or vaccine.

In the early days of this research, scientists called for a moratorium until the risks of this new technology could be assessed. Even after the National Institute of Health issued guidelines, public fear was considerable. When Harvard University planned to construct a genetic facility for gene splicing, the mayor of Cambridge, Massachusetts, expressed his concern that “something could crawl out of the laboratory, such as a Frankenstein.”

The potential benefits of gene splicing are significant. First, the technology can be used to produce medically important substances. The list of these substances is quite large and would include insulin, interferon, and human growth hormone. Gene splicing also has great application in the field of immunology. In order to protect organisms from viral disease, doctors must inject a killed or attenuated virus. Scientists can use the technology to disable a toxin gene, thus yielding a viral substance that triggers the generation of antibodies without the possibility of producing the disease.

A second benefit is in the field of agriculture. This

technology can improve the genetic fitness of various plant species. Basic research using this technology could increase the efficiency of photosynthesis, increase plant resistance (to salinity, drought, or viruses), and reduce a plant's demand for nitrogen fertilizer.

Third, gene splicing can aid industrial and environmental processes. Industries that manufacture drugs, plastics, industrial chemicals, vitamins, and cheese will benefit from this technology. Scientists have already begun to develop organisms that can clean up oil spills or toxic wastes.

This last benefit, however, also raises one of the greatest scientific concerns over genetic technology. The escape (or even intentional release) of a genetically engineered organism might wreak havoc on the environment. Scientists have created microorganisms that dissolve oil spills or reduce frost on plants. Critics of gene splicing fear that radically altered organisms could occupy new ecological niches, destroy existing ecosystems, or drive certain species to extinction.

Gene Splicing: Legal and Ethical Concerns

Now, we want to focus on the legal and ethical concerns of gene splicing.

Legal concerns also surround genetic technology. The Supreme Court ruled that genetically engineered organisms as well as the genetic processes that created them can be patented. The original case involved a microorganism designed to eat up oil-slicks; it was patented by General Electric. Since 1981 the U.S. Patent and Trademark Office has approved nearly 12,000 patents for genetic products and processes. Scientists have been concerned that the prospects of profit have decreased the relatively free flow of scientific information. Often scientists-turned-entrepreneurs refuse to share their findings for fear of commercial loss.

Even more significant is the question of whether life should even be patented at all. Most religious leaders say no. A 1995 gathering of 187 religious leaders representing virtually every major religious tradition spoke out against the patenting of genetically engineered substances. They argued that life is the creation of God, not humans, and should not be patented as human inventions.

The broader theological question is *whether* genetic engineering should be used and, if permitted, *how* it should be used. The natural reaction for many in society is to reject new forms of technology because they are dangerous. Christians, however, should take into account God's command to humankind in the cultural mandate (Gen. 1:28). Christians should avoid the reflex reaction that scientists should not tinker with life; instead Christians should consider how this technology should be used responsibly.

One key issue is the worldview behind most scientific research. Modern science rests on an evolutionary assumption. Many scientists assume that life on this planet is the result of millions of years of a chance evolutionary process. They conclude, therefore, that intelligent scientists can do a better job of directing the evolutionary process than nature can do by chance. Even so, many evolutionary scientists warn of this potential danger. Ethan Singer believes that scientists will "verify a few predictions, and then gradually forget that knowing something isn't the same as knowing everything. . . . At each stage we will get a little cockier, a little surer we know all the possibilities."

Some evolutionary scientists have always believed they could control evolution. In essence, gene splicing gives them the tools they have wanted. Julian Huxley looked forward to the day in which scientists could fill the "position of business manager for the cosmic process of evolution." Certainly this technology enables scientists to create new forms of life and alter existing forms in ways that have been impossible until

now.

How should Christians respond? They should humbly acknowledge that God is the sovereign Creator and that man has finite knowledge. Genetic engineering gives scientists the god-like technological ability, but without the wisdom, knowledge, and moral capacity to behave like God.

Even evolutionary scientists who deny the existence of God and believe that all life is the result of an impersonal evolutionary process express concern about the potential dangers of this technology. Erwin Chargaff asked, “Have we the right to counteract, irreversibly, the evolutionary wisdom of millions of years, in order to satisfy the ambition and curiosity of a few scientists?” His answer is no. The Christian’s answer should also be the same when we realize that God is the Creator of life. We do not have the right to “rewrite the sixth day of creation.”

But can gene splicing be used responsibly? We’ll address that question next as we attempt to put forward a biblical framework for genetic engineering.

A Biblical Framework for Genetic Engineering

When faced with the complexities of modern life, and especially with modern technology, many tend to exert the mental reflex of condemning all forms of genetic engineering. So the obvious first question is whether genetic engineering should be used at all. Then, if it is permissible, we should ask how it should be used.

Christians must resist the tendency to reject technology merely because it is foreign or merely because it is technology. God’s command to humankind in the cultural mandate (Gen. 1:28) instructs us to develop and use technology wisely. Christians should avoid the reflex reaction that scientists should not tinker with life; instead Christians should develop a biblical framework to guide responsible use of this

technology.

In developing this framework, I believe we must distinguish between two types of research. The first could be called genetic repair. This research attempts to remove genetic defects and develop techniques that will provide treatments for existing diseases. Applications would include various forms of genetic therapy and genetic surgery as well as modifications of existing microorganisms in order to produce beneficial results.

The Human Genome Project is helping scientists to pinpoint the location and sequence of the approximately 100,000 human genes. Further advances in gene splicing will allow scientists to repair defective sequences and eventually remove these genetic diseases from our population.

Genetic disease is not part of God's plan for the world. It is the result of the Fall (Gen. 3). Christians can apply technology to fight these evils without being accused of fighting against God's will. Genetic engineering can and should be used to treat and cure genetic diseases.

A second type of research is the creation of new forms of life. While minor modifications of existing organisms may be permissible, Christians should be concerned about the large-scale production of novel life forms. Their potential impact on the environment and on mankind could be considerable. Science is replete with examples of what can happen when an existing organism is introduced into a new environment (e.g., the rabbit into Australia, the rat to Hawaii, or the gypsy moth in the United States). One can only imagine the potential devastation that could occur when a newly created organism is introduced into a new environment.

God created plants and animals as "kinds" (Gen. 1:24). While there is minor variability within these created kinds, there are built-in barriers between these created kinds. Redesigning

creatures of any kind cannot be predicted the same way new elements on the periodic chart can be predicted for properties even before they are discovered. Recombinant DNA technology offers great promise in treating genetic disease, but Christians should also be vigilant. While this technology should be used to repair genetic defects, it should not be used to confer the role of creator on scientists.

I believe Christians involved in the scientific disciplines of biology, genetics, medicine, and molecular biology need to stand up and point the way to the wise and proper use of genetic engineering. The benefits are great, but so are the perils. As with any form of technology, Christians should thoughtfully and carefully promote the beneficial aspects of this technology while resisting and constraining its detrimental aspects.

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Evolution and the Pope

Are Science and Religion at War?

We have just passed the one hundredth anniversary of one of the more important books written about the interaction of science and Christianity. The book's title, *A History of the Warfare of Science with Theology in Christendom*, says much about the book.

Andrew White wrote the book in 1896 to justify his belief that a university should be without any religious affiliation. He was the founder and first president of Cornell University in New York and was very outspoken in his views about the

hindrance religion has been to scientific progress. It was White who popularized the view that there was a war between science and Christianity, and that in all cases science had ultimately been shown to be right.

A History of the Warfare of Science and Theology in Christendom is one long polemic attempting to show that religion has always held back the advance of science. The author maintains that if only theology would quit sticking its nose into the tent of science, everyone would be better off. Well into this century the book was regarded as being an important statement on the tension between science and religion.

One hundred years, however, has changed the tone of the discussion. Today many historians of science would agree that Christianity was a significant foundation for modern science, even though it is now viewed as an outmoded belief. For several reasons, then, it came to be commonly accepted that Christianity had played a key role in preparing the way for the development of modern science. First, Christians assumed they lived in a world that could be understood because it was created by a rational God—the same God who had also created them. This gave early scientists some reason to assume that nature might obey laws that could be known. Speaking about the view of the universe that the Church gave to the culture around it, the great mathematician and philosopher Alfred North Whitehead said early in this century, "When we compare this tone of thought [the faith in reason and the regularity of the universe] in Europe with the attitude of other civilizations when left to themselves, there seems but one source for its origin. It must come from the medieval insistence on the rationality of God."

Second, not only was the universe understandable because a rational God made it, but the Bible encouraged believers to look at God's creation for signs of His handiwork. For example, as early as the Psalms David had proclaimed, "The

heavens are telling of the glory of God" (Ps. 19:1). Scriptures such as this one, and many others, encouraged Christians to study nature to understand how it glorified God. Christians were confident that nature's design would show forth God's glory.

However, in the nineteenth and twentieth centuries much happened that eroded Christian confidence that they lived in a world crafted by God. In particular, Darwin's theory (that all organisms were descended from a common ancestor and that any appearances of design could be explained by natural selection working over long periods of time) came to have great acceptance among almost all scientists. For many the theory of evolution came to be seen as the complete answer as to why the world is as it is. For them, there was no need at all for a Creator or God to explain anything because evolution could, or would, explain everything.

A notable example of this position is the famous statement by astronomer Carl Sagan, "The universe is all that is or ever was or ever will be." With these words he began his immensely popular series about the universe, *Cosmos*. His words are the creed of the materialist (i.e., if it can be counted, measured, observed, experimented on, understood by natural laws, then it is real). Anything else is either meaningless or, at least, not scientific. According to this view, mountain goats are real because we can see them, touch them, put them in zoos. Angels, on the other hand, are not real because we can do none of these things to them. Science has to do with facts, and if there is any place for religion it is in the consideration of morals or ethics or those other areas where there are no facts.

But some people, such as Stephen Gould, a palaeontologist at Harvard, have remained open to dialogue on how religion and science can coexist. In his monthly column for *Natural History* magazine, he recently put forth his latest elaboration of how evolution, science, and religion are related. His proposed

resolution of this issue is the theme of this essay.

Stephen Gould, the evolutionary writer and scientist, addresses what are the proper bounds of science and religion in a recent *Natural History* magazine. He proposes a complete answer to the problem of how they relate to one another. Simply put, they don't interact at all. "The net of science," says Gould, "covers the empirical universe: what it is made of (fact) and why does it work this way (theory). The net of religion extends over questions of moral meaning and value. These two magisteria do not overlap."

The Roman Catholic Church uses the term *magisterium* to refer to its authority to teach in areas relating to the Bible and its interpretation. Gould borrows this term and applies it as well to the legitimate area that science teaches. So the Church may speak about moral issues and science about matters of fact and theory. For this somewhat unbalanced division he creates the wonderful phrase "nonoverlapping magisteria."

Has the Pope's View of Evolution Evolved?

Gould is certainly free to pontificate. However, what is somewhat mystifying is how he draws in Pope John Paul II as a prime supporter not only of his interesting distinction between science and religion, but also as a firm supporter of evolution!

On October 22, 1996, Pope John Paul addressed the Pontifical Academy of Sciences. The theme of their conference was to be the origin of life and evolution, so John Paul helpfully laid out what the Church had said over the last fifty years.

The Pope made clear that his predecessor, Pope Pius XI, had "considered the doctrine of 'evolutionism' a serious hypothesis." But, John Paul says, "Today, almost half a century after the publication of the encyclical [of Pius XI], new knowledge has led to the recognition of the theory of

evolution as more than a hypothesis. It is indeed remarkable that this theory has been progressively accepted by researchers, following a series of discoveries in various fields of knowledge. The convergence, neither sought nor fabricated, of the results of work that was conducted independently is in itself a significant argument in favor of this theory."

That is as far as John Paul's statement goes: evolution has moved from a serious hypothesis to a theory with significant arguments in its favor. Yet from this statement, Gould triumphantly draws an amazing observation:

> *In conclusion, Pius had grudgingly admitted evolution as a legitimate hypothesis that he regarded as only tentatively supported and potentially (as I suspect he hoped) untrue. John Paul, almost fifty years later…adds that additional data and theory have placed the factuality of evolution beyond reasonable doubt. Sincere Christians must now accept evolution not merely as a plausible possibility, but also as an effectively proven fact.*

Is this really what the Pope said? We'll now look more carefully at Gould's interpretation of the Pope's statement.

Does Evolution Fit the Truth About Man?

Stephen Gould, writing in *Natural History*, makes the Pope say something far more significant, and from Gould's point of view, a concession of defeat. How does Gould paraphrase John Paul's statement? "Sincere Christians must now accept evolution not merely as a plausible possibility, but also as an effectively proven fact."

Nevertheless, either by reading too rapidly or possessing too much enthusiasm for his own position, Gould misses critical distinctions that the Pope's announcement makes. To argue that the Pope's statement ("new knowledge has led to the

recognition of the theory of evolution as more than a hypothesis") means that "sincere Christians must now accept evolution not merely as a plausible possibility, but also as an effectively proven fact" is ludicrous. Gould almost twists the Pope's statement to contradict what he does say.

In fact, in his next paragraph, the Pope states: "A theory is a metascientific elaboration, distinct from the results of observation but consistent with them….Furthermore, while the formulation of a theory like evolution complies with the need for consistency with observed data, it borrows certain notions from natural philosophy."

"Metascientific" means going beyond the realms of science into an abstract, philosophical arena. So, the Pope says, evolution is more than a hypothesis; it is a theory, but as such, it also is "distinct from the result of observation" and borrows from philosophy. His next statement is one Gould may have skipped over:

> *And, to tell the truth, rather than the theory of evolution, we should speak of several theories of evolution. On the one hand, this plurality has to do with the different explanations advanced for the mechanism of evolution, and on the other, with the various philosophies on which it is based. Hence the existence of materialist, reductionist and spiritualist interpretations.*

So, rather than saying the words Gould puts in his mouth, the Pope actually says that not only is evolution based on a philosophy, but there are several theories, and he goes on to rule out some of them, at least for Roman Catholics. "Theories of evolution which, in accordance with the philosophies inspiring them, consider the spirit as emerging from the forces of living matter or as a mere epiphenomenon of this matter, are incompatible with the truth about man."

Gould wants the Pope to say, "You talk about science, and I'll

talk about religion. You can have the world of facts, and I'll take what's left. These areas won't overlap with each other, and we'll each stay in our own gardens." But the Pope is unwilling to follow Gould's convenient (for science) scheme. Instead, he firmly declares "The Church's magisterium is directly concerned with the question of evolution, for it involves the conception of man." This is what all of us who are Christians should be saying. Evolution, as it is usually put forward, is not just a theory about ancient data. It is also a philosophical statement about where man came from and what, if any, importance he has. While Gould claims his scientific views are not related to his moral views, his words give little support to this.

Is Christianity Concerned About Evolutionary Theories?

Early in his essay Gould has dispatched creationists with a few quick paragraphs. "Creationism does not pit science against religion, for no such conflict exists. Creationism does not raise any unsettled intellectual issues about the nature of biology or the history of life. Creationism is a local and parochial movement, powerful only in the United States among Western nations, and prevalent only among the few sectors of American Protestantism that choose to read the Bible as an inerrant document, literally true in every jot and tittle." Well, so much for a fair, informed assessment of one's opponents.

First he defines out of existence what creationists see as a central argument by merely saying "no such conflict exists." Then he proceeds to caricature creationists as a fringe group only found among a small group of Protestants. Prior to this he has equated "scientific creation," the view that the earth was created in six days and "only a few thousand years old," with all of creationism, which he fails to note includes even those who believe in evolution and an earth billions of years

old, but believe God superintended the process.

Gould's claim that "creationism does not raise any unsettled issues" ignores significant questions that have been raised about how life first arose from chemicals, about the source of the genetic code, and of the origination of new biological structures. But does the Pope truly believe in Gould's nonoverlapping magisteria? Gould's summation of the opening of John Paul's speech is that he "begins by summarizing Pius's older encyclical of 1950, and particularly reaffirming the NOMA principle [nonoverlapping magisteria] nothing new here."

Is this really what the Pope said? He begins by saying that "the origins of life and evolution [are] an essential subject which deeply interests the Church, since revelation, for its part, contains teachings concerning the nature and origins of man. . . . I would like to remind you that the magisterium of the Church has already made pronouncements on these matters within the framework of her own competence." This hardly sounds like there is no overlap between what the Church teaches and science. Toward the end of his remarks John Paul flatly contradicts Gould's neat distinction: "The Church's magisterium is directly concerned with the question of evolution for it involves the conception of man." So it would seem that Gould has used those parts of the Pope's speech which he likes and disregarded the rest.

Two points are important here. First, while Gould sets forth an interesting view about the relationship between science and religion and gives a new name to what used to be called "complementarity," it is not the view espoused by the Pope, and is almost antithetical to it. Second, Gould himself does not abide by this strict separationism in his own views, even when he claims to. When Gould actually makes his own moral position clear, it is hard to escape the conclusion that it comes directly from his views and philosophy as a scientist.

Why Trust Your Mind If No One Made It?

"As a moral position…I prefer the 'cold bath' theory that nature can be truly 'cruel' and 'indifferent.'" This is the summary of Harvard paleontologist Stephen Gould in his *Natural History* essay on how science and religion should relate to each other. "Science," Gould says, "covers the empirical universe: what is it made of (fact) and why does it work (theory)." Religion is left to cover "questions of moral meaning and value."

Gould calls his position nonoverlapping magisteria and claims the Pope holds the same view. As we stated earlier, this is far from true. But Gould then goes on to describe the moral view he takes.

Gould's position, which he immediately claims is not "a deduction from my knowledge of nature's factuality" is "nature was not constructed as our eventual abode, didn't know we were coming… and doesn't give a _____ about us (speaking metaphorically)." He says he finds such a view "liberating…because we then become free to conduct moral discourse…in our own terms, spared from the delusion that we might read moral truth passively from nature's factuality." It is indeed hard not to draw the conclusion that Gould has read his view about the process of evolution into his own moral position. How does he know that nature was not constructed for us if not from his studies of the natural world? How would he know it doesn't care about us unless somehow he saw this in his studies? Where else might he get such ideas?

In his speech, Pope John Paul II spoke quite candidly of his view of evolution:

> *And, to tell the truth, rather than the theory of evolution, we should speak of several theories of evolution. On the one hand, this plurality has to do with the different explanations advanced for the mechanism of evolution, and on*

the other, with the various philosophies on which it is based. Hence the existence of materialist, reductionist and spiritualist interpretations.

Stephen Gould has a materialist philosophy behind his theory of evolution. He believes that the material universe is all that exists, and that our own consciousness is a chance phenomena and does not come from a Creator. So, for Gould, where else can he draw his views about the meaning of life and what might be moral? His very thinking is a chance product of evolutionary processes that had no design, either to produce man or to give him a mind. Nonetheless, Gould trusts his mind not only to be able to distinguish between science and religion, he is sure that they should not influence one another.

Gould's view is a version of what is the common denominator of much of science today. At all costs religion must be kept out of science, or else science will cease to exist. Only material answers can be given to any question because the intervention of a Creator would negate the laws that govern science. What is missed in all of this is that without a Creator of some kind, not only is there no basis to trust the human mind to make true observations, but there is no reason to suppose that it would matter. Why worry about science or religion, and certainly why worry about whether they could have a negative effect on each other? If there is no God, there can only be arbitrary judgments. It is God who gives meaning to what we say and believe.

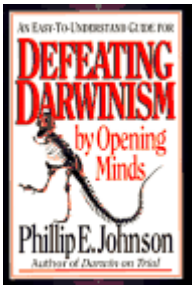
Christians serve a rational God who made both them and the world. On what does Gould base his trust in either science or the mind?

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Defeating Darwinism

Introduction

What's this? A lawyer debating philosophy with scientists? If you keep close tabs on the creation/evolution debate, you've probably already heard the name Phillip Johnson. If not, but you're interested in seeing how one Christian is challenging the dogma of Darwinism, you'll want to know about this man.



Phillip Johnson is a law professor at the University of California, Berkley. In 1997 InterVarsity Press published *Defeating Darwinism by Opening Minds*, Johnson's third book in his debate with naturalistic evolution. His first book, *Darwin On Trial*, examined the scientific evidence for evolution and launched a series of lectures and debates across the United States and overseas in universities and on radio and television. His second book, *Reason in the Balance*, examined the influence of naturalism in the spheres of science, law, and education. *Defeating Darwinism* brings his case to high school and early college-level students and their parents.

So, what prompted a law professor to take on the evolutionists? It seems that Johnson became aware of a significant difference between the way the theory of evolution is presented to the public and the way it's discussed among scientists. To the general public, evolution is presented as being settled with respect to the really important questions. Among scientists, however, there is still no consensus as to

how evolution could have occurred. As another author said, evolution is a theory in crisis. Professor Johnson studied the literature closely and concluded that what keeps the "evolution-as-fact" dogma alive is not scientific evidence at all, but rather a commitment to the philosophy of naturalism.

Naturalism is the belief that everything that exists is on the same basic level, that of nature. There is no God who created the universe whether in six days or in 40 million years.

One needs to be cautious here. Many scientists believe in God. However, the rule of the day in the laboratory and the classroom is a commitment to the philosophy of naturalism or at least to practical naturalism. Consequently, whether there is a God or not, no reference can be made to Him in the realm of scientific study.

Two reasons come to mind to explain why Johnson has received such a wide hearing in secular academia. First, he keeps the focus on evolution, *not* on a particular theory of creation. This is annoying to evolutionists. But Johnson knows that as soon as he allows his views to be put under the spotlight, the debate will be over. Why? Because the evolutionists will immediately label his views as "religious," and he will be dismissed out of hand. Second, he is a legal scholar with years of experience in the logical analysis of evidence. He has the skill to carefully dissect the arguments of evolutionists, show their weaknesses, and reveal their unargued presuppositions.

In this essay we'll take a closer look at Johnson's book *Defeating Darwinism*. We'll see how evolution gained dominance as a theory of origins, and we'll learn how Johnson exposes its UNscientific foundations. I urge you to get a copy of this book even if science isn't your area, just to learn one way to engage our culture in the realm of ideas.

Where's the Beef?

In his new book, *Defeating Darwinism By Opening Minds*, Phillip Johnson seeks to help high-school and college students and their parents evaluate the claims of Darwinism.

In his first book, *Darwin on Trial,* Johnson described the evidential problems with evolution in some detail. In *Defeating Darwinism*, he simply notes that possible transitional forms in the fossil record are very few in number and they are not found where fossil evidence is most plentiful. The problem, he says, is that textbooks and museums often present evidence in a way that implies there is more evidence available than there really is. As an example, Johnson points to an exhibit in San Francisco called the "Hard Facts Wall" which fills in gaps in the fossil record with imaginary ancestors. Says Johnson:

> *Visitors to the museum at first take the exhibit at face value; after I explain it to them, they are astonished that a reputable museum would commit such a deception. But the museum curators are not consciously dishonest; they are true believers who are just trying too hard to help the public get to the right' answer.(1)*

Even though the physical evidence is not there, and there is no known mechanism for the transition from one type of organism to another, the scientific community clings to evolution as fact. The reasoning seems to be this: Since science studies the natural order, scientific theory must remain within naturalistic bounds. Since neo-Darwinism is the best naturalistic theory, it *must* be true. This commitment extends beyond simply influencing scientific study; it is indoctrinated into students as the way things are. Johnson says that, "When students ask intelligent questions like 'Is this stuff really true?' teachers are encouraged or required not to take the questions seriously."(2)

A fifteen-year-old high school student found out about the power of Darwinist orthodoxy when he challenged a requirement to watch a program on public television which promoted the "molecule to man" theory as fact. When school administrators showed an inclination to go along, the bottom fell out. Johnson stated, "the Darwinists, . . . flooded the city's newspapers with their letters. Some of the letters were so venomous that the editorial page editor of the Denver Post admitted that her liberal faith had been shaken."(3) When CBS carried the story, a prominent evolutionist made the teenager out to be an enemy of education. Orthodoxy is not to be questioned.

One of the most significant factors in establishing the reign of evolution was the movie *Inherit the Wind*, the imaginative re-telling of the story of the Scopes "Monkey Trial" of 1925. The trial is presented as a David-and-Goliath match between the few reasonable and enlightened advocates of progress and the forces of ignorance and oppression who are shackled by their "Old Time Religion." The important players were caricatured and significant details were completely falsified, but the point was made: religion can co-exist with science, but only if it minds its own business.

The book *Defeating Darwinism* is an important contribution not only because of the questions it raises about evolution, but also because it teaches the reader *how* to think about issues. Next, we'll look at some fallacious arguments evolutionists use.

Baloney Detectors Wanted

In his book *Defeating Darwinism by Opening Minds*, Phillip Johnson analyzes the role *Inherit the Wind* played in our thinking about the relation of religion and science. This was the play—and later the movie—which retold the story of the Scopes "Monkey Trial" of 1925. One significant character who only appeared for a few minutes was the Radio Man, the radio

announcer who made a live broadcast from the courtroom.

Near the end of the play, when the prosecuting attorney launches into a long speech denouncing the evils of evolution, the radio program director decides that the attorney's speech has become boring, and Radio Man turns off the microphone. This is the only microphone in the courtroom. Johnson sees this move as symbolic. He says: "That is why what happened in the real-life Scopes trial hardly matters; the writers and producers of *Inherit the Wind* owned the microphone, making their interpretation far more important than the reality."(4)

This example illustrates one of several logical fallacies evolutionists sometimes commit which Johnson exposes in his chapter "Tuning Up Your Baloney Detector." This first fallacy is the selective use of evidence. Radio Man could broadcast what *he* wanted people to hear without giving the other side equal time. What we hear about today, says Johnson, are the evidences which seem to support evolution. What we don't hear about is the absence of significant evidence in the fossil record as a whole. Seeing the entire picture can, and should, easily give one doubts about the story we're now being told by the evolutionists.

Another fallacy evolutionists sometimes employ is the *ad hominem* argument, or the argument "against the man." If a doubter can be labeled a "fundamentalist" or a believer in "creation science" (meaning creation in six, twenty-four hour days), his doubts can be set aside on the grounds of religious prejudice.

Johnson cautions us to watch out also for "vague terms and shifting definitions." The word *evolution*, for example, can mean different things. Are we speaking of microevolution, small changes within a species, or are we talking about macroevolution, major mutations from one type of organism to another? As Johnson says, "That one word *evolution* can mean something so tiny it hardly matters, or so big it explains the

whole history of the universe."(5)

Johnson notes that fewer than 10 per cent of Americans actually believe that "humans . . . were created by a materialistic evolutionary process in which God played no part."(6) Nonetheless, the vast majority who doubt this are not allowed to think for themselves on the matter of the fact of evolution. Rather than being educated to think for themselves, students are indoctrinated with the dogmatic claims of evolutionists.

In response, Johnson urges students to discern whether what they are being taught is simply assumed or whether it is based on real evidence. When evolutionists insist on the *fact* of evolution without having concrete evidence, and without having any idea of the *mechanism* of evolution, they're revealing a faith commitment.

Although Johnson's particular strength is in exposing the flaws in evolutionists' arguments, he also presents a positive case for intelligent design in the creation of life. We'll look at that subject next.

Intelligent Design

When Charles Darwin presented his theory of evolution, little was known about what goes on inside living cells. They were "black boxes," objects the insides of which were unknown. With the development of molecular biology, scientists have come to realize that cells are extremely complex.

In his book, *Defeating Darwinism by Opening Minds*, Phillip Johnson introduces the reader to some exciting new discoveries in biology which he believes deal a significant blow to Darwinian evolution.

Johnson says it's now recognized that there's information encoded in cells which can't be reduced to matter. The evolutionist Richard Dawkins writes,

> *Each nucleus . . . contains a digitally coded database larger, in information content, than all 30 volumes of the Encyclopedia Britannica put together. And this figure is for each cell, not all the cells of the body put together."(7)*

This information is distinct from the physical structure in the same way that the message of a book is distinct from the ink and paper which records it. The question biologists must answer is, Where did this genetic information come from? Information implies intelligence. It can't be explained by physical mutations and natural selection. This is a serious problem for Darwinists.

Another finding which also is a major problem for Darwinists is what is called the irreducible complexity of living organisms. Johnson explains what this means: "Molecular mechanisms . . . are made up of many parts that interact in complex ways, and all the parts need to work together. Any single part has no useful function unless all the other parts are also present."(8) The eye, for example, requires the coordinated working of many different parts to do its work. Each of these parts, however, can accomplish nothing on its own. That being the case, why would the individual parts have been preserved through time by natural selection? If there *were* gradual development, there must have been some intelligence behind it to know what to retain and what to destroy.

These two factors, then—information content and irreducible complexity—are strong physical evidence for intelligent design. Information implies intelligence, and complexity can't be accounted for by mutation and selection. It requires design.

In spite of the evidence, however, Darwinists still insist that the origin of life can't lie in supernatural creation. As we noted on earlier, the key issue for them is their prior

commitment to a naturalistic philosophy. As geneticist Richard Lewontin said, "[W]e are forced by our *a priori* adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, . . . Moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door."(9)

It's Phillip Johnson's project to expose this prior commitment and to convince evolutionists to acknowledge it. Now we'll turn to look at Johnson's overall project and see what lessons we can draw from it.

Evaluation

Johnson calls his basic strategy for addressing the issue of evolution, the "wedge." He wants to drive a wedge into the "log" of scientific materialism so as to separate the facts of scientific investigation from the naturalistic philosophy which dominates science.

One of the criticisms of Johnson's work is that he wants to throw the baby out with the bathwater. Theistic evolutionists, for example, say that one needn't accept a materialistic theory of evolution to recognize the gradual development of life on our planet. Indeed, Johnson seems to be fighting two battles: the first against those who insist upon doing science in a thoroughgoing naturalistic framework; the second against macroevolution of any sort.

I noted earlier that Johnson argues against separating the so-called *fact* of evolution from the *mechanism* of evolution. He insists that before we can know *that* evolution happened, we need to know *how* it happened. This certainly isn't a universal logical principle. I don't need to know precisely how a camera and film produce pictures to know that they do. Nonetheless, Johnson is correct in pressing for conclusive fossil evidence for gradual change or for a plausible explanation for sudden macromutations.

Johnson's challenge to the scientific community boils down to this question: "What should we do if empirical evidence and materialist philosophy are going in different directions?"(10) In other words, Are you willing to abandon a theory of purposeless processes if the evidence weighs against such a theory? When scientists are willing to do this, then science will be free to discover—as far as it's able—what nature is really like apart from personal prejudices.

It's evident that Johnson has struck a nerve in the scientific community. He's debated well-known scientists and has spoken at prestigious universities across America and overseas. He has not allowed opponents to pin him down on a particular theory of creation and then to dismiss him with the usual "religion vs. science" argument.

Johnson notes that Marx, Freud, and Darwin were three of the most influential men in this century. Marxism and Freudianism have both passed into history. Says Johnson, "I am convinced that Darwin is next on the block. His fall will be by far the mightiest of the three."(11)

But this will only happen, he says, if we "step off the reservation"(12) and do the work necessary to prove our case. We must encourage our young people to take up the challenge of thinking for themselves on this matter and not be intimidated by those who wish to maintain the status quo. This will involve a risk, but as Johnson says: "We will never know how great the opportunity was if we are afraid to take the risk."(13)

This book is valuable for any Christian who wants to learn how to think critically, whether the reader is scientifically-minded or not. Here we find a model for turning the tables on those who want to keep us on the defensive. If we have to give an answer for what we believe, it's only fair that our critics should do the same. *Defeating Darwinism* is an example of how to get them to do it.

Notes

1. Phillip E. Johnson, *Defeating Darwinism by Opening Minds* (Downers Grove, Ill.: InterVarsityPress, 1997), 38.

2. Ibid., 54.

3. Ibid., 35.

4. Ibid., 33.

5. Ibid., 45.

6. Ibid., 10.

7. Ibid., 77.

8. Ibid.

9. Ibid., 81.

10. Ibid., 114.

11. Ibid., 113.

12. Ibid., chap. 8.

13. Ibid., 118.

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Darwin's Black Box

Michael Behe's book Darwin's Black Box *was hailed by Christianity Today as 1996's Book of the Year, with good reason. This is the first book suggesting Intelligent Design*

that has received such serious attention from the scientific community. Dr. Ray Bohlin, with a background in molecular biology, reviews this book from a perspective as a creationist and scientist.

 *This article is also available in Spanish.*

Darwin's Black Box: The Biochemistry of the Cell

What do mouse traps, molecular biology, blood clotting, Rube Goldberg machines, and irreducible complexity have to do with each other? At first glance they seem to have little if anything to do with each other. However, they are all part of a recent book by Free Press titled, *Darwin's Black Box: The Biochemical Challenge to Evolution* by Michael Behe. Michael Behe is a biophysics professor at Lehigh University in Pennsylvania and his book, released last summer, has been causing a firestorm of activity in academic circles ever since.

The stranglehold that Darwinism has had in the biological sciences for decades has already been weakened over the last 30 years due to the new creationist movement and more recently by the push from intelligent design theorists. But Behe's new book may end up being the straw that broke the camel's back. Usually books like these are released by Christian publishers or at least a secular press that is small and willing to take a chance. Also, creationist books are rarely sold in secular bookstores or reviewed in secular publications. *Darwin's Black Box* has gained the attention of evolutionists not normally accustomed to responding to anti- evolutionary ideas in the academic arena. People like Niles Eldredge from the American Museum of Natural History, Daniel Dennett, author of *Darwin's Dangerous Idea*, Richard Dawkins of Oxford University and author of *The Blind Watchmaker*, Jerry Robison of Harvard University, and David Hull from the University of Chicago have

all been forced to respond to Behe either in print or in person.

In summary, the reason for all this attention is that they readily admit that Behe is clearly a reputable scientist from a reputable institution and his argument is therefore more sophisticated than they are accustomed to hearing from creationists. Mild, backhanded compliments aside, they unreservedly say he is flat wrong, but they have gone to much greater lengths in the literature, from the podium, and in the electronic media to explain precisely why they think he is wrong. Creationists and intelligent design theorists are usually dismissed out of hand, but not Behe's *Darwin's Black Box.*

Behe's simple claim is that when Darwin wrote *The Origin of Species*, the cell was a mysterious black box. We could see the outside of it, but we had no idea of how it worked. In *Origin*, Darwin stated,

> *If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down. But I can find no such case.*

Simply put, Behe has found such a case. Behe claims that with the opening of the black box of the cell through the last 40 years of research in molecular and cell biology, there are now numerous examples of complex molecular machines that absolutely break down the theory of natural selection as an all-encompassing explanation of living systems. The power and logic of his examples prompted *Christianity Today* to name *Darwin's Black Box* as their 1996 Book of the Year. Quite a distinction for a book on science published by a secular publisher!

In this essay I will be examining a few of Behe's examples and detailing further just how the scientific community has been

reacting to this highly readable and influential book.

Irreducible Complexity and Mousetraps

Behe claims the data of biochemistry argues strongly that many of the molecular machines in the cell could not have arisen through a step-by-step process of natural selection. In contrast, Behe claims that much of the molecular machinery in the cell is irreducibly complex.

Let me first address this concept of irreducible complexity. It's really a quite simple concept to grasp. Something is irreducibly complex if it's composed of several parts and each part is absolutely necessary for the structure to function. The implication is that such irreducibly complex structures or machines cannot be built by natural selection because in natural selection, each component must be useful to the organism as the molecular machine is built. Behe uses the example of a mousetrap. A mousetrap has five parts that are absolutely necessary for the mousetrap to function. Take any one of these parts away and the mousetrap can no longer catch mice.

The mousetrap must contain a solid base to attach the four other parts to, a hammer that clamps down on the mouse, a spring which gives the hammer the necessary power, a holding bar which holds the now energized hammer in position, and a catch to which the holding bar is secured, holding the hammer in coiled tension. Eventually, the jiggling action of a mouse, lured to the catch by a tasty morsel of peanut butter, causes the holding bar to slip away from the catch, releasing the hammer to spring down upon the unsuspecting mouse.

It's fairly easy to imagine the complete breakdown of functionality if you take away any of these five parts. Without the base, the other parts can't maintain the proper stability and distance from each other to be functional; without the spring or hammer, there is no way to actually

catch the mouse; and without both the catch and holding bar, there is no way to set the trap. All the parts must be present and accounted for in order for a mouse to be caught and the machine to function at all.

You can’t build a mousetrap by Darwinian natural selection. Let’s say you have a factory that produces all five parts of a mousetrap but uses them for different purposes. Over the years as the production lines change, leftover parts of no-longer-made contraptions are put aside on shelves in a storage room. One summer, the factory is overrun with mice. If someone were to put his mind to it, he might run by the storage room and begin to play around with these leftover parts and just might construct a mousetrap. But those pieces, left to themselves, are never going to spontaneously self-assemble into a mousetrap. A hammer-like part may accidentally fall from its box into a box of springs, but it’s useless until all five parts are assembled so they can function together. Nature would select against the continued production of the miscellaneous parts if they are not producing an immediate benefit to the organism.

Michael Behe simply claims that we have learned that several of the molecular machines in the cell are just as irreducibly complex as a mousetrap and, therefore, just as unable to be constructed by natural selection.

The Mighty Cilium

One of Behe’s examples is the cilium. Cilia are tiny hair-like structures on the outside of cells that either help move fluid over a stationary cell, such as the cells in your lungs, or serve as a means of propelling a cell through water, as in the single-celled paramecium. There are often many cilia on the surface of a cell, and you can watch them beat in unison the way a stadium crowd performs the wave at a ball game.

A cilium operates like paddles in a row boat; however, since

it is a hair-like structure, it can bend. There are two parts to the operation of a cilium, the power stroke and the recovery stroke. The power stroke starts with the cilium essentially parallel to the surface of the cell. With the cilium held rigid, it lifts up, anchored at its base in the cell membrane, and pushes liquid backwards until it has moved nearly 180 degrees from its previous position. For the recovery stroke, the cilium bends near the base, and the bend moves down the length of the cilium as it hugs the surface of the cell until it reaches its previous stretched out position, again having moved 180 degrees back to its original position. How does this microscopic hair-like structure do this? Studies have shown that three primary proteins are necessary, though over 200 others are utilized.

If you made a cross-section of a cilium and made a photograph of it with an electron microscope, you would see that the internal structure of the cilium is composed of a central pair of fibers surrounded by an additional 9 pairs of these same fibers arranged in a circle. These fibers or microtubules are long hollow sticks made by stacking the protein tubulin. The bending action of cilia depends on the vertical shifts made by these microtubules.

The bending is caused by another protein that is stretched between the pairs of tubules called nexin. Nexin acts as a sort of rubber band connector between the tubules. As the microtubules shift vertically, the rubber band is stretched taut, the microtubules continue to shift if they bend. Whew! I know this is getting complicated, but hang with me a little longer. The microtubules slide past each other by the action of a motor protein called dynein. The dynein protein also connects two microtubules together. One end of the dynein remains stationary on one microtubule, while the other end releases its hold on the neighboring microtubule and reattaches a little higher and pulls the other microtubule down.

Without the motor protein, the microtubules don’t slide and the cilium simply stands rigid. Without nexin, the tubules will slide against each other until they completely move past each other and the cilium disintegrates. Without the tubulin, there are no microtubules and no motion. The cilium is irreducibly complex. Like the mousetrap, it has all the properties of design and none of the properties of natural selection.

Rube Goldberg Blood Clotting

Rube Goldberg was a cartoonist in the earlier part of this century. He became famous for drawing weird contraptions that must go through many seemingly unnecessary steps in order to accomplish a rather simple purpose. Over the years, some evolutionists have alluded to living systems as Rube Goldberg machines as evidence of their construction by natural selection as opposed to being designed by a Creator. Things such as the Panda’s thumb and the intricate workings of the many varieties of orchids are said to be contrived structures that an intelligent creator surely would have found a better way of doing.

If you have never seen a cartoon of a Rube Goldberg machine, let me describe one for you from Mike Behe’s book, *Darwin’s Black Box*. This one is titled the “Mosquito Bite Scratcher.” Water falling off a roof migrates into a drain pipe and collects into a flask. In the flask is a cork that floats up as the glass fills. Inserted in the cork is a needle that eventually rises high enough to puncture a suspended paper cup filled with beer. The beer then sprinkles onto a nearby bird that becomes intoxicated and falls off its platform and onto a spring. The spring propels the inebriated bird onto another platform where the bird pulls a string (no doubt mistaking it for a worm in its intoxicated state). The pulled string fires a cannon underneath a small dog, frightening him and causing him to flip over on his back. His rapid breathing raises and

lowers a disk above his stomach which is attached to a needle positioned next to a mosquito bite on a man's neck allowing the bite to be scratched, causing no embarrassment to the man while he talks to a lady.

Well, this machine is obviously more complicated than it needs to be. But the machine is still designed and as Behe claims, it is also irreducibly complex. In other words, if one of the steps fails or is absent, the machine doesn't work. The whole contraption is useless. Well, there are a few molecular mechanisms in our bodies that are very similar to Rube Goldberg machines and therefore irreducibly complex. One is the blood-clotting cascade. When you cut your finger an amazing thing happens. Initially, it begins to bleed, but if you just leave it alone, after a few minutes, the flow of blood stops. A clot has formed, providing a protein mesh that initially catches the blood cells and eventually closes up the wound entirely, preventing the plasma from escaping as well.

This seemingly straightforward process involves over a dozen different proteins with names like thrombin, fibrinogen, Christmas, Stuart, and accelerin. Some of these proteins are involved in forming the clot. Others are responsible for regulating clot formation. Regulating proteins are needed because you only want clots forming at the site of a wound not in the middle of flowing arteries. Yet other proteins have the job of removing the clot once it is no longer needed. The body also needs to eliminate the clot when it has outlived its usefulness, but not before.

Now it's easy to see why some, when considering the blood-clotting cascade, wonder if a Creator could have devised something simpler. But that assumes we fully understand the system. Perhaps it absolutely needs to be this way. Besides, this doesn't in any way diminish the fact that even a Rube Goldberg machine is designed just as the blood clotting system seems to be.

Silence of Molecular Evolution and the Reaction

Clearly, the irreducible complexity inherent in many biochemical systems not only precludes the possibility that they evolved by Darwinian natural selection, but actually suggests the strong conclusion that some kind of intelligent design is necessary. Behe makes a very significant point by recognizing that the data that implies intelligent design doesn't necessarily mean one knows who the designer is. Inferring that intelligent design is present is a reasonable scientific conclusion. Planetary astronomers, for example, claim that we will be able distinguish a radio signal from space that was sent by an intelligent civilization from the surrounding radio noise even though we won't initially understand it and won't know who sent it.

Yet the astounding complexity of the cell has gone largely unnoticed and greatly unreported to the general public. There is an embarrassed silence. Behe speculates as to why; he says,

> *Why does the scientific community not greedily embrace its startling discovery? Why is the observation of design handled with intellectual gloves? The dilemma is that while one side of the elephant is labeled intelligent design, the other side might be labeled God (p.233).*

This may also help to account for another curious omission that Behe highlights, the almost total lack of scientific literature attempting to describe how complex molecular systems could have arisen by Darwinian natural selection. The *Journal of Molecular Evolution* was established in 1971, dedicated to explaining how life at the molecular level came to be. One would hope to find studies exploring the origin of complex biochemical systems in this journal. But, in fact, none of the papers published in *JME* over the entire course of its life as a journal has ever proposed the origin of a single

complex biochemical system in a gradual step-by-step Darwinian process.

Furthermore, Behe adds,

> *The search can be extended, but the results are the same. There has never been a meeting, or a book or a paper on details of the evolution of complex biochemical systems (p. 179).*

Behe's sophisticated argument has garnered the attention of many within the scientific community. His book has been reviewed in the pages of *Nature*, *Boston Review*, *Wall Street Journal*, and on many sites on the Internet. While some have genuinely engaged the ideas and offered serious rebuttal, most have sat back on Darwinian authority and claimed that Behe is just lazy or hasn't given the evolutionary establishment enough time. Jerry Coyne in *Nature* (19 September 1996, pp. 227-28) put it this way:

> *There is no doubt that the pathways described by Behe are dauntingly complex, and their evolution will be hard to unravel. Unlike anatomical structures, the evolution of which can be traced with fossils, biochemical evolution must be reconstructed from highly evolved living organisms, and we may forever be unable to envisage the first proto-pathways. It is not valid, however, to assume that, because one man cannot imagine such pathways, they could not have existed.*

But that's precisely the point; it is not one man but the entire biochemical community that has failed to elucidate a specific pathway leading to a complex biochemical system.

I highly recommend Behe's book. Its impact will be felt for many years to come.

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The Little Lamb That Made a Monkey of Us All

Like many others, I was caught totally flat-footed, astonished by the announcement of the successful cloning of an adult sheep, Dolly. Caught so unaware, in fact, that Probe is re-airing my three-year-old program on human cloning the week of March 17-21, 1997, because so little had changed. When the announcement of a successful sheep cloning was made, it was too late to pull the program from the schedule; tapes had already been sent to all the radio stations and there just wasn't time to replace it in only three weeks. Consequently (and spurred by a number of phone calls and e-mails from around the country), I have compiled a few thoughts and comments regarding scientific and moral considerations about this historic breakthrough to temporarily plug the gap.

Scientific Considerations

Normal mammary cells were intentionally starved of critical growth nutrients in order to allow the cells to reach a dormant stage of the normal cell cycle. This process of bringing the cells into dormancy apparently allows the cell's DNA to be reprogrammed by the proteins already in the egg cell for renewed cell division and new cell functions. The cells were fused with an enucleated egg cell (a cell that had its nucleus removed) and stimulated to begin cell division by an electric pulse.

The process was inefficient. Out of 277 cell fusions, 29 began growing *in vitro.* All 29 were implanted in receptive ewes, 13 became pregnant, and only one lamb was born as a result. This is a success rate of only 3.4%. In nature, somewhere between

33 and 50% of all fertilized eggs develop fully into newborns.

The procedure was very non-technical, and no one is really sure why it worked. It needs to be repeated. All attempts to clone mouse cells from adults have failed. Some suggest that sheep embryos do not employ the DNA in the nucleus until after 3-4 cell divisions. This may give the egg cell sufficient time to reprogram the DNA from mammary cell functions to egg cell functions. Human and mouse cells employ the nuclear DNA after the second cell division. Human and mouse cells may not be capable of being cloned because of this difference.

The purpose of these experiments was to find a more effective way to reproduce genetically engineered sheep for the production of pharmaceuticals. A sheep embryo can be engineered to produce a certain human protein or hormone in its milk. The human protein can then be harvested from the milk and sold on the market. Instead of trusting the somewhat unpredictable and time-consuming methods of normal animal husbandry to reproduce this genetic hybrid, cloning it assures that the engineered gene product will not be lost.

Genetic material is the same in all cells of an organism (except the reproductive cells, sperm and egg, which have only half the full complement), but differentiated cells are biochemically programmed to perform limited functions, and all other functions are turned off. Based on attempts in frogs and mice, most scientists felt that the reprogramming was impossible.

A critical question is the lifespan of Dolly. All cells have a built-in senescence or death after so many cell divisions. Dolly began from a cell that was already six years old. A normal lifespan for a ewe is around 11 years. Will Dolly live to see her seventh birthday?

It is also uncertain as to whether Dolly will be reproductively fertile. Frog clones are usually sterile.

Reprogramming the nucleus could lead to procedures to stimulate degenerating nerve cells to be replaced by newly growing nerve cells. Adults do not generate nerve cells normally.

Moral Considerations

Will humans be cloned for spare parts? While this is certainly possible, I consider it very unlikely that this would be sanctioned by any government. That doesn't mean, however, that someone won't try.

Will humans be cloned to replace a dying infant or child? This is certainly a possibility, but we need to ask if this is an appropriate way to deal with loss. Might unrealistic expectations be placed on a clone that would not be placed on a normally-produced child?

Will humans be cloned to produce children for otherwise childless couples? This is the most often-given reason for human cloning. This argument is unpersuasive when there are currently so many children that need adoption. Also, this further devalues children to the level of a commodity. If *in vitro* fertilization is expensive, cloning will be worse.

Will humans be cloned for vanity? Someone will certainly try.

Will human clones have a soul? In my mind, they will be no different from an identical twin or a baby that results from *in vitro* fertilization. How a single fertilized egg splits in two to become two individuals is a similar mystery.

Does cloning threaten genetic diversity? Excessive cloning may indeed deplete the genetic diversity of an animal population, leaving the population susceptible to disease and other disasters. But most biologists are aware of these problems, and I would not expect this to be a major concern unless cloning were the only means available to continue a species.

If the technique is perfected in animals first, will this save the tragic loss of fetal life that resulted from the early human experimentation with *in vitro* fertilization? *In vitro* fertilization was perfected in humans before it was known how effective a procedure it would be. This resulted in many wasted human beings in the embryonic stages. The success rate is still only 1 in 5 to 1 in 10; normal fertilization and implantation success rates are 2-3 times that. While animal models will help, there will be unique aspects to human development that can only be known and overcome by direct human experimentation which disrespects the sanctity of human life.

This provides a means for lesbians to have a child. One supplies the nucleus and the other provides the egg. The egg does contain some unique genetic material in the mitochondria that are not contributed by sperm or nucleus. One cell from each donor would be fused together to create a new individual, though all the nuclear genetic material comes from one cell. Sue Bohlin has an upcoming program on homosexual myths including gay marriage. This is no longer marriage as it is currently understood, and the technological hoops that must be jumped through for any gay couple to have children should be a clear warning that something is wrong with the whole arrangement.

Are human clones unique individuals? Even identical twins manage to forge their own identity. The same would be true of clones. In fact, this may argue strongly against the usefulness of cloning since you can never reproduce all the life experiences that have molded a particular personality. The genes will be the same, but the environment and the spirit will not.

All together, I find the prospect of animal cloning potentially useful. But I wonder if the procedure is as perfectible as some hope, and may end up being an inefficient process to achieve the desired result. Human cloning is

fraught with too many possible difficulties, from the waste of human fetal life during research and development to the commercializing of human babies (see my previous cloning article) with far too little potential advantage to individuals and society. What there is to learn about embryonic development through cloning experiments can be learned through animal experimentation. The cloning of adult human beings is an unnecessary and unethical practice that should be strongly discouraged if not banned altogether.

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Can Humans Be Cloned Like Sheep?

Why Is Cloning So Difficult and How Did They Do It?

Like so many others I was caught totally flat-footed and astonished by the announcement of the successful cloning of an adult sheep, Dolly. A few years ago I aired a radio program on the prospects of human cloning and considerably downplayed the possibilities. Earlier this year, we here at Probe had decided to rebroadcast this program because little had changed. When the announcement about Dolly was made, it was too late to pull the program from the schedule as tapes had already been sent to all the radio stations, and there just wasn't time to replace or update it. Consequently, I compiled a few thoughts and comments on this historic breakthrough and quickly made it available on our web site to temporarily plug the gap.

Subsequently, the article was featured on Christian Leadership's web site, Leadership University (www.leaderu.com), and I started receiving numerous phone calls and e-mails as a result. This essay is now an updated and expanded version of that article to help us think through both the scientific and moral implications of this stunning achievement.

The genetic material is the same in all cells of an organism (except the reproductive cells, sperm and egg, which have only half the full complement of chromosomes). However, differentiated cells (liver cells, stomach cells, muscle cells, etc.) are biochemically programmed to perform limited functions and all other functions are turned off. Most scientists felt that the reprogramming was next to impossible based on cloning attempts in frogs and mice.

So what did the scientists in Scotland do that was successful? Well, they took normal mammary cells from an adult ewe and starved them (i.e., denied them certain critical growth nutrients) in order to allow the cells to reach a dormant stage. This process of bringing the cells into dormancy apparently allows the cells' DNA to be deprogrammed. Apparently most if not all of the programming for specific functions of the mammary cells were turned off and the DNA made available for reprogramming. The starved mammary cells were then fused with an egg cell that had its nucleus removed. The egg cell was then stimulated to begin cell division by an electric pulse. Proteins already in the egg cell somehow altered the DNA from the mammary cell to be renewed for cell division and embryological functions.

As might be expected, the process was inefficient. Out of 277 cell fusions, 29 began growing as embryos *in vitro* or in the petri dish. All 29 were implanted into 13 receptive ewes, yet only one became pregnant. As a result of these efforts, one lamb was born. This translates to a success rate of only 3.4%, and the success rate is even less (.36%), when you calculate

using the 277 initial cell fusions attempted. In nature, on the other hand, somewhere between 33 and 50% of all fertilized eggs develop fully into newborns.

Altogether the procedure was rather non-technical, and no one is really sure why it worked. The experiments still need to be repeated. Previously, all attempts to clone mice from adult cells have failed. But clearly, an astounding breakthrough has been made. You can be sure that numerous labs around the world will be attempting to repeat these experiments and trying the technique on other mammalian species. Can this procedure be done with humans? Should we try it with humans? I'll be dealing with these questions later in this discussion.

Why Clone Anything?

Before proceeding to deal with the question of human cloning, a more basic concern needs to be addressed. Some, for example, may be asking, "Why would anyone want to clone anything in the first place, but especially sheep?"

The purpose of these experiments was to find a more effective way to reproduce already genetically engineered sheep for production of pharmaceuticals. Sheep can be genetically engineered to produce a certain human protein or hormone in its milk. The human protein can then be harvested from the milk and sold on the market. This is accomplished by taking the human gene for the production of this protein or hormone and inserting it into an early sheep embryo. Hopefully the embryo will grow into a sheep that will produce the protein.

This is not a certainty, and while the process may improve, it will never be perfect. Mating the engineered sheep is also not foolproof because even mating with another genetically engineered sheep may result in lambs that have lost the inserted human gene and cannot produce the desired protein. Therefore, instead of trusting the somewhat unpredictable and time-consuming methods of normal animal husbandry to reproduce

this genetic hybrid, cloning more directly assures that the engineered gene product will not be lost.

There may be other benefits to cloning technology. Reprogramming the nucleus of other cells, such as nerve cells, could lead to procedures to stimulate degenerating nerve cells to be replaced by newly growing nerve cells. Nerve cells in adults do not ordinarily regenerate or reproduce. This could have important implications for those suffering from Parkinson's and Alzheimer's.

If the process can actually be perfected to the extent that production costs are reduced and the quality of the eventual product is improved, then this would be a legitimate research goal. The simplicity of the technique, though still inefficient, makes this plausible. But there are still questions that need to be answered.

One critical question concerns the lifespan of Dolly. All cells have a built in senescence or death after so many cell divisions. Dolly began with a cell from a ewe that was already six years old. A normal lifespan for a ewe is around 11 years. Will Dolly live to see her seventh birthday? Actually most cell divisions are used up during embryological development. Dolly's cells may peter out even earlier. This is critical because a 10-year-old sheep is considered elderly, and lambing and wool production decline in sheep after their seventh year. My guess though is that since Dolly's genes were reprogrammed from mammary cell functions to embryological functions, that the senescence clock was also reset back to the beginning. I expect Dolly to live a normal lifespan.

It is also uncertain as to whether Dolly will be reproductively fertile. Frogs cloned from tadpole cells are usually sterile. It is possible that while Dolly is normal anatomically, the cloning process may somehow interfere with the proper development of the reproductive cells. If this were the case, there may be other problems not immediately

detectable. This will be answered this summer when Dolly reaches sexual maturity.

Can We Clone Humans?

While we have established that animal cloning may be permissible and even scientifically useful, what about cloning humans? First of all, is it feasible? Secondly, just because we can do it, should we? Should we even try?

At this point it is reasonable to assume that because the procedure works with sheep and possibly with cattle (the experiments with cattle are already underway), it should be perfectible with humans. This does not mean, however, that there may not be unique barriers to cloning humans as opposed to cloning sheep.

Some suggest that by using the particular procedure developed by the researchers in Scotland, sheep may be easier to clone. The reason is that sheep embryos do not employ the DNA in the nucleus until after 3 to 4 cell divisions. This may give the egg cell sufficient time to reprogram the DNA from mammary cell functions to egg cell functions. Human and mouse cells employ the nuclear DNA after only the second cell division. This may be why similar experiments have not worked in mice. Therefore, human cells and mouse cells may not be capable of being cloned because of this difference.

If this barrier does indeed exist, it is not necessarily insurmountable. The news of a cloned sheep was surprising enough that no one, including me, is now going to step out on the same sawed-off limb and predict that it **can’t** eventually work with humans. I mentioned earlier that the procedure is so startlingly non-technical that there are numerous laboratories around the world that could immediately begin their own cloning research program with a minimum of investment and expertise. While I fully expect that many labs will begin studies on cloning other mammalian species besides sheep, I’m

not so sure about humans.

In 1993, researchers here in the United States employed well known techniques to artificially twin human embryos. They immediately became embroiled in a firestorm of public scrutiny that they did not anticipate nor enjoy (see my earlier article, "Human Cloning: Have Human Beings Been Cloned?"). They were even criticized by other researchers in the field for jumping ahead without scrutinizing the ethical ramifications. The public reaction was no doubt very sobering to the rest of the scientific community. Many countries have already either completely banned experimentation in human cloning or at least imposed a temporary moratorium so that the ethical questions can be properly investigated before stepping ahead. Even the researchers in Scotland responsible for Dolly have plainly stated that they see no reason to pursue human cloning and are personally repulsed by the idea.

There are some in the scientific community, however, who feel that the ability to do something is reason enough to do it. But in this case, I believe that they are the minority. For example, molecular biologists imposed a moratorium of their own in the 70s when genetic technology was first being developed until critical questions could be answered. Also, while nuclear weapons have been produced for over 50 years, only two have been used and that was 52 years ago. Many are now being dismantled. These cases show us that human restraint, though rare, is possible.

So while it is reasonable to believe that humans can be cloned, and that someone, somewhere may try, the overall climate is so against it that I don't think we will see it announced anytime soon.

Why Clone Humans?

Overall, the public reaction has been negative toward cloning

human beings, and this is rather curious in a culture that is admittedly post-Christian in orientation. Nevertheless, many people still want to draw a distinction between animals and humans.

As Christians we understand this desire because we assert that humans are made in the image of God and that animals are not. There is, therefore, a clear demarcation between animals and humans. But in an evolutionary view, humans are nothing special—just another animal species. The expected reaction was offered by an editorial in the *Dallas Morning News* (Monday, 3 March 1997, 9D) by Tom Siegfried which he titled: "It's hard to see a reason why a human Dolly is evil." He summarized his perspective when he said, "The ability to clone is part of gaining deeper knowledge of life itself. So Dolly should not be seen as scary, but as a signal that life still conceals many miracles for humans to discover." To the naturalist, any knowledge is valuable, and the means to obtain it is justified essentially by its benefit to society.

With this in mind, let's explore some of the reasons why people have suggested that human cloning is a worthwhile proposition and deal with some of the questions people are asking.

Concerns About Human Cloning

There is much that can be learned about human embryonic development by researching human cloning. While this is true, this is precisely the reasoning used by Nazi Germany to justify experimentation on Jews. Experiments were performed on exposure to cold, water, and other extreme conditions with human subjects, frequently to the point of death, because data on human subjects was deemed indispensable. Of course, we know now that animal models work just as well; consequently, there is no need to use human models to gain this type of data.

Will humans be cloned for spare parts? A few writers have

suggested that some individuals may want to establish an embryonic clone to be frozen and put away. Then, in the event of a childhood disease requiring a transplant, the embryo can be thawed, implanted in a surrogate, and raised to a sufficient age for the spare organ to be harvested and transplanted. While this is certainly possible, I consider it very unlikely that these practices would be sanctioned by any government because it completely tosses aside the uniqueness of humanity and trashes the concept of human dignity. That doesn't mean, however, that someone won't try.

Will human cloning be used to replace a dying infant or child? This is certainly a possibility, but we need to ask if taking such a course of action is an appropriate way to deal with loss. Unrealistic expectations may be placed on a clone that would not be placed on a normally produced child. The cloned child may be the same genetically, but different in other respects. This could create more frustration than comfort.

Will humans be cloned to provide children for otherwise childless couples? This is the reason most often given for human cloning, yet the argument is unpersuasive when there are so many children that need adoption. Also, this devalues children to the level of a commodity. Also, if *in vitro* fertilization seems expensive at $5,000-8,000 a try, cloning will be more so.

Will human clones have souls? In my mind, they will be no different than an identical twin or a baby that results from *in vitro* fertilization. How a single fertilized egg splits in two to become two individuals is a similar mystery, but it happens.

Does cloning threaten genetic diversity? Excessive cloning may indeed deplete the genetic diversity of an animal population, leaving the population susceptible to disease and other disasters. But most biologists are aware of these problems, and I would not expect this to be a major concern unless

cloning were the only means available to continue a species.

If the technique is perfected in animals first, will this save the tragic loss of fetal life that resulted from the early human experimentation with in vitro *fertilization? In vitro* fertilization was perfected in humans before it was known how effective a procedure it would be. This resulted in many wasted human beings in the embryonic stages. The success rate is still only 10 to 20%. The success rate of normal fertilization and implantation is around 33 to 50%. While animal models will help, there will be unique aspects to human development that can only be known and overcome by direct human experimentation which does not respect the sanctity of human life.

Cloning provides a means for lesbians to have children as a couple. One supplies the nucleus and the other provides the egg. The egg does contain some unique genetic material in the mitochondria that are not contributed by sperm or nucleus. One cell from each partner is fused together to create a new individual, though all the nuclear genetic material comes from only one cell. The real question is whether this is the proper environment for any child to grow up in. (For more information on this topic, see Sue Bohlin's essay, "Homosexual Myths.") Homosexual "marriages" are not really marriages in the normal understanding of the term, and the technological hoops that must be jumped through for any gay couple to have children should be a clear warning that something is wrong with the whole arrangement.

Are human clones unique individuals? Even identical twins manage to forge their own identity. The same would be true of clones. In fact, this may argue strongly against the usefulness of cloning since we can never reproduce all the life experiences that have molded a particular personality. The genes will be the same, but the environment and the spirit will not.

All together, I find the prospect of animal cloning potentially useful. But I wonder if the procedure is as perfectible as some hope. It may end up being an inefficient process to achieve the desired result. Human cloning is fraught with too many possible difficulties, from the waste of human fetal life during research and development to the commercializing of human babies (see my previous Human Cloning article) with far too little potential advantage to individuals and society. What there is to learn about embryonic development through cloning experiments can be learned through animal experimentation. The cloning of adult human beings is an unnecessary and unethical practice that should be strongly discouraged if not banned altogether.

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A Darwinian View of Life

Probe's Dr. Ray Bohlin reviews Richard Dawkins' anti-theistic book, A River Out of Eden: A Darwinian View of Life*, showing the holes in Dawkins' arguments.*

A River of DNA

A River Out of Eden: A Darwinian View of Life by Richard Dawkins is the fourth in a series being published by Basic Books entitled "The Science Masters Series." This series is said to be "a global publishing venture consisting of original science books written by leading scientists. "Purposing to "present cutting-edge ideas in a format that will enable a broad audience to attain scientific literacy," this series is aimed at the non-specialist.

The first three releases were *The Last Three Minutes:*

Conjectures about the Ultimate End of the Universe by Paul Davies, *The Origin of Humankind* by Richard Leakey, and *The Origin of the Universe* by John D. Barrow. These were followed by the contribution from Dawkins. A look at these books, and at future contributors like Daniel Dennett, Jared Diamond, Stephen Jay Gould, Murray Gell-Mann, Lynn Margulis, and George C. Williams, makes the endeavor look less like a scientific literacy series and more like an indoctrination in philosophical naturalism.

The exposition of a Darwinian view of life by Dawkins in *River Out of Eden* certainly fits into the overt anti-theism category. His "River Out of Eden" is a river of DNA that is the true source of life and the one molecule that must be understood if life is to be understood.

This river of DNA originally flowed as one river (one species) which eventually branched into two, three, four, and eventually millions of rivers. Each river is distinct from the others and no longer exchanges water with the others, just as species are isolated reproductively from other species. This metaphor allows Dawkins to explain both the common ancestry of all life along with the necessity of gradualism in the evolutionary process.

Dawkins refers to this river of DNA as a digital river. That is, the information contained in the DNA river is completely analogous to the digital information of languages and computers.

Surprisingly, Dawkins gives away the store in this first chapter. In pressing home the digital analogy, Dawkins first uses probability to indicate that the code arose only once and that we are all, therefore, descended from a common ancestor:

> *The odds of arriving at the same 64:21 (64 codons: 21 amino acids) mapping twice by chance are less than one in a million million million million million. Yet the genetic code is in*

> *fact identical in all animals, plants and bacteria that have ever been looked at. All earthly living things are certainly descended from a single ancestor.(p. 12)*

So it is reasonable to use probability to indicate that the code could not have arisen twice, but there is no discussion of the probability of the code arising by chance even once. A curious omission! If one tried to counter with such a question, Dawkins would predictably fall back on the assumption of naturalism that since we know only natural processes are available for the origin of anything, the genetic code must have somehow beaten the odds.

African Eve

Chapter 2 attempts to tell the story of the now famous "African Eve." African Eve embodies the idea that we are all descended from a single female, probably from Africa, about 200,000 to 100,000 years ago. This conclusion originates from sequence data of the DNA contained in mitochondria.

Mitochondria are tiny little powerhouses that produce energy in each and every cell of your body. Just as your body contains many organs that perform different functions, the cell contains many organelles that also perform specific functions. The mitochondrion is an organelle whose task is to produce energy molecules the cell can use to accomplish its tasks.

However, mitochondria are also the only organelle to contain their own DNA. Certain proteins necessary to the function of mitochondria are coded for by the mitochondrial DNA and not by the nuclear DNA like every other protein in the cell. One other unique aspect of mitochondria is their maternal inheritance. That is, all the mitochondria in your body are descended from the ones you initially inherited from your mother. The sperm injects only its DNA into the egg cell, not

its mitochondria. Therefore, an analysis of mitochondrial DNA reveals maternal history only, uncluttered by the mixture of paternal DNA like nuclear DNA. That's why these studies only revealed an African Eve, though other recent studies claim to have followed DNA from the Y chromosome to indicate an ancient "Adam."

Now these scientists don't actually think they have uncovered proof of a real Adam and Eve. They only use the names as metaphors. But this action does reveal a shift in some evolutionists minds that there is a single universal ancestor rather than a population of ancestors. This at least is closer to a biblical view rather than farther away.

Finally, Dawkins makes his case for the reliability of these molecular phylogenies in general. Here he glosses over weaknesses in the theory and actually misrepresents the data. On page 43 he says, "On the whole, the number of cytochrome c letter changes separating pairs of creatures is pretty much what we'd expect from previous ideas of the branching pattern of the evolutionary tree." In other words, Dawkins thinks that the trees obtained from molecular sequences nearly matches the evolutionary trees we already had. Later on page 44, when speaking of all molecular phylogenies performed on various sequences, he says, "They all yield pretty much the same family tree which by the way, is rather good evidence, if evidence were needed, that the theory of evolution is true."

Well, besides implying that evidence is not really needed to prove evolution, Dawkins stumbles in trying to display confidence in the molecular data. What exactly does "pretty much" mean anyway? Inherent in that statement are the numerous contradictions that don't fit the predictions or the ambiguous holes in the general theory. But then, evidence isn't really needed anyway is it?

While this chapter contained the usual degree of arrogance from Dawkins, particularly in his disdain for the original

account of Adam and Eve, it was somewhat less compelling or persuasive than is his usual style. He hedged his bet frequently and simply waived his hand at controversy. Unfortunately, this may not be picked up by the unwary reader.

Scoffing at Design

In Chapter 3 Dawkins launches a full-scale assault on the argument from design. After presumably debunking arguments from the apparent design of mimicry (not perfect design, you know, just good enough), Dawkins states, “Never say, and never take seriously anybody who says, ‘I cannot believe so-and-so could have evolved by gradual selection.’ I have dubbed this fallacy ‘the Argument from Personal Incredulity.'”

To some degree I’m afraid that many creationists have given Dawkins and others an easy target. Such a statement, “I cannot believe…,” has been used many times by well-meaning creationists but is really not very defensible. It is not helpful to simply state that you can’t believe something; we must elaborate the reasons why. First, Dawkins levels the charge that much of what exists in nature is far from perfectly designed and is only good enough. This he claims is to be expected of natural selection rather than a designer. This is because a designer would design it right while natural selection has to bumble and fumble its way to a solution. To begin with, the lack of perfection in no way argues for or against a designer.

I have always marveled at some evolutionists who imply that if it isn’t perfect, then Nature did it. Just what is perfection? And how are we to be sure that our idea of a perfect design wasn’t rejected by the Creator because of some flaw we cannot perceive? It is a classic case of creating God in our own image.

The evolutionists are the ones guilty of erecting the straw man argument in this instance. In addition, Dawkins fully

admits that these features work perfectly well for the task at hand. The Creator only commanded His creatures to be fruitful and multiply, not necessarily to be perfectly designed (humanly speaking) wonders. Romans 1:18-20 indicates that the evidence is sufficient if you investigate thoroughly.

Dawkins further closes off criticism by declaring that "there will be times when it is hard to think of what the gradual intermediates may have been. These will be challenges to our ingenuity, but if our ingenuity fails, so much the worse for our ingenuity." So if explanations fail us, the fault is not with the evolutionary process, just our limited thinking. How convenient that the evolutionary process is so unfalsifiable in this crucial area. But after all, he implies, this is science and intelligent design is not!

Dawkins concludes the chapter with a discussion on the evolution of the honeybee waggle dance. It is filled with probabilistic statements like "The suggestion is that…. Perhaps the dance is a kind of…. It is not difficult to imagine…. Nobody knows why this happens, but it does…. It probably provided the necessary…." Yet at the end, Dawkins proclaims,

> *We have found a plausible series of graded intermediates by which the modern bee dance could have been evolved from simpler beginnings. The story as I have told it…may not be the right one. But something a bit like it surely did happen.*

Again, "it happened" only because any other explanation has been disallowed by definition and not by the evidence.

God's Utility Function

Dawkins concludes his attack on design in his book *River Out of Eden,* with a more philosophical discussion in Chapter 4, God's Utility Function. He begins with a discussion of the ubiquitous presence of "cruelty" in nature, even mentioning

Darwin's loss of faith in the face of this reality. Of course, his answer is that nature is neither cruel nor kind, but indifferent. That's just the way nature is.

But a curious admission ensues from his discussion. And that is, "We humans have purpose on the brain." Dawkins just drops that in to help him put down his fellow man in his usual arrogant style. But I immediately asked myself, "Where does this 'purpose on the brain' stuff come from?"

The rest of nature certainly seems indifferent. Why is it that man, within an evolutionary worldview, has "purpose on the brain"? In his attempt to be cute, Dawkins has asked an important question: Why is man unique in this respect?

As Christians, we recognize God as a purposeful being; therefore if we are made in His image, we will also be purposeful beings. It is natural for us to ask "Why?" questions. No doubt if pressed, someone will dream up some selective or adaptive advantage for this trait. But this, as usual, would only be hindsight, based on the assumption of an evolutionary worldview. There would be no data to back it up.

At the chapter's end Dawkins returns to his initial topic. "So long as DNA is passed on, it does not matter who or what gets hurt in the process…. But Nature is neither kind nor unkind…. Nature is not interested one way or another in suffering, unless it affects the survival of DNA." Even Dawkins admits that this is not a recipe for happiness. The problem of evil returns. Dawkins's simple answer is that there is no problem of evil. Nature just is.

He recounts a story from the British papers of a school bus crash with numerous fatalities and reports a Catholic priest's inadequate response to the inevitable "Why" question. The priest indicates that we really don't know why God would allow such things but that these events at least confirm that we live in a world of real values: real positive and negative.

“If the universe were just electrons, there would be no problem of evil or suffering.” Dawkins retorts that meaningless tragedies like this are just what we expect from a universe of just electrons and selfish genes.

However, it is also what we expect in a fallen world. Evolutionary writers never recognize this clear biblical theme. This is not the way God intended His world to be. What is unexpected in an evolutionary world are people shaped by uncaring natural selection who care about evil and suffering at all. Why are we not as indifferent as natural selection?

In making his point, Dawkins says that the amount of suffering in the natural world is beyond all “decent” contemplation. Where does decency come from? He calls the bus crash a “terrible” story. Why is this so terrible if it is truly meaningless? Clearly, Dawkins cannot live within the boundaries of his own worldview. We see purpose and we fret over suffering and evil because we are created in the image of a God who has the same characteristics. There are aspects of our humanity that are not explainable by mutation and natural selection. Dawkins must try to explain it, however, because his naturalistic worldview leaves him no choice.

Are We Alone?

Dawkins closes his book with a final chapter on the origin of life and a discussion on the possibilities of life elsewhere in the universe. This chapter is a bit of a disappointment because there is really very little to say. To be sure, it is filled with the usual Dawkins arrogance and leaps of naturalistic logic, but there is no real conclusion just the possibility of contacting whatever other life may be out there.

Dawkins begins with a definition of life as a replication bomb. Just as some stars eventually explode in supernovas, so some stars explode with information in the form of life that

may eventually send radio messages or actual life forms out into space. Dawkins admits that ours is the only example of a replication bomb we know, so it is difficult to generalize as to the overall sequence of events that must follow from when life first appears to the sending of information out into space, but he does it anyway.

While we can clearly distinguish between random and intelligent radio messages, Dawkins is unable to even ask the question about the origin of the information-rich DNA code. I suppose his answer is contained on page 138 when he says, “We do not know exactly what the original critical event, the initiation of self-replication, looked like, but we can infer what kind of an event it must have been. It began as a chemical event.”

This inference is drawn not from chemical, geological, or biological data, because the real data contradicts such a notion. Dawkins takes a few pages to evoke wonder from the reader by documenting the difficult barriers that had to be crossed. His conclusion that it was a chemical event is rather an implication that is derived from his naturalistic worldview. It is a chemical event because that is all that is allowed. Creation is excluded by definition, not by evidence. While chemical evolution may be difficult, we are assured that it happened!

The book closes with a discussion of the Ten Thresholds that must be crossed for a civilization of our type to exist. Along the way, Dawkins continues to overreach the evidence and make assumptions based on naturalism without the slightest thought that his scenario may be false or at least very wide of the mark.

All along the way Dawkins tries to amaze us with both the necessity and complexity of each threshold but fails miserably to explain how each jump is to be accomplished. He depends totally on the explanatory power of natural selection to

accomplish whatever transition is needed. It is just a matter of time.

But, of course, this begs the question. Dawkins perfects this art for 161 pages. Despite the smoke and mirrors, Richard Dawkins is still trying to sail upstream without a paddle. It just won't work. While many of his explanations and ruminations should make careful reading for creationists (he is not stupid and writes well), I have tried to point out a few of his inconsistencies, assumptions, and poor logic.

What bothers me most is that this is meant to be a popular book. His wit and dogmatism will convince and influence many. For these reasons I found it a frustrating and sometimes maddening book to read. Unfortunately, few will think their way through these pages and ask tough questions of the author along the way. This is where the real danger lies. We must not only show others where he is wrong but help them how to discover these errors on their own. We must help people to think, not just react.

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Genesis Unbound

A New and Different Genesis 1

Have you ever read a book that totally changed the way you thought about something? Or heard an idea that gave you a completely new picture of something you thought you knew well? This essay is about just such a book.

Most of us know the verses of Genesis 1 so well we could recite parts of them from memory. Some have studied them for

years and read shelves of books about what the first chapters of Genesis mean. But what if someone suggested that most of what you have thought and pictured and been told about those early chapters might not be quite right? Would you reach for the red tag of "Heresy" to slap on the book? Would you be sure that the author could not possibly be right? In this discussion we are reviewing a new book called *Genesis Unbound*, and it may well cause you to reexamine what you thought Genesis 1 and 2 are about.

The author, Dr. John Sailhammer, is not a newcomer to theology. Educated at Dallas Theological Seminary and UCLA, Dr. Sailhammer taught at Trinity Evangelical Divinity School. He now teaches at Northwestern College. He has written several well-respected books on the first five books of the Bible (the Pentateuch) and is considered an excellent conservative Old Testament scholar. The commentary on Genesis in Zondervan's *Expositor's Bible Commentary* is by Dr. Sailhammer. His recent book gives a surprisingly new, and yet very old, look at the first chapters of Genesis.

To lay the groundwork for any new view, it is important to understand the prevailing view first. Sailhammer helpfully provides five basic assumptions that he says make up the core beliefs of nearly all the current views.

The first of these core assumptions is that the first verse of Genesis 1, "In the beginning God created the heavens and the earth," refers to the creation of some sort of unformed mass that God will make into a universe as the six days progress.

The second assumption that almost all commentators make about Genesis 1 is that the "light" created on day one was something unique and temporary for dividing the days until the fourth day when God would create the sun, moon, and stars.

Third, it is generally assumed that the sun, moon, and stars were actually created on the fourth day.

Fourth, until recent science began to question the assumption, it has been almost universally believed that the days of Genesis 1 were normal, 24-hour days. Some placed a gap between the first and second verses, to place all of the geological ages, but this was not a widely held view. In our century it is common to make the days long ages so the Bible will agree with the consensus of modern geology.

Lastly, the earth that God is making ready for man in Genesis 1 has almost always been seen as the whole planet. Accordingly, verse one is about the creation of the whole universe, and verse two begins a description of how God fashioned the earth for (1) the creatures He was about to make, and (2) a home for the two people He would make in His own image.

But suppose there were some assumptions in this list that we did not need to make? How would that change our view of these first chapters of Genesis? Next we will consider how a Jewish reader of Moses' time might have understood Genesis 1.

The Forming of the Promised Land

We all make assumptions when we read or hear something; we cannot think without a structure. But sometimes we make unnecessary assumptions that hinder our understanding. Of the five assumptions that many make about Genesis 1, could some be unnecessary baggage? The first assumption was that "In the beginning God created the heavens and the earth" describes an initially chaotic state out of which God would create the material world. But suppose instead that this verse actually described God's creation of heaven and earth? Dr. Sailhammer carefully develops the view that in the Old Testament, the Hebrew word for "In the beginning" often describes a period of indeterminate time. Genesis 10:10 says "And the beginning of his kingdom was Babel and Erech and Accad and Calneh." Jeremiah 28:1 describes "The beginning of the reign of Zedekiah king of Judah, in the fourth year." Genesis Unbound

suggests that we picture God creating the whole universe, “the heavens and the earth,” over some unspecified time in the past.

When we begin verse two, “And the earth was formless and void,” Sailhammer says it is not talking about the whole of planet earth. What are Moses’ five books about? The nation of Israel. What is the whole theme of the Pentateuch? How God chooses a people and takes them to the promised land He has made for them. Why not give “earth” in verse two its other meaning of “land”? And specifically “The Land.” God, through Moses, is telling us how He prepared the Promised Land for the people He already knew He would choose.

Startling?

Why, then, was the land “formless and void?” It wasn’t! Genesis Unbound contends that this assumption crept in with the first Greek translation of the Bible, the Septuagint. It translates the Hebrew into Greek as “unseen and unformed” in order to harmonize the Bible with the view of the Greeks, who believed the world was formed out of chaos, so the translators wanted to seem relevant and mirrored that idea! According to Dr. Sailhammer, it would be better to translate the phrase as “an uninhabitable wasteland.” God had not yet prepared it for man, but it was not chaos either. God was preparing to take the “wasteland” and make it the “promised land.”

On day two, God prepares the sky for the land He will soon begin to make ready. The word often translated “firmament” Sailhammer suggests actually refers to what we would call the sky. And the waters above the firmament are the clouds that God sets in the sky. Interestingly, this is exactly what John Calvin thought. He wrote, “To my mind, this is a certain principle, that nothing is here treated of but the visible form of the world. He who would learn astronomy . . . let him go elsewhere.”

On day three, God gathers together the seas and makes the dry land appear. The land is brought out of the water to make a fit place for Adam and Eve. The water settles into rivers and lakes. The Hebrew word for any body of water can be translated "sea." Here it is plural, while if it referred to the ocean it would be singular.

Then God creates "fruit trees." In Sailhammer's understanding, that is what the words describe, not all kinds of vegetation.

At the end of the third day, the Promised Land has been prepared with clouds in the sky, rivers and lakes, and fruit trees for food.

The Filling of the Land

The book *Genesis Unbound* presents what seems at first a completely new understanding of Genesis 1. But by seeing the chapter as God preparing the Promised Land, first for Adam and Eve, and eventually for His chosen nation Israel, many problems are avoided. Dr. Sailhammer takes the days to be normal 24-hour days, but sees the creation of the whole universe as having taken place in the first verse, over some unstated period of time in the past. Then God focuses in on His preparation of a place for His last creation to live.

Now, on day four, God gives a new purpose to the sun, moon, and stars that have been shining since He created them "in the beginning." On day four, God declares they are to guide the people He is about to make. They will act as measures of time; they will serve humanity. There have been no people placed on earth yet, so the sun has merely been a star in the sky. Now God speaks, and the host of heaven takes on a new function as celestial markers. On the first three days, God created the land and places for things. Now He is declaring what is to fill each part of the stage, and what their functions will be.

On day five the same word for "create" that was used in verse

one occurs again: bara. Why does God use this word again? Dr. Sailhammer suggests that Moses is drawing our attention back to 1:1 to remind us that only God can create things out of nothing. But on day five, when God populates this new land He has made, it is with animals and birds that are descendants of those He made on day one. God speaks, His creation responds, He sees it is good and blesses His creation.

Day six is the climax of the account, and the center of God's activity. From nothing God has created the universe in Genesis 1:1. He has prepared a special land and populated it with His creations. And then we come to man.

Here God changes His whole approach. He now announces, "Let us make man in Our image." And in order for the creation to fully bear His image, He makes them male and female. Sailhammer makes an interesting point here as he discusses why the text suddenly says "Let us." He sees a reflection of God's character in the fact that it takes both a male and female before God's image can be born by humans. Just as men and women complement one another, so too the "us" points to the relationships that exist within the Godhead. So, in Dr. Sailhammer's fascinating argument in *Genesis Unbound*, when God sets out to create "in His image" for the first time, He first creates a special land for them, then appoints the sun, moon, and stars to a new purpose, fills the land, sky, and waters with creatures, and creates a garden for Adam and Eve to live in.

Some might object that God doesn't seem to do very much. But, Sailhammer argues that God had already created everything out of nothing in Genesis 1:1. Now, God speaks ten times (just as He spoke the Ten Commandments) and makes a land perfect for humans to live in. He creates for Adam and Eve a garden. And that garden will someday be the very land that God promises to Abraham, and eventually brings the nation of Israel to, for as we will see next, Eden is the land of Israel.

Does Genesis 2 Contradict Genesis 1?

At last we come to day seven. God has created a place for each of His creations, and just as He instructs His creation to do in the Ten Commandments, God Himself is said to “rest.”

He has taken a wild land, unfit for people, and made it into a literal garden spot. Now, in a pattern that He sets for His creation to follow, He takes a day of rest. This becomes deeply significant later on when Moses receives the Ten Commandments. In Exodus 20:11 God says “For in six days the LORD made the sky, the earth, and the seas and all that is in them, and rested on the seventh day.” Thus the divine pattern is also to be the human plan. Even now that we are burdened with the effects of the Fall, even in our rebelliousness, God still wants His creation to rest, and take time to bless our Creator.

Then what are we to make of Genesis 2? Many modern scholars have spoken of two creation accounts and seen this as an inconsistency or an error in the Bible. The usual answer has been that the account in Genesis 2 is a narrowing of focus from chapter 1, looking just at the creation of man and woman in detail. If this is so, Dr. Sailhammer asks, then why not see Genesis 1 as describing the same place as Genesis 2, Eden? Thus he continues his argument into chapter 2.

In Genesis 2:5-6, some have seen a contradiction with the first chapter. How can there be no shrubs or plants or rain? What *Genesis Unbound* sees in these verses is a comparison being set up between before and after the Fall. There are no “shrubs of the field” or “plants of the field” because these would come as a result of Adam and Eve’s disobedience. These are the “thorns and thistles” and “plants of the field” that Adam is told he must work to cultivate in Genesis 3:18-19.

When the text says “it had not rained on the earth,” it is a contrast to when God will “send rain on the earth” during the

Flood. And there was “no man to cultivate the ground” because this too would come as a result of the Fall in Genesis 3:23. So the text is already preparing us for what the results of man’s disobedience will be, even as the Garden is being made.

Dr. Sailhammer also finds the large amount of space devoted to locating Eden of considerable significance. While modern commentators have despaired of ever locating the exact place, he sees the length of the description as indicative that at least Moses expected people to recognize where Eden was located.

The primary way that Eden is located is by the rivers that flow from it. And what are those rivers? One of them is the Pishon, a river now unknown. But the second is the Gihon, which flows around the land of Cush. Since Cush is roughly the same as Egypt, might not the river Gihon be the Nile River of Egypt? And the other two rivers are the Tigres and the Euphrates. Sailhammer thinks it is not coincidence that two of these rivers are exactly the ones that God uses to explain to Abraham where the promised land will be (Gen. 15:18).

Next we will consider why Eden and Israel are so closely connected, and whether Genesis should be read as poetry or not.

Genesis Unbound and the Rest of Scripture

Dr. John Sailhammer’s new book *Genesis Unbound* has many novel explanations of Genesis 1 and 2. But at the same time, it both helps us see how a Hebrew reader might have understood what Moses wrote and answers a number of puzzling questions that most of us have had about the text. One of these questions is, “What became of Eden after God devoted so much care to making it?”

Earlier we looked at how the rivers God uses to describe where Eden was, are much the same as the ones He uses to tell

Abraham where the promised land was to be. Think of the parallels. In the same way that God prepares a special place for Adam and Eve, a place they will be driven out of if they are disobedient, so too, He promises first Abraham, and then the whole nation of Israel a special place, that they will be driven out of if they are disobedient. In fact, both are sent the same direction, to the east, when they do disobey. And then, where will the Messiah come to? Exactly the same area as the first Adam lived! And where is the New Jerusalem of Revelation 21 located? Just where God placed the first Jerusalem, which was in the same place that He created for Adam and Eve: Eden!

In this view, the whole Bible ties together in a way that makes complete sense and has God wasting nothing as He prepares a land for His people. The blessings and curses that form so much a part of the later books of the Pentateuch, can now be seen as being foreshadowed in God's initial command to Adam and Eve.

But should we even be reading Genesis so literally? After all, isn't Genesis really poetry? As an Old Testament scholar, Sailhammer makes short work of the argument. What is it that characterizes all Hebrew poetry? Parallelism and meter. Parallelism is the use of two lines to express the same idea in two ways. For example:

The Lord is a great God
And a great king above all gods.

These express the same thought in two related ways. Hebrew poetry also has a certain meter, where either the number of words or symbols will be approximately the same between two lines. Does Genesis 1 or 2 fit that pattern? Absolutely not. And in fact, Sailhammer chides Evangelicals, who, to try to take these chapters less literally, speak of "poetry-like" language. As he says, this seems like "little more than an attempt to dismiss the obvious intent of these narratives to

tell us, in literal terms, what actually happened at creation."

In conclusion, he considers the question, "Is the Big Bang being described in Genesis 1:1?" Interestingly enough, his answer is a fairly firm, "No." As he pointedly comments, "When understood as the Big Bang, creation becomes just another example of the forces of the physical world we see around us today. . . . Our world, however, cannot be traced back to the divine act of creation. Science and history will always be separated from the divine acts of creation."

You will have to read all of Dr. Sailhammer's provocative book to make up your own mind. But at least give him the chance to make his case directly from the text. *Genesis Unbound* is a book to stir your thinking, and should be read slowly. But go back and read Genesis to be reminded of God's greatness in His creation.

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