Darwinism Takes a Step Back in Kansas

Has Oz Returned to Kansas?

Suddenly, the mere mention of the Kansas State Board of Education in most educational and academic circles brings derisive giggles and sneers. In August the Kansas State Board of Education voted to remove references to macroevolution from state science testing standards. A wave of revulsion gripped the nation's media. In *Time* magazine, Harvard University paleontologist Stephen J. Gould trumpeted, "The board transported its jurisdiction to a never-never land where a Dorothy of the new millennium might exclaim, 'they still call it Kansas, but I don't think we're in the real world anymore.'"{1} Gould further belittles honest concerns about the teaching of evolution by proclaiming: (1) no other nation has endured any similar movement (this makes us look bad overseas); (2) evolution is as well documented as any phenomenon in science (it is perverse to call evolution anything but a fact); and (3) no discovery of science can lead us to ethical conclusions (believe what religion you want, science doesn't threaten you).

That's a pretty scathing reaction. Let's see what else we can find.

Here's one from nationally syndicated columnist Ellen Goodman of the *Boston Globe*.{2} Ms. Goodman declared that "removing evolution from the science curriculum is a bit like removing verbs from the English curriculum. Evolution can still be taught, but it's no longer required, it won't be tested, and it will be discouraged." (However, natural selection, variation, and microevolution will still be recommended and tested.) Later she decries the fact that "In 1925,

creationists dragged a young biology teacher, John Scopes, to the courtroom for the infamous 'Monkey Trial.'" Actually it was the ACLU that dragged Scopes into the courtroom. He couldn't even remember if he had actually taught evolution. They needed a "volunteer" to defend to test the new Tennessee law. (See Phillip Johnson's *Defeating Darwinism By Opening Minds,* 1997, IVP, Chapter 2 for the real story of the Scopes trial and its shameful portrayal in the play and film, *Inherit the Wind*.) Goodman also pontificates that "there is no serious scientific dispute about the fact of evolution." Notice that Ms. Goodman indicates that evolution is a fact, therefore beyond question. She also cleverly indicates that if you dispute evolution, you must not be a serious scientist.

In the Seattle *Post-Intelligencer*, Sean Gonsalves laments, "Educated people everywhere are still in shock over the appalling ignorance displayed by the Kansas state board of education that voted two weeks ago to effectively remove evolution and the 'Big Bang' theory from the state's science curriculum. Is there still a science curriculum in Kansas?"{3}

Well, those unruly, ignorant anti-evolutionists really seem to have overstepped their bounds this time! You would think that we would be cowering in the corner somewhere after all the abuse from such heavy hitters, but no, actually, we're quite ecstatic. I have given you only a small example of the media and science firestorm, but it is just more of the same. While nobody enjoys being the butt of jokes and verbal abuse, what is significant are two things. First, the Kansas board has dealt Darwinists a severe blow by not mandating creation, thereby eliminating Darwinist's usual rallying cry of science versus religion. They have simply searched for a more objective means of presenting evolution. That's tough to argue against. Second, Darwinists have been flushed out into the open. Flimsy, *ad hominem* attacks, appeals to authority, and question begging have been brought out in the open for all to see. The Kansas State Board of Education has unintentionally

raised the stakes in the decades old creation/evolution discussion.

What Really Happened in Kansas?

Given the reaction to the decision by the Kansas State Board of Education you would have thought the six board members who voted for the new standards in a close 6-4 vote were part of some dastardly plan to underhandedly bring God into the classroom. Also seemingly at stake was the reputation of the whole state of Kansas if its citizenry did not rise up in revolt against such an irrational decision. Apparently, Kansas had been set back decades in science literacy.

Well, what actually happened in Kansas? What did the board actually do and why? It is important to realize that the Kansas board authorized a 27-member panel of scientists and science educators from the state to revise the current state science testing standards. These standards do not mandate what can and cannot be taught, only what likely will be included on state science tests. What the board received was a highly prejudicial document making evolution the single unifying concept to the state's biology standards. When board chairwoman Linda Holloway asked the committee representatives for evidence of macroevolution they essentially replied, "We're the experts, and that will have to do."{4} What that means is that she received no evidence, just an admonition that, with their position as scientists, she should just trust them.

Rather than turn the Kansas high school classrooms into a propaganda machine for materialist philosophy, the board decided to amend the standards to maintain microevolution—natural selection acting on genetic variation—but not macroevolution¾the claim that microevolution leads to new complex adaptations and new genetic information. They also left it up to the individual school districts to determine how much or how little evolution to teach. Evolution

was *not* removed from the curriculum, as so many news stories reported. Creation was not mandated, Darwin was not banned, and evolution was not censored.

What this *does* do is leave open to school districts the opportunity to teach the surging controversy surrounding evolution. Actually, what many in the intelligent design movement would have preferred, if possible, is to teach more evolution, not less. Meaning, let's teach not only the evidence for evolution, but also the mounting evidence calling the naturalistic creation story into question. Students should be familiar with evolution. It is the major story of origins within the scientific community. But in the interest of a true liberal education, the serious questions regarding evolution should also be included. Students should be allowed the privilege of weighing the evidence for themselves, not just accepting it because their teacher tells them to.

This is really where the threat to the scientific community lies. The more doubt about evolution that's allowed, the trickier the educational landscape becomes for a fully naturalistic, materialistic approach to education.

In the past, the media barrage over such an anti-evolutionary decision has been decidedly one-sided. What is significant this time is that the Kansas board has received some rather hefty and significant support from invited articles, guest columnists, and op-ed pieces in prestigious news outlets such as the *Wall Street Journal*, the *Washington Post*, the *Chicago Tribune*, and the *Washington Times*. The debate is indeed changing.

Some Surprising Support for Kansas Board of Education

Amidst the unusual rancor and indignation from the media and scientific community following the decision of the Kansas State Board of Education, many have missed the small, yet

significant, support the board has received for the spirit of their decision: namely, to try to find a way to disrupt the universal agenda to present scientific naturalism as the only possible explanation of where we all came from.

On August 16, 1999, the *Wall Street Journal* published an article by UC Berkeley law professor and Darwinian critic, Phillip Johnson.{5} Johnson quotes a Chinese paleontologist who openly criticizes Darwinism as wryly commenting that "In China we can criticize Darwin but not the government. In America you can criticize the government but not Darwin." After summarizing the frantic response of scientists and educators, Johnson commented, "Obviously, the cognitive elites are worried about something a lot more important to themselves than the career prospects of Kansas high school graduates."

Johnson pointed out that evolution is the main scientific prop for scientific naturalism, a philosophical system that leaves God totally out of its picture of reality. Quoting well-known scientists such as Carl Sagan, Richard Dawkins, Stephen J. Gould, and Richard Lewontin, Johnson makes clear that this is the real battle. Allowing evolution's flaws to be detailed in classrooms would allow a broader discussion of fundamental assumptions. Johnson concluded optimistically, "Take evolution away from the worldview promoters and return it to real scientific investigators, and a chronic social conflict will become a chronic intellectual adventure."

A few days later, the *Washington Times*{6} chided the rest of its media cohorts for a vast overreaction and actually cited evidence that calls Darwinism into question. The friendly editorial concluded with "No one, and certainly not the Kansas Board of Education, is saying that evolution should not be taught; it remains the prevailing scientific theory of creation. Rather, some healthy agnosticism and scientific open-mindedness on the matter would seem to be in the best interest of everyone curious about the greatest mystery of all." Hear, hear!

The *Chicago Tribune*, while openly critical of the action of the Kansas Board of Education, also criticized previous actions of the National Association of Biology Teachers concerning evolution.{7} The association initially used the words *unsupervised* and *impersonal* to describe the evolutionary process. These clearly non-scientific terms were eventually and reluctantly removed by the association, who explained they didn't think the terms would be construed negatively, which the *Tribune* called either a lie or clear demonstration of scientific fundamentalism.

Finally, the *Washington Post*{8} printed an article by Jay Richards, senior fellow and program director of the Discovery Institute's Center for the Renewal of Science and Culture. The CRSC is currently the only think tank I know of that openly supports and endorses intelligent design. Richard's final point, "Fairness and objectivity in the science classroom require that teachers teach the controversy, not deny its existence," is fair, lucid, rational, and appealing. "Teach the controversy" has become a rallying cry. You are bound to hear it more and more. The debate in Kansas has resulted in similar debates around the country, to which we now turn our attention.

Darwinism Assailed in Other States

Following the recent decision by the Kansas State Board of Education the teaching of evolution was big news around the country. In Kansas there were roundtable discussions, lectures, and debates. Some were in academic settings, such as the University of Kansas and Washburn University, some were in churches, and some were sponsored by a humanist skeptic organization. The American Association for the Advancement of Science (AAAS) was prompted to publish their own statement deploring the action taken by the Kansas Board of Education.{9}

You might think that all the negative publicity would cause

other states to back off any changes in their own science curriculum. But apparently, all this publicity has encouraged other school boards to chart their own course or adopt the methods of other states before them.

The Oklahoma State Textbook Committee voted to adopt a disclaimer to be placed on the inside cover of all biology textbooks. Unhappy with the propaganda-like treatment of evolution in the majority of textbooks they looked at, the committee needed the disclaimer to be able to recommend a sufficient diversity of biology texts for the state. While arguably not the best statement on the subject, the disclaimer labels evolution as controversial, a separation of microevolution and macroevolution, and encourages students to study hard, keep an open mind, and perhaps they can contribute to the origins discussion in the future. Nothing is said about creationism, intelligent design, or any other theories. Basically the statement wants students to think critically about evolution.

What has been missed in the newly swirling controversy about the disclaimer in Oklahoma is that it is nearly a direct copy of the disclaimer adopted by Alabama over two years ago which has not been challenged in court. However, instead of mentioning the obvious connection, journalists attempted to draw parallels to a Louisiana school district directive that was recently struck down because it specifically mentioned creationism. The two disclaimers are not related, but in the attempt to make it look as bad as possible, the chosen tactic is to mislead.{10} Once again, a very reasonable, but not perfect resolution was dismissed as simply another attempt to smuggle creationism into the public schools.

Meanwhile in West Virginia a similar controversy hit the news. The Kanawha County Board of Education is considering a resolution that would allow for the teaching of theories for and against the theory of evolution. It soon came to light that Illinois and Kentucky had previously passed resolutions

similar to the one in Kansas. Commentary and editorials were appearing in major and local newspapers across the country taking sides in a suddenly public and heated discussion. Clearly, something has changed. The usual evolutionist hand-wringing is sounding more like whining and the previously unheard-of support for a revision of the instruction in evolution is suddenly receiving a cautious but receptive ear in important academic, educational, and media circles. While it must be kept in mind that all of these "victories" are relatively small and can be easily overturned, nonetheless their simplicity, objectivity, and legal savvy are raising eyebrows that paid little attention before.

What Does All This Mean?

The flurry of nationwide activity concerning the teaching of evolution in our public school systems, while noteworthy, is not terribly new. This battle has been going on for over three decades, but with seemingly little change. However, this time, as I have documented, there has been surprising support and very public discussion over the last few months. Phillip Johnson and others have been invited or allowed to offer their impressions and rebuttals in newspapers, journals, and magazines across the country. Public lectures, debates, and roundtable discussions have been offered before large crowds.

Something has definitely changed. I think we can isolate the change in two places. First some of the cherished, misleading evolutionary explanations are being rebutted openly and decisively in these public discussions. Second, the public is becoming better educated on the issues involved and they are less intimidated by the evolutionary rhetoric.

One of the favorite lines used to dismiss critics of evolution is to label them as religious zealots and fundamentalists. Religion and science, says this argument, have nothing to say to one another so you can't bring religion into the science classroom. Stephen Gould states the case in his usual

journalistic style, “Science and religion should be equal, mutually respecting partners, each the master of its own domain, and with each domain vital to human life in a different way.”{11} Elsewhere it becomes plain that Gould means that science deals in facts and religion in the intangibles of morality and such. This is seen more and more as condescending nonsense. Other evolutionists like Douglas Futuyma readily admit that, “By coupling undirected, purposeless variation to the blind, uncaring process of natural selection, Darwin made theological or spiritual explanations of life processes superfluous.”{12} The negation of a theological principle is itself, a theological principle. Besides, any theory which purports to explain where we came from will contain the seeds of ethics and morality.

Robert E. Hemenway, chancellor of the University of Kansas, tried to say that the Kansas decision is a rejection of science altogether.{13} But when you actually read what the Board of Education did, they actually expanded the coverage of evolution from the previous standards and required students to know a very decent description of Darwinian evolution.{14} Skepticism is healthy in science. The new standards actually promoted questioning and critical thinking. This kind of obfuscation was not so easily foisted on the public.

The educational effort of many organizations over the past several decades has begun to yield citizens surer of themselves and not so easily intimidated. Seeing articles appearing in major news outlets like the *Wall Street Journal*, the *Washington Times*, and the *Chicago Tribune*, as well as appearances on CNN, have galvanized popular opinion and provided means to critically counterattack the bluster of the opposition.

Although the coverage has not always been accurate and completely positive, and the actual decisions by education boards have not always hit the mark, the net effect has been a major opening up of the debate. Change has been accomplished

in these few months that would have ordinarily taken years. As mentioned previously, the phrase “teach the controversy” will be found more and more in the public discussion. That’s exactly what needs to happen.

Notes

1. Stephen Jay Gould, “Dorothy, It’s Really Oz, 1999,” *Time* vol. 154, no.8 (August 23, 1999), 59.

2. Ellen Goodman, “Those Ever-Evolving Creationists,” *Boston Globe*, Aug. 19, 1999, A19.

3. Sean Gonsalves, “Kansas School Board Fighting the Wrong Theory,” *Seattle Post-Intelligencer*, August 24, 1999, A11.

4. Jeremy Johnson, “Media Pigeonholes Board into Stereotype,” *Kansan*, August 19, 1999.

5. Phillip E. Johnson, “The Church of Darwin,” *Wall Street Journal*, August 16, 1999, A14.

6. “Editorial, Kansas Conundrum,” *Washington Times*, August 19, 1999, A16.

7. Steve Kloehn, “In a Word, Kansas Tries to Make Evolution Go Away,” *Chicago Tribune*, August 20, 1999, 10.

8. Jay Richards, “Darwinism and Design,” *Washington Post*, August 21, 1999, A19.

9. “AAAS Statement on the Kansas State Board of Education Decision on the Education of Students in the Science of Evolution and Cosmology,” *Science*, vol. 286 (November 12, 1999), 1297.

10. Diane Plumberg, “Panel Plunges State into Debate about Evolution,” *Daily Oklahoman*, November 12, 1999.

11. Gould, 59.

12. Douglas J. Futuyma, *Evolutionary Biology*, 3rd ed. (Sunderland MA: Sinauer Assoc., 1998), 5.

13. Robert E. Hemenway, "The Evolution of a Controversy in Kansas Shows Why Scientists Must Defend the Search for Truth," *Chronicle of Higher Education*, October 29, 1999, B7.

14. Jonathan Wells, "Ridiculing Kansas School Board Easy, But It's Not Good Journalism," *Mitchell (South Dakota) Daily Republic*, October 14, 1999.

Mere Creation: Science, Faith and Intelligent Design

An unprecedented intellectual event occurred in Los Angeles on November 14-17, 1996. Under sponsorship of Christian Leadership Ministries, Biola University hosted a major research conference bringing together scientists and scholars who reject naturalism as an adequate framework for doing science and who seek a common vision of creation united under the rubric of intelligent design. The two hundred participants, primarily academics, formed a nonhomogeneous group. Most had never met each other. Yet virtually all the participants questioned the reigning paradigm of biologynamely, that natural selection and mutation can account for the origin and diversity of all living things.{1}

So said Dr. Henry F. Schaefer III, professor of chemistry at the University of Georgia, author of over 750 scientific publications, director of over fifty successful doctoral students, and five-time Nobel nominee, in his foreword to the

1998 book, *Mere Creation: Science, Faith and Intelligent Design.*{2} I was privileged to be one of the two hundred participants at this historic conference which, along with the subsequent book, form the backbone of future direction of the fledgling intelligent design movement.

I would like to highlight significant chapters from this book and provide additional resources to learn more about this important challenge to Darwinism. Along the way I hope you will gain a glimpse of how important this movement is to the future not just of biology, but of science education as a whole in this country and around the world.

Jonathan Wells is a post-doctoral research biologist in the department of molecular and cell biology at the University of California at Berkeley. His Ph.D. is from the same institution in developmental biology. In his chapter, "Unseating Naturalism,"{3} Wells lists several important insights from developmental biology that seriously challenge a purely naturalistic biologic science.

Since 1983, homeotic genes have been the rage in evolutionary developmental biology. First discovered in fruit flies, these genes appear to act as switches to turn on a series of genes important for sequential levels of development. Of interest to evolutionists, is the fact that many of the same genes found in fruit flies are also found in almost every other animal group, all acting as developmental switches. They are even frequently found on the same chromosome and in the same order from species to species. Such evidence seems quite a compelling argument for all life forms evolving from a common ancestor.

But Wells quickly points out that these genes do not control the same body structures from species to species, so an evolutionary explanation does not fit so well. "If the same gene can 'determine' structures as radically different as a fruit fly's leg and a mouse's brain or an insect's eyes and

the eyes of humans and squids, then that gene is not determining much of anything."{4} There is no current mechanism to understand how a homeotic-switching gene can change from coding for one function to another in different organisms. Suddenly, this new great evidence of evolution is yet another problem for evolutionary biology. Wells goes on to point out that intelligent design has no trouble incorporating similar switches in different organisms just as an engineer understands the use of similar ignition switches in different kinds of vehicles.

Wells concludes that, "A design paradigm can nurture the sort of formal and teleological thinking that will enable biologists to discover the laws of development that have so far eluded them."{5} The reason for the elusion is the shackles of Darwinism.

Redesigning Science

In taking a close look at the book, *Mere Creation*, edited by Bill Dembski, I would like to explore Dembski's own contribution to the volume, "Redesigning Science."{6} If the name Bill Dembski is unfamiliar to you, it won't be for long. Dembski is an extremely bright and articulate young man with earned doctorates in mathematics from the University of Chicago and philosophy from the University of Illinois at Chicago along with an M. Div. from Princeton Theological Seminary. Dembski is also the author of perhaps the most significant book to date in the intelligent design movement, *The Design Inference: Eliminating Chance through Small Probabilities*{7}, from the prestigious Cambridge University Press.

Bill is also confident. He is confident that intelligent design can thoroughly reshape the horizons of science in the next twenty years. He begins his chapter with a whimsical scenario recounting a "nightmare" potentially experienced by Harvard paleontologist and vocal anti-creationist, Stephen Jay

Gould. The nightmare includes Gould no longer teaching at Harvard, relegated to leading field trips to the Galapagos Islands and the Burgess Shale in the Rocky Mountains of Canada, with Phil Johnson and cronies firmly in control of the National Science Foundation.{8} While Dembski admits that the nightmare is hopefully not realized in all its details, the notion of design claiming primacy within science is clearly the objective.

In order for this objective to be realized, design must be specifically and rigorously defined. I'll allow Dembski to explain in his own words.

> *The key step is to delineate a method for detecting design. Such a method exists. We use it implicitly all the time. . . . The method takes the form of a three-stage explanatory filter. Given something we think might be designed, we submit it to the filter. If it successfully passes all three stages of the filter, then we are warranted asserting it is designed. Roughly speaking, the filter asks three questions, and in the following order: Does a law explain it? Does Chance explain it? Does design explain it?{9}*

In trying to classify an event as either due to natural law, chance, or design, we first try to assess if it is an event of high probability and therefore due to some recognizable natural law. A bullet firing when a gun's trigger is pulled or getting at least one head when a fair coin is tossed a hundred times are both high probability events due to natural law.

Rolling snake eyes with a pair of fair dice, or even winning a million dollar lottery when considering how many tickets are sold, constitute events of intermediate probability that are justly relegated to chance.

But let's say the same person wins that lottery three times in a row or even twice in a row. Suddenly we suspect that something more than chance is involved. Dembski's own example

is Nicholas Caputo, the county clerk of Essex County, New Jersey. Caputo was responsible for determining the order in which candidates appeared on the ballots for elections. Caputo was a Democrat and 40 out of 41 times the Democrats were listed first, which everyone agrees, gave them a slight advantage. We intuitively use the explanatory filter to classify these events as designed because they are of small probability and they conform to a pattern. Thus intelligent design combines small probability with what Dembski terms, "specified complexity."

Dembski and the other authors of *Mere Creation* believe we can apply the same test scientifically to physical, chemical, and biological events.

The Explanatory Power of Design

One of the critical questions for intelligent design is its ability to explain at least some natural phenomena more completely than naturalistic science. Stephen Meyer addresses this problem in his chapter, "The Explanatory Power of Design."{10} Steve Meyer is professor of philosophy at Whitworth College in Spokane, Washington, with a Ph.D. in the history of and philosophy of science from Cambridge University, England. As an example of design's explanatory power, Meyer chooses to explore the origin of information within living systems, specifically the origin of the genetic code. Meyer brings a scholarly appraisal to the subject since his Ph.D. dissertation concerned the history and status of origin of life research.

Meyer summarizes the extreme problems origin of life research has encountered in the last thirty years, highlighting along the way the important work by Charles Thaxton and Walter Bradley.{11} Following the euphoria of the famous experiment by Miller and Urey in 1953, the origin of life community has suffered setback after setback. Miller and Urey demonstrated that a mixture of methane, ammonia, water and hydrogen could

be induced to produce, among many other organic compounds, a few amino acids, the building blocks of proteins. Subsequent work showed that this hypothetical atmosphere was pure mythology. So was the notion of a prebiotic soup of biochemical building blocks.{12}

Beyond the purely biochemical difficulties of origin of life research looms the immense problem of accounting for the origin of complex specified information contained in biomolecules, and specifically in DNA and the genetic code. In the computer age we are often amazed at the speed and storage capacity of modern personal computers, particularly the laptop variety with their 12 gig hard drives and 500 MHz speeds. We seldom realize, however, that "the information storage density of DNA, thanks largely to nucleosome spooling, is several trillion times that of the most advanced computer chips."{13} So not only is there real information stored in DNA, but it is stored at a density on a molecular level, we can't even approach with our best computers. So just where did this information come from?

Attempts to account for the origin of biological information by natural biochemical means have utterly failed. The odds of achieving even a small 100 amino acid protein are less than 1 in 10^{125}. Events of that small a probability just don't happen. Not only that, but researchers now realize that natural forces are incapable of achieving the formation of bio-information by any process. At first, some thought that maybe the amino acids and nucleotides had some natural affinity for each other to help account for the specific sequences of proteins and DNA. When that turned into a dead end, some hoped that some sort of natural selection of molecules might help. But natural selection requires reproducing cells. So-called "self-organization" processes only provide low level order, like ripples in the sand, not informational messages like "JOHN LOVES MARY" written in the sand.

Scientific laws will only describe ordered natural phenomena, like the structure of a crystal, which bear no relationship to the specified complexity within biomolecules. Instead, our experience with informational codes and languages indicates that they always come from an intelligent source. Therefore mind or intelligence stands as the only possible source for the information in DNA, proteins and cells as a whole.{14}

Applying Design within Biology

Have you ever wondered how a baby is formed from a single cell in just nine months? You could ask the same question of just about any animal from wasps to caterpillars to frogs to clams. A fully functioning organism is a symphony of integrated parts performing in coordinated fashion to make beautiful music. But where did all the orchestra members (or proteins) come from? And who told them where to sit? And how do they know when and what to play? And what about tempo and volume and on and on? Well, you get the picture. Biological organisms are immensely complex, but they all start out as single cells. Somehow they turn into assemblages of different cells and tissues that all know their places and roles. Embryological development has long been a mystery and its secrets are only slowly being revealed. It has also turned into a potentially fruitful battleground between evolution and intelligent design.

Paul Nelson recently received his Ph.D. in philosophy from the University of Chicago and is currently doing post-doctoral work at the same university in evolutionary and developmental biology. The connection between embryological development and evolution is significant because, in order for organisms as diverse as hawks and starfish to evolve from a common ancestor, they must change not only their outward appearance but also the developmental process that starts as single cells for both. Nelson's "Applying Design within Biology" explores the connection and its inherent contradictions.{15}

A major observation of embryology has been that developmental

mutations are usually harmful and often fatal. And the earlier in the developmental process the mutation occurs, the more likely the effect will be harmful. This led most embryologists to believe that evolutionary changes utilize mutations that appear relatively late in embryological development. Subsequently Darwinists predicted that the further back you go in comparing two organisms' patterns of development, the more similar they will be. Unfortunately for evolution, this is not true. There is wide diversity of early cleavage patterns of cells in embryos from species that can actually be closely related. One author went so far as to refer to this as "intellectually disturbing."{16}

Such a dramatic reversal would, you would think, cause many or at least some developmental biologists to question the validity of Darwinism. But as I have indicated so many other times in other essays, Darwinism is assumed, not questioned. Biologists mainly concluded that change in early development is doable after all and quite common. But as Nelson aptly summarizes, "There is little if any experimental evidence that 'changes in early development are possible.'"{17}

While the diversity of pathways to similar ends in development is a problem for evolutionary developmental biology, it is an expectation of intelligent design. The sheer magnitude of instructions for embryological progress screams for a design perspective. Design is also found in the newly discovered redundancy of developmental pathways. Knocking out a seemingly essential gene can sometimes have no effect whatsoever. Built-in redundancy is a hallmark of *design*, not chance mutations and natural selection. Nelson basically believes that any element of an organism necessary for survival and reproduction in any environment is a strong candidate for design. This should help open up new research avenues for developmental biology which is exactly what new theories should do.

Basic Types of Life

Next time you are walking through a zoo, stop and think about what makes some animals different and others similar. For instance, if you are looking out over a large pond, you may see different species of ducks, geese, and swans. While they do appear different in some respects, there are also very tantalizing similarities. However, if there are also some flamingos or sea gulls in the crowd of aquatic birds, you would not put them in the same category as ducks and geese. They seem different. Evolutionists, of course, would see sufficient similarities: they are birds, after all, with wings, feathers, and beaks. So evolutionists would say they all evolved from a common ancestor. Ducks and geese are more similar to each other than they are to flamingos so the ancestor of ducks and geese is more recent than the ancestor of ducks, geese, and flamingos.

But since intelligent design is calling into question many evidences and predictions of naturalistic evolution, it is reasonable to assume that all animals are not related back in time through a common ancestor. Perhaps all birds did not evolve from a single source. Maybe there are many different ancestors for the many groups of birds and other animals. Well, how would you know? How could you recognize groups of animals that do derive from a common ancestor and those that have arisen independently? Siegfried Scherer makes an attempt in his chapter titled, “Basic Types of Life.” {18}

Dr. Scherer is a professor of microbial ecology and director of the Institute of Microbiology at the Technical University of Munich and has published numerous papers in international peer-reviewed journals. Scherer proposes that there is another unit of taxonomic classification that can be overlaid on current taxonomy, the idea of basic types.{19} A basic type is a group of organisms or species that are capable of hybridizing. These hybrids don’t necessarily have to be

fertile themselves. Simply producing a coherent functioning organism from sperm and eggs of different species is sufficient.{20} Numerous successful attempts to hybridize different species of ducks, swans, and geese have convinced Scherer that they belong to a single basic type. This would mean that all 148 species are descended from a single common ancestor.{21}

The distinct differences mentioned earlier, between ducks and flamingos, would result from them being of different basic types. This observation leads Scherer to suggest that microevolution can now be defined as evolution within one basic type and macroevolution as evolution between basic types. The current evidence suggests that macroevolution is an undocumented process both from the fossil record and the biology of basic types.

The plethora of species within a basic type like the ducks and geese also suggests that there was a great deal of variation built into each basic type to allow many distinct species to form through speciation. This prediction would be consistent with intelligent design but not evolution. There would be no reason for evolution to suggest that some species would have more variation than others would. This is corroborated by the observation that hybrids between two species frequently resemble a third species. This indicates that the genetic combination of the third species was hidden between the two species used to form the hybrid.{22}

Scherer summarizes that evidence of individual ancestors for each basic type, fossil and biological gaps between basic types, similar or convergent characters in different basic types, and odd features, such as slightly differing genetic codes now found in a few organisms would also be evidence of design over evolution. The possibilities for further research are everywhere. Intelligent design becomes an extremely fruitful paradigm for research.

Notes

1. Henry F. Schaefer III, “Foreword,” in *Mere Creation: Science, Faith and Intelligent Design*, William A. Dembski, Ed. (Downers Grove, Ill.: InterVarsity Press, 1998), 9.

2. Ibid., 475.

3. Ibid.,, 51-70.

4. Ibid., 56.

5. Ibid., 68.

6. Ibid., 93-112.

7. William A. Dembski, *The Design Inference: Eliminating Chance through Small Probabilities* (Cambridge: Cambridge University Press, 1998), 243.

8. Dembski, *Mere Creation*, 93.

9. Ibid., 94.

10. Ibid., p. 113-147.

11. Charles Thaxton, Walter Bradley and Roger Olsen, *The Mystery of Life’s Origin: Reassessing Current Theories* (Dallas: Lewis and Stanley, 1984), 228.

12. *Mere Creation*, 118-119.

13. Ibid., 120.

14. Ibid., 136-137.

15. *Mere Creation*, 148-174.

16. Eric Davidson, quoted in *Mere Creation*, 155.

17. Ibid.

18. Ibid., 195-211.

19. Scherer does at least mention a competing idea, baramin, initially proposed by creationist Frank Marsh (*Fundamental Biology*, 1940, Lincoln Neb., n.p., *Variation and Fixity in Nature*, Mountain View, Calif.: Pacific Press) and further explicated by Kurt Wise (K. Wise, Baraminology: "A Young Earth Creation Biosystematic Method, in *Proceedings of the Second International Conference on Creationism*, R.E. Walsh and C.L. Brooks, eds. (Creation Science Fellowship, Pittsburgh, PA, 1990, Vol. 2, 345-360 and K. Wise, "Practical Baraminology," *Creation Ex Nihilo Technical Journal*, 1991, 6(2): 122-137). Scherer chooses not to mention another attempt in fleshing out this concept, the prototype, proposed by Lane P. Lester and Raymond G. Bohlin in *The Natural Limits to Biological Change* (Dallas: Probe Books, 1984), 161-172.

20. *Mere Creation*, 197-199.

21. Ibid., 200.

22. Ibid., 203-204.

"Can You Recommend the Best Christian Colleges for My Son?"

Dear Dr. Bohlin,

I read your article on line at Leadership U. and would respect your opinion on a matter of concern to me. I am especially impressed that you managed to keep the faith while studying genetics and molecular biology.

My son will be starting college next year. He is homeschooling, but I guess he does well academically because he got 1600 (perfect score) on his SAT. He wants to go to California Institute of Technology and study physics eventually, but wants to first go to a Christian College of good reputation for one or two years to meet other Christian young people and to become really well grounded in the faith before going to Cal Tech. (I personally hope for him to meet a godly, Christian girl for a wife.)

Hopefully, it would be a college committed to an orthodox, fundamental, conservative Christian doctrine, and have at least more than, say, 1000 students.

What are the best Christian colleges, in terms of the quality of the students and the quality of the teaching?

Can you make any suggestions, any recommendations of Christian colleges?

Your request is a reasonable one and I commend you for seeking advice. I would also suggest you ask others who have sent their kids to Christian colleges for their opinion. Our older son attends John Brown University, a Christian college of about 1,100 students in Siloam Springs, Arkansas. It is a sound Christian university dedicated to teaching a Christian worldview. Their engineering department is top-notch (our son is in digital media), I understand, and very rigorous. I would presume their physics department is up to those standards. I also recommend Taylor University in Indiana, Westmont College in Santa Barbara, California and to a lesser extent, Wheaton College in Illinois. Any of these colleges would offer significant scholarship money for your son. But you already

seem a bit leery and that is good. A college is only as good as its faculty and they are never universally excellent either in scholarship and teaching or in their adherence to a thoroughly Christian worldview. For instance, a number of the biology faculty at these institutions are theistic evolutionists and would not be receptive to many of my articles. However, I know some of the biology faculty at Westmont and they are not theistic evolutionists. I know of only one at Wheaton for sure. A student must be equipped to know what they believe and why even in a Christian university.

Clearly your son has been given a gift with his intelligence and I respect his desire for Cal Tech. We need more Christian young people with the talent and dedication to pursue the best education they can get to qualify them to impact the academic community for Christ. There is a strong growing movement away from a strict materialism, particularly in astronomy and physics. The intricate workings of God's universe are more and more being seen as something that is beyond being explained by chance. So much so that being a Christian in these fields is not as difficult as biology and geology.

I would strongly recommend your son attend our weeklong Mind Games Conference outside of Little Rock, Arkansas this summer regardless of where he goes. This conference is billed as our national conference and repeatedly draws national merit scholars and valedictorians from local and distant Christian and public schools. He will be among peers. There are also several college students who attend who can help with advising from their own experiences. Our web site can give you some details for this conference (probe.org/student-mind-games). Also look at my article on Campus Christianity to get an idea of my practical advice for students (it is usually the final session of a conference for students).

Concerning a wife, a good Christian wife can also be found among Christians from a secular university who understand the challenge to their faith at these institutions. This can be a

very maturing experience. Our younger son is at the University of North Texas and growing in his faith in a much more vital way than our son at John Brown. Each student is different, and their needs are different. If our sons were to switch colleges they would both be profoundly unhappy. By the way, I met my wife at the University of Illinois in Campus Crusade for Christ.

I hope you find this helpful.

Respectfully,

Ray Bohlin
Probe Ministries

Why Does the University Fear Phillip Johnson?

Who Is Phillip Johnson?

Best-selling author Phillip Johnson has become the leader of the Intelligent Design movement. His books *Darwin on Trial, Reason in the Balance, Defeating Darwinism by Opening Minds* and the recently released *Objections Sustained* have become rallying points for Christian scholars across the academic spectrum. Johnson has addressed university audiences around the country, sometimes on his own, often in debate with a leading proponent of evolution. He has even addressed in private session entire science, law, and philosophy departments at top universities. Well, just who is Phillip Johnson and how does he rate such attention?

Johnson was raised in a nominally Christian family, but he

grew to become a convinced skeptic of the faith. This process was greatly aided by his education, first as an undergraduate at Harvard and then at the University of Chicago Law School where he graduated first in his class. Johnson became convinced that people were basically good, education would solve whatever problems you had, the stuff of Sunday school was okay but mythology, and he could achieve success by thinking for himself and absorbing the culture around him.

This is the enticing picture the academic community paints for students and Johnson bought it. But things began to unravel in his mid-thirties. He had achieved his goals. He served as law clerk for Supreme Court Chief Justice Earl Warren and held a distinguished professorship of law at UC Berkeley, but he lacked fulfillment. He was publishing papers nobody read, or ought to read. His marriage to a beauty queen fell apart and he was single parenting for awhile. The writings of C. S. Lewis had impacted him greatly, but he thought, “Too bad we can’t believe in that anymore.” Eventually he heard the gospel preached in a way that seemed plausible and attractive. Johnson envied the speaker’s combination of commitment and fulfillment. “Do I have something so wonderful?” he questioned. Johnson said, “They believed it, I could too.”

Johnson put his faith in Christ, but faced a dilemma. If the gospel is true, why are all the “intelligent” people agnostic? He prayed for insight. Beginning with a sabbatical at University College in London in 1987-88, Johnson embarked on an intellectual journey. This journey has developed into a project that has seen him publish four books, deliver hundreds of lectures on college campuses, and become the leader of the fledgling Intelligent Design movement over the last ten years. Primarily through his study of evolution, Johnson learned that the academic community’s primary intellectual commitment is to the philosophy of naturalism. If the “facts” contradict materialistic conclusions, then the “facts” are either explained away, ignored, or just plain wrong.

Therefore, evolutionists like Richard Dawkins can say things like “Biology is the study of complicated things that give the appearance of having been designed for a purpose,” and actually say it with a straight face. The appearance of design is an illusion, you see, because we “know” that organisms evolved and the primary reason we “know” this is because naturalistic philosophy demands it.

Johnson’s primary task seems to be continually provoking the scientific community into facing the reality of its naturalistic presuppositions. In earlier years, the scientific establishment was able to dismiss creationists and not officially respond. But when a tenured law professor from Berkeley starts messing with your head, people start answering back. The National Academy of Sciences has issued two publications in the last two years trying to stem the tide.{1} The cracks in Darwinian evolution are beginning to show.

What Could a Law Professor Say About Evolution?

What could a legal scholar possibly have to say about evolution? Many in the academic community have raised the same question as Phillip Johnson has visited their university. In his own words Johnson states: “I approach the creation-evolution dispute not as a scientist but as a professor of law, which means among other things that I know something about the ways that words are used in arguments.”{2}

Specifically what Johnson noticed was that both the rules of debate about the issue as well as the word *evolution* itself were defined in such a way as to rule out objections from the start. Science is only about discovering naturalistic causes of phenomena, therefore arguing against the sufficiency of natural causes is not science! Also the “fact of evolution” is determined not by the usual definition of fact such as collected data or something like space travel which has been

done, but as something arrived by majority vote! Steven J. Gould said, “In science, fact can only mean ‘confirmed to such a degree that it would be perverse to withhold provisional assent.'”{3}

In the early chapters of *Darwin on Trial*, Johnson does an excellent job of summarizing the evidence that has been around for decades calling Darwinian evolution into question. These include problems with the mechanism of mutation and natural selection, problems with finding transitional fossils between major groups when they should be numerous, problems with the molecular evidence for common descent, and severe problems with any scenario for the origin of life.

In a chapter titled “The Rules of Science” Johnson excels in illuminating the clever web evolutionists have drawn to insulate evolution from criticism.{4} In order to limit discussion to naturalistic causes, science is defined in purely naturalistic terms. In the Arkansas creation law decision, Judge Overton said science was defined as being guided and explained by natural law, testable, tentative, and falsifiable. Overton got this from the so- called expert testimony of scientists collected for the trial by the ACLU. These criteria were used against creation on the one hand to say that a creator is not falsifiable, and also that the tenets of creation science were demonstrably false. How can something be non-falsifiable and false at the same time?

The conflict enters in when one realizes that creation by Darwinist evolution is as un- observable as creation by a supernatural creator. No one has ever observed any lineage changing into another and the few fossil transitions that exist are fragmentary and disputable. “As an explanation for modifications in populations, Darwinism is an empirical doctrine. As an explanation for how complex organisms came into existence in the first place, it is pure philosophy.”{5}

In a chapter titled “Darwinist Religion” Johnson points out

that despite the claims of scientists that evolution is secular, it is loaded with religious and philosophical implications. Most definitions of evolution emphasize its lack of purpose or goal. This makes evolution decidedly non-purposive in contrast to a theistic, purposive interpretation of nature. If it is the philosophic opposite of theism, evolution must be religious itself. Darwin himself constantly argued the superiority of descent with modification over creation. If scientific arguments can be made against theism, why can't scientific arguments be made for theism?

Darwin on Trial continues to sell, to be read, and to influence those open to consider the evidence. Since Johnson is not a scientist his book is highly readable to the educated layman. If you have never picked it up, you owe it to yourself to read what has become a classic in the creation/evolution controversy.

Johnson Extends His Case against Evolution into Law and Education.

Over the years of speaking on the creation/evolution issue I have been asked many times why people get so upset over this issue. If it is just a question of scientific accuracy, why does it produce such emotional extremes? The answer, of course, is that the creation/evolution debate involves much more than science. At question is which worldview should hold sway in making public decisions.

In Phil Johnson's second book, *Reason in the Balance*, he makes this very point when he says, "What has really happened is that a new established religious philosophy has replaced the old one. Like the old philosophy, the new one is tolerant only up to a point, specifically, the point where its own right to rule the public square is threatened."{6}

The old philosophy Johnson speaks of is the theistic or Judeo-Christian worldview and the new philosophy is the materialist

or naturalistic worldview. Johnson has referred to *Reason in the Balance* as his most significant and important work. That is because it is here that he lays the all important philosophical groundwork for the scientific, legal, and educational battleground of which the creation/evolution controversy is only a part.

That we no longer live in a country dominated by Judeo-Christian principles should be inherently obvious to most. But what many have missed is the concerted effort by the intellectual, naturalistic community to eliminate any possibility of debate of the worthiness of their position. On page 45 Johnson says,

> *"Modernist discourse accordingly incorporates semantic devices—such as the labeling of theism as religion and naturalism as science—that work to prevent a dangerous debate over fundamental assumptions from breaking out in the open. As the preceding chapter showed, however, these devices become transparent under the close inspection that an open debate tends to encourage. The best defense for modernist naturalism is to make sure the debate does not occur."*[7]

Johnson is quick to point out that there is not some giant conspiracy, but simply a way of thinking that dominates the culture, even the thinking of many Christians.

Therefore, in the realm of science when considering the important question of the existence of a human mind, only the biochemical workings of the brain can be considered. Not because an immaterial reality has been disproved, but because it is outside the realm of materialistic science and therefore not worth discussing. Allowing the discussion in the first place lays bare a discussion of fundamental assumptions, the very thing that is to be avoided.

In education, "The goal is to produce self-defining adults who choose their own values and lifestyles from among a host of

alternatives, rather than obedient children who follow a particular course laid down for them by their elders."{8} The reason, of course, is if God is outside the scientific discussion of origins, then how we should live must also exclude any absolute code of ethics. This also precludes the underlying assumptions from being discussed.

In law, naturalism has become the established constitutional philosophy. Rather than freedom *of* religion, the courts are moving to a freedom *from* religion. The major justification is that "religion" is irrational when it enters the domain of science or a violation of the first amendment in public education. "Under current conditions, excluding theistic opinions means giving a monopoly to naturalistic opinions on subjects like whether humans are created by God and whether sexual intercourse should be reserved for marriage."{9} What then are the strategies for breaking the monopoly?

Can Darwinism Be Defeated?

The main thing Christian parents and teachers can do is to teach young thinkers to understand the techniques of good thinking and help them tune up their baloney detectors so they aren't fooled by the stock answers the authorities give to the tough questions.{10}

So says Phillip Johnson in his recent book, *Defeating Darwinism.* (For a fuller review see Rick Wade's article, Defeating Darwinism: Phil Johnson Steals the Microphone.) Johnson is at his best here, relaying the many semantic and argumentative tricks used to cover up the inadequacies of Darwinism. In the chapter "Tuning Up Your Baloney Detector," Johnson introduces the reader to examples of the use of selective evidence, appeals to authority, ad hominem arguments, straw man arguments, begging the question, and lack of testability. This chapter will give you a good grasp of logical reasoning and investigative procedure.

Johnson also explains the big picture of his strategy to weaken the stranglehold of Darwinism on the intellectual community. He calls it *the wedge*. Darwinism is compared to a log that seems impenetrable. Upon close investigation, a small crack is discovered. "The widening crack is the important but seldom recognized difference between the facts revealed by scientific investigation and the materialist philosophy that dominates the scientific culture."{11} In order to split the log, the crack needs to be widened. Inserting a triangular shaped wedge and driving the pointed end further into the log can do this. As the wedge is driven further into the log, the wider portions of the wedge begin widening the crack.

Johnson sees his own books as the pointed end of the wedge, finding the crack and exposing its weaknesses. Other books in these initial efforts would certainly include the pioneering works of Henry Morris,{12} Duane Gish,{13} Charles Thaxton,{14} and even the agnostic Michael Denton.{15} Following close behind and fulfilling the role of further widening the crack are the works of J. P. Moreland,{16} Michael Behe,{17} and William Dembski.{18} What is needed now to widen the crack further and eventually split the log are larger numbers of theistic scientists, philosophers, and social scientists to fill in the ever widening portions of the wedge exposing the weaknesses of naturalistic assumptions across the spectrum of academic disciplines.

Here Johnson's strategy meshes nicely with Probe Ministries. Much of our energy is spent educating young people in a Christian worldview through Mind Games Conferences, the ProbeCenter in Austin, Texas, and our website (www.probe.org). We share with Johnson the joy of encouraging and opening doors for young people in the academic community. Johnson says,

> *"If you know a gifted young person, help him or her to see the vision. Those who are called to it won't need any further encouragement. Once they have seen their calling, you had better step out of the way because you won't be able to stop*

them even if you try."{19}

There is also an inherent risk in all this. Teaching young Christians to think critically and have the courage to join this exciting and meaningful cultural battle means they will also begin to examine their own faith critically. Some may even go through a period of doubt and deep questioning. While this may sound threatening, we shouldn't shy away. If Jesus truly is the way, the truth, and the light then any "truth" exposed to the light will endure. Our children will be stronger having put their faith to the test. The reward of possibly making a directional change in our downward spiraling culture is worth the risk.

Johnson Responds to the Intellectual Elite

One of the reasons that Phillip Johnson has become a leader in the Intelligent Design movement is the combined effect of his tenured position on the law faculty of the prestigious University of California at Berkeley and his deftness and sheer enjoyment in taking on the power brokers within the established halls of academia. Johnson has traveled extensively in the U.S. and abroad. He has also lectured and debated before university audiences and faculties. His knowledge of debate, concise prose, and his likeable demeanor allows him to bring the issues to the table skillfully. Many are able to think clearly about these issues for perhaps the first time.

Another avenue Johnson has pursued with great success has been to write articles and review books for some of the leading magazines and newspapers in the country. Johnson's fourth book, *Objections Sustained: Subversive Essays on Evolution, Law & Culture,*{20} is a collection of his essays since the publication of *Darwin on Trial* in 1991. While most of the essays in the book were originally published in either the

journal *First Things* or the paper *Books and Culture*, Johnson's pen has also been found in the pages of *The Atlantic, The Wall Street Journal, The Washington Times, The New Criterion,* and many other national and local magazines and newspapers. He has openly challenged some of the leading spokesmen for naturalistic evolution such as Stephen J. Gould and Richard Lewontin of Harvard, Richard Dawkins of Oxford University, and Daniel Dennet from Tufts University.

The point of all this is to draw the Darwinists out into the open where the debate can be seen and heard by all who are interested. Previously, creation was routinely dismissed as religion, but Johnson is not so easily swept aside since he has been able to expose the house of cards behind the bluster of Darwinism. The debate has crept more and more out in the open.

Two examples come to mind. First, the National Association of Biology Teachers (NABT) was caught with its hand in the cookie jar. In 1995, they released a statement about evolution describing it as, among other things, unsupervised and impersonal. Such theological/philosophical concepts should have no place in a "scientific" statement. A storm of controversy sparked both within and outside the teachers' ranks culminated in a reconsideration of the statement by the NABT board. At first the board voted unanimously to uphold the statement, and then a few days later, voted to remove the offending words. The *New York Times* remarked that "This surprising change in creed for the nation's biology teachers is only one of many signs that the proponents of creationism, long stereotyped as anti-intellectual Bible-thumpers, have new allies and the hope of new credibility."{21}

Second, the prestigious National Academy of Sciences has published two official publications attacking creationism{22} and supporting the teaching of evolution.{23} Rather than taking its critics head-on, these two books timidly revert to old and tattered evidences and appeals to authority. For

instance, the National Academy boldly asserts that "there is no debate within the scientific community over whether evolution occurred, and there is no evidence that evolution has not occurred."{24}

Science and Creationism says on the one hand, "Scientists can never be sure that a given explanation is complete and final."{25} But evolution cannot really be questioned because "Nothing in biology makes sense in biology except in the light of evolution."{26} Such obfuscation is now officially in the open arena—precisely where Johnson has been trying to force it to appear. The next ten to fifteen years promise to be exciting. I hope you continue to read Phillip Johnson and observe the ever broadening wedge drive deeper into the chinks of the Darwinian armor.

Notes

1. National Academy of Sciences, *Teaching About Evolution and the Nature of Science* (Washington, D. C.: National Academy Press, 1998), 140. Available online at http://www.nap.edu/readingroom/books/creationism/. National Academy of Sciences, *Science and Creationism: A View from the National Academy of Sciences* (Washington D. C.: National Academy Press, 1999), 35. Available online at http://www.nap.edu/readingroom/books/evolution98.

2. Phillip Johnson, *Darwin On Trial* (Downers Grove, IL: InterVarsity Press, 1991), 8.

3. Stephen J. Gould, "Evolution as Fact and Theory" in *Hen's Teeth and Horse's Toes* (New York: W. W. Norton, 1983), 255.

4. Johnson, *Darwin on Trial,* 111-122.

5. Ibid., 115.

6. Phillip E. Johnson, *Reason in the Balance: The Case Against Naturalism in Science, Law and Education* (Downers Grove, IL:

InterVarsity Press, 1995), 37.

7. Ibid., 45.

8. Ibid., 157.

9. Ibid., 29.

10. Phillip E. Johnson, *Defeating Darwinism by Opening Minds* (Downers Grove, IL: InterVarsity Press, 1997), 116.

11. Ibid., 92.

12. Henry Morris, *Scientific Creationism* (San Diego: Creation-Life Publishers, 1974).

13. Duane Gish, *Evolution: The Fossils Say No!* (San Diego: Creation-Life Publishers, 1972).

14. Charles B. Thaxton, Walter L. Bradley, and Roger L. Olsen, *The Mystery of Life's Origin* (New York: Philosophical Library, 1984).

15. Michael Denton, *Evolution: A Theory in Crisis* (Bethesda, MD: Adler and Adler, 1986).

16. J. P. Moreland, ed., *The Creation Hypothesis: Scientific Evidence for an Intelligent Designer* (Downers Grove, IL: InterVarsity Press, 1994).

17. Michael Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: The Free Press, 1996).

18. William A. Dembski, *The Design Inference: Eliminating Chance through Small Probabilities* (New York: Cambridge University Press, 1998.) And, William A. Dembski, ed., *Mere Creation: Science, Faith and Intelligent Design* (Downers Grove, IL: InterVarsity Press, 1998).

19. Johnson, *Defeating Darwinism,* 96.

20. Johnson, *Objections Sustained: Subversive Essays on Evolution, Law & Culture* (Downers Grove, IL: InterVarsity Press, 1998).

21. Quoted in Johnson, *Objections Sustained*, p. 88.

22. *Science and Creationism,* see note 1.

23. *Teaching about Evolution and the Nature of Science,* see note 1.

24. Ibid., 4.

25. *Science and Creationism,* 1.

26. Ibid., ix.

Campus Christianity

Spiritual Wastelands 101

In the fall of my junior year in college, I had been a Christian for only a year. Since I had been involved in a Christian group on campus, however, I felt I had learned a great deal about my faith. As a science major I had completed most of my requirements for my degree, and I was looking forward to taking electives in my major of animal ecology. However, I still had a couple of hours in humanities to fulfill, not my most favorite subject. While I was looking for a humanities elective, I came across an English course entitled “Spiritual Wastelands.” I remember thinking to myself, “That looks interesting. I wonder what spiritual wastelands this course is about?” With my newfound interest in

spiritual things, I decided to enroll.

On the first day of class, I was horrified the minute the instructor walked into the room. He wore an old Army fatigue jacket, a blue work shirt open to the middle of his hairy chest, ratty blue jeans, sandals, long tangled hair, and a beard. He punctuated his appearance with a leather necklace containing what looked like sharks' teeth. To make it worse, he proceeded to go around the room and ask every student why he or she took this course. I don't really reember what the other students said but when he got around to me, I sheepishly replied that I was a Christian and that I was interested in knowing what kind of spiritual wastelands he was going to talk about. Immediately, with a look of malevolent glee, he exploded: "You're a *Christian*? I want to *hear* from *you*!"

Needless to say, if there had been a place to hide, I would have found it. As you may guess, the only spiritual wasteland he wanted to talk about was Christianity. I was like a babe who had been thrown to the wolves. Our class discussions, more often than not, were two-sided: the instructor versus me. Hardly anyone else ever spoke up. To say that I found myself floundering like a fish out of water would be an understatement. Occasionally my questions and comments would hit the mark. But I am convinced, as I look back, that even that degree of success was purely the grace of God.

Since that time, I have spent twelve more years in the university environment as both an undergraduate and graduate student. I have learned a great deal about how a Christian student should relate to the academic community, and I would like to share with you four principles for effective Christian witnessing in that setting. I think you will also find that these principles will prove to be an effective guide in any sphere of life.

> ***Approach your studies from a Christian worldview.*** *We need to think Christianly. The only way to accomplish this is to be*

continually involved in the process of knowing God.

***Realize that the job of the student is to learn**—not to preach. A teachable spirit is highly valued. This may seem obvious to you, but believe me, it isn't obvious to everyone.*

***Pursue excellence.** Every exam, every paper, every assignment must be pursued to the best of our ability, as unto the Lord.*

***Be faithful to the task**—leave the results (grades) to God. Do not get hung up on the world's definition of success.*

Think Christianly

All of our thoughts are to be Christ-centered, including those expressed in a university classroom. Paul tells us in 2 Corinthians 10:5 that "we are taking every thought captive to the obedience of Christ." All knowledge is to be encompassed by a Christian worldview. In other words, we should try to see all knowledge through the eyes of Jesus. This all sounds well and good, but how do we do that?

The only way to think and see as Jesus does is to know Him. This brings us to the basics of the Christian life. There are numerous demands on the time of a student. There are always experiments to do, books to read, papers to write, exams to study for, assignments to turn in, classes to attend. This is doubly true for graduate students, who spend their entire time seemingly three steps behind where they are supposed to be. Let's not forget the demands of a girlfriend or boyfriend, family, exercise, and just plain having fun. How is one supposed to find time for regular personal devotions, worship on Sunday mornings, fellowship with other believers, and the study of God's Word? These activities can all take a serious bite out of the time the university demands from a student. But this is the only way to draw closer to God and to understand His ways.

By being faithful in spiritual things, we trust God to honor the time spent and to bring about His desired results in our academic pursuits despite our having less free time than most non- Christians. Christian campus groups can be of tremendous help in these matters through training, Bible studies, and fellowship with believers who are going through the same struggles you are.

For those times when trouble does arise in the classroom, and you feel that your faith is being challenged and you are confused, an enormous amount of assistance is available to you. The manager of your local Christian bookstore can be a great help in finding books that deal with your problem. Organizations such as Probe Ministries can also help steer you in the right direction with short essays, position papers, and bibliographies. Dedicated and highly educated Christians have addressed just about every intellectual attack on Christianity. There is no reason to feel like you have to do it on your own. That was my mistake in the "Spiritual Wastelands" course. It never even occurred to me to seek help. I could have represented my Lord in a much more credible way if I had only asked.

There are no shortcuts to living the Christian life. We cannot expect to emerge from the university with a truly Christian view of the world if we put our walk with the Lord on hold while we fill our heads with the knowledge of the world. Remember! We are to take every thought captive to the obedience of Christ. In order to do that, we must know Him; in order to know Him, we must spend time with Him. There were many times in my college career when higher priorities prevented me from spending the amount of time I felt necessary to prepare for an exam, paper, or presentation, but I always found God to be faithful.

During my doctoral studies, we moved into a new house and the boys were ages 4 and 2. The room they were going to share desperately needed repainting and we were having new bunk beds

delivered on Monday, the same day of an important cell biology exam. The professor writing this exam was the one in whose lab I had hopes of working for my doctoral project. So I needed to do well.

The room was small and the beds were large, so they needed to be constructed inside the room. This meant the room had to be painted before the beds arrived. If I paint, I lose critical study time for an important exam. If I study, the room goes unpainted and I have an unhappy wife and a difficult task getting to it later. I chose to paint the room. I had a total of three hours of study time for the exam! I entered the exam free of tension knowing I did my best and it was in God's hands. I had no idea how I did on the exam, but when the grades came out, I received the second highest grade in the class and the best exam score in my tenure as a graduate student! The professor was impressed enough to allow me to begin working in her lab.

Cultivate a Teachable Spirit

I have run across numerous professors whose only encounters with Christians were students who simply told them that they were wrong and the Bible was right. Most professors do not have much patience with this kind of approach. It is a great way to gain enemies and demonstrate how much you think you know, but it does not win anybody to Christ.

Some Christian students have the impression that when they hear error being presented in university classroom, it is their duty to call out the heavy artillery and blast away. This is not necessarily so. As a student, your job is to learn, not to teach. In my education, I reasoned that in order to be a *critic* of evolution, I needed to first be a *student* of evolution and demonstrate that I knew what I was talking about. Once professors realized I was serious about wanting to understand evolution, when I began to ask questions, they listened. In the end my professors and I often had to agree to

disagree, but we all learned something in the process, and I built relationships that could grow and develop in the future.

The most effective tactic in the classroom is the art of asking questions. This approach accomplishes three things. First, you demonstrate that you are paying attention, which is somewhat of a rarity today. Second, you demonstrate that you are truly interested in what the instructor is talking about. All good teachers love students with teachable spirits, but not students who are so gullible as to believe unquestioningly everything they say. Third, as you become adept at asking just the right question that exposes the error of what is being taught, you allow the professor and other students to see for themselves the lack of wisdom or truth in the idea being discussed. Truth is truth, whether expressed by a believer or a pagan. However, non-Christians will believe other non-Christians much more readily than they will a fanatical Christian waving a Bible in his hand.

As a graduate student, I was in a class with faculty and other graduate students discussing a new discipline called sociobiology, the study of the biological basis for all social behaviors. One day we were discussing the purpose and meaning of life. In an evolutionary worldview, this can only mean survival and reproduction. Disturbed at how everyone was accepting this, I said, “We have just said that the only purpose in life is to survive and reproduce. If that is true, let me pose this hypothetical situation to you. Let’s suppose I am dead and in the ground and the decomposers are doing their thing. Since you say there is no afterlife, this is it. It’s over! What difference does it make to me now, whether I have reproduced or not?” After a long silence, a professor spoke up and said, “Well, I guess that ultimately, it doesn’t matter at all.” “But wait,” I responded. “If the only purpose in life is to survive and reproduce, and ultimately—now you tell me—that doesn’t matter either, then what’s the point? Why go on living? Why stop at red lights? Who cares?!” After

another long silence, the same professor spoke up and said, "*Well, I suppose that in the future, those that will be selected for will be those who know there is no purpose in life, but will live as if there is.*" What an amazing and depressing admission of the need to live a lie! That's exactly the point I wanted to make, but it sank in deeper when, through my **questions**, the ***professor*** said it and not me. When Jesus was found by His parents in the temple with the priests, He was listening and asking them questions—probably not for His benefit, but for theirs (Luke 2:46).

We are all familiar with 1 Peter 3:15, which says, "Sanctify Christ as Lord in your hearts, always being ready to make a defense to every one who asks you to give an account for the hope that is in you, yet with gentleness and reverence." This verse is a double-edged sword that most of us sharpen only on one side or the other. Many are prepared to make a defense, but they leave destruction in their wakes, never exhibiting gentleness or reverence. Others are the most gentle and reverent people you know, but are intimidated by tough questions and leave the impression that Christianity is for the weak and feeble-minded. The latter need to go back and read a few important passages:

> *2 Corinthians 10:3-5*
>
> *For though we live in the world, we do not wage war as the world does. The weapons we fight with are not the weapons of the world. On the contrary, they have divine power to demolish strongholds. We demolish arguments and every pretension that sets itself up against the knowledge of God, and we take captive every thought to make it obedient to Christ.*
>
> *Colossians 2:8*
>
> *See to it that no one takes you captive through hollow and deceptive philosophy, which depends on human tradition and*

the basic principles of this world rather than on Christ.

Acts 17

(The story of what happened when Paul boldly proclaimed the gospel in Thessalonica, Berea, and the Areopagus in Athens.)

Paul was a firm believer in the intellectual integrity of the gospel. The "staunch defender" needs to remember that Jesus told His disciples that the world would know that we are Christians by the love we have for one another (John 13:34-35) and that we are to love our enemies (Matt. 5:43-47). Paul exhorted the Romans not to repay evil with evil, but to repay evil with good and to leave vengeance to the Lord (Rom. 12:17-21). Finally, the writer of Proverbs tells us that a gentle answer turns away wrath, but a harsh word stirs up wrath (Prov. 15:1), and that the foolish man rages and laughs and always loses his temper, but a wise man holds it back (Prov. 29:9,11).

Pursue Excellence

Nothing attracts the attention of those in the academic community as much as a job well done. There is no argument against excellence. In Colossians 3:17 Paul tells us, "Whatever you do in word or deed, do all in the name of the Lord Jesus, giving thanks through Him to God the Father." If we are to do everything in Jesus' name, He deserves nothing less than the best that we can do. How many of our papers and exams would we be comfortable stamping with the words, "Performed by a disciple of Jesus Christ"? I think I would want to ask if I could have a little more time before I actually handed it in! Yet Paul admonishes us to hold to that standard in all that we do. This does not mean that every grade must be an A. Sometimes your best is a B or a C or even just getting the assignment done on time. The important thing is to try. It's important to be able to tell yourself that,

with the time, resources, and energy you had available to you, you did your best. The road to excellence is tough, exhausting, and even frightening. It is hard going. But our Lord deserves nothing less.

Ted Engstrom, in his book *The Pursuit of Excellence,* tells the story of a pastor who spent his spare time and weekends for months repairing and rebuilding a dilapidated small farm in a rural community. When he was nearly finished, a neighbor happened by who remarked, "Well, preacher, it looks like you and God really did some work here!" The pastor replied, "It's interesting you should say that, Mr. Brown. But I've got to tell you—you should have seen this place when God had it all to Himself!"

It is certainly true that God is the source of all our strength, and all glory and honor for what we may accomplish is His. But, it is no less true that God has always chosen people to be His instruments—frail, mistake-prone, imperfect people. His servants have not exactly enjoyed a life of ease while in His service. Striving for excellence is a basic form of Christian witness. We pay attention to people who always strive to do their best. In the classroom, people may not always agree with what you say, but if they know you as a person who works diligently and knows what you are talking about, they will give your words great respect. And, if there is enough of the Savior shining through you, your listeners will come back and want to know more.

I am reminded of the impact of four Hebrew youths in the Babylonian culture during the reign of Nebuchadnezzar: Daniel, Hananiah, Mishael and Azariah (whom you may recognize by their Babylonian names: Meshach, Shadrach and Abednego). They entered the prestigious secular institution, "Babylon University," and were immersed into an inherently hostile atmosphere. But Scripture says that

And as for these four youths, God gave them knowledge and

> *intelligence in every branch of literature and wisdom; Daniel even understood all kinds of visions and dreams . . . And as for every matter of wisdom and understanding about which the king consulted them, he found them ten times better than all the magicians and conjurers who were in all his realm (Daniel 1:17, 20).*

You can be sure they were instructed in Babylonian literature and wisdom, not Hebrew, yet they excelled. If our God is indeed the King of Kings and Lord of Lords, then He can not only protect us as we enter the university, but He can also prosper us. Imagine the testimony for Jesus Christ if the best philosophers, the best doctors, the best poets and novelists, the best musicians, the best astrophysicists, and on and on, were all Christians. That would be a powerful witness!

As you pursue excellence, do not be deterred by mistakes. They are going to come, guaranteed. The pursuit of excellence is an attitude in the face of failure. Thomas Edison, the creator of many inventions including the light bulb and the phonograph, was never discouraged by failed experiments. He simply reasoned that he now knew of one more way that his experiment was not going to work. Mistakes were his education. The wise man admits and learns from his mistakes, but the fool ignores them or covers them up. We all admire someone who freely admits a mistake and then works hard not to repeat it.

Strive for Faithfulness, Not Success

As students in the university learn to approach their studies from a Christian worldview, as they grow to appreciate their place as people who are there to learn and not necessarily to confront, and as they begin to pursue excellence in everything they do, it is tempting for them to believe that God will bless whatever they set out to accomplish. Their primary focus becomes whether or not all of their efforts are successful. It can become depressing if they do not see the kind of results

they expected God to bring about.

Soon after Mother Teresa received the Nobel Peace Prize for her work among the poor in Calcutta, she was asked by a reporter in New York City how she could dedicate herself so completely to her work when there was no real hope of success. It was obvious she was not going to eliminate hunger, poverty, disease, and all the other ills of that densely populated city in India. In other words, he asked, if you can't really make a dent in the conditions these people live in, why bother? Her reply was simple, yet profound; she said, "God has not called us to success, but to faithfulness." How many times have we heard in witnessing seminars that our job is to share the gospel and leave the results to God? What I hear Mother Teresa saying is that our responsibility is the same in everything we do.

Oswald Chambers, in his timeless devotional book *My Utmost for His Highest,* caused me to recall Mother Teresa and reflect on my own expectations. He said,

> *Notice God's unutterable waste of saints, according to the judgment of the world. God plants His saints in the most useless places. We say—God intends me to be here because I am so useful. Jesus never estimated His life along the line of the greatest use. God puts His saints where they will glorify Him, and we are no judges at all of where that is. (August 10)*

The main point here is that we should be faithful to the task God has given to us rather than worry about whether or not we are achieving the results we think God should be interested in. When we begin thinking that "God is wasting my time and His," we have probably stepped over the line. I spent five and a half years in the laboratory on doctoral experiments in molecular biology, experiments that never accomplished what I had planned. The most frustrating aspect was that these

experiments did not result in work that was publishable in the scientific literature, which is the ultimate goal of any scientist. I had a great deal of confidence when I started this difficult research problem that the Lord and I would work it out. Well, we didn't. I never dreamed how much Mother Teresa's words concerning the value of faithfulness over success would be lived out in my own life. It has been a hard, hard lesson. And I don't believe I have a complete answer as to why God chose to deal with me in this way. Scientific publications seemed not just desirable but necessary in my future career; yet God is sovereign and He apparently has other plans. During those years, I learned a great deal about living the Christian life in the midst of difficult circumstances. I can only pray that I will not forget what was so painful to learn.

Conclusion

In summary, orient your studies according to a Christian world view. Your main job as a student is to learn and to develop the skill of asking questions, and to keep the boxing gloves at home. Pursue excellence and remain faithful to the task to which God has called you, and leave the results to Him.

Suggested Reading

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Cloning and Genetics: The Brave New World Closes In

Is Dolly Really a Clone?

When the creation of Dolly, the first mammal cloned from adult cells, was first announced in February of 1997 there was a storm of publicity and controversy. While many wondered about the purpose of animal cloning and the possibilities such a success held for further animal applications, others were more concerned about the possible application to human beings. If we can clone sheep, can we clone humans? Should we clone humans? Why should we clone humans? Should humans be cloned to provide a baby for childless, infertile couples? Should we clone humans for embryo research? Should we clone humans to make extra copies of people with good genes? Would clones have a soul? While I answered these and other questions about human cloning in my article Can Humans Be Cloned Like Sheep? in retrospect, there was one question that was virtually ignored at the outset: Was Dolly a true clone?

Looking back, this appears to be a legitimate question that should have been more obvious. After all, Dolly was the only success amid 276 failures. There were 277 cell fusions made, with only 29 growing as embryos. All 29 were implanted into 13 ewes with only one pregnancy and one live birth. Dolly really beat the odds. There was also the fact that Dolly was not cloned from a currently living adult. Dolly's older twin had been dead for several years. Some of her tissues were harvested and kept frozen in the lab, so there was no live animal with which to compare Dolly.

Dolly's authenticity was formally challenged in a January 30,

1998 letter to the editor of the journal *Science*{1}. The authors offered seven reasons for skepticism concerning Dolly's identity as a clone of an adult cell. Among them was the fact that Dolly was alone and not yet joined by another adult clone from the Roslin Institute or any other laboratory. Also, though omitted by the original paper, it had been learned that the original sheep had been pregnant when the tissues were removed, raising the possibility that Dolly was cloned from a fetal cell rather than an adult cell. In addition, the questioning scientists called for additional genetic tests to establish Dolly's identity.

Although Ian Wilmut, the Scottish scientist who is Dolly's co-creator, admitted that Dolly might be a one in a million fluke, he and others were busy performing genetic tests to fully establish that Dolly was an authentic clone from an adult cell. Other labs had so far failed to duplicate Wilmut's success after hundreds of tries. This may not be so unusual since Dolly was the only success out of 300 nuclear transfers and the real odds may be as high as one in 1000. There was no way to know for sure. Wilmut may have gotten lucky indeed to achieve success after only 300 tries.{2}

A pair of papers in the British journal *Nature*{3} remedied much of the concern over Dolly's authenticity. DNA microsatellite and DNA fingerprinting analyses conclusively demonstrated that Dolly was an identical DNA copy of the cells of a 6-year-old ewe and not a clone of the fetus carried inside that ewe.

Cloning Mice Makes Cloning Humans More Feasible

Even with the clear success of cloning sheep, which Dolly's appearance and confirmation make plain, many doubted that the technology used to produce Dolly could be applied to humans. This skepticism was largely due to the universal failure to

clone mice from adult cells.

Mice have a number of advantages as experimental animals for cloning. The gestational time in mice is very short—a matter of weeks, their embryos are easier to manipulate than sheep and cows, and their genetics are already well understood.{4} But it was widely recognized that the early development of mice and sheep is significantly different. In sheep, the DNA in the newly formed nucleus remains dormant for several days. This was suspected to provide time for the DNA to be reprogrammed from its original function to embryonic functions. Mice, on the other hand, begin using the DNA in the newly formed nucleus after just 24 hours. It was thought that this might prove to be insufficient time for the DNA to be reprogrammed.

However, this too has been overcome, and in dramatic fashion. In July of 1998, *Nature* published results by T. Wakayama, working in Hawaii, documenting the cloning of mice.{5} And not just one mouse, but over 50 mice. Three successive generations were cloned, raising the conundrum that the "grandmother" was the twin sister of the "granddaughters."{6}

But what did Wakayama and his colleagues do that was different to bring about success? Strangely enough, no one is really sure. Apart from a few tricks of timing, the major difference seems to be that they used a cell type that no one had used before, and it worked! As an aside, Wakayama tried other adult mouse cells (neurons and testicular cells) that only brought about the usual negative results.

But they also tried cumulus cells. Cumulus cells are a non-growing group of cells that surround an egg cell after it is released from the ovaries. This served to confirm the suspicion that adult cells need to be quiescent, or non-growing, to be successful in cloning experiments. Still, the nuclear transfer technique employed by Wakayama was successful between 2 and 3% of the time using cumulus cells. This rate of

success is ten times better than the technique that led to Dolly, but still very low, making the process tedious.

The success with cumulus cells is why the first cloned mouse was named Cumulina. It is also interesting that only cells from females have been successful in cloning attempts thus far. This could be problematic. For, you see, if all you need is a quiescent adult cell, an egg, and a womb, well, male involvement isn't really necessary. Perhaps it's best not to speculate what, if anything, this may mean in the future.

For many, the real significance of successful mouse cloning techniques is its application to humans. The early stages of embryonic development are very similar in mice and humans. Therefore, many believed that since cloning mice seemed next to impossible because of the early onset of DNA activity in mice and humans, cloning humans would also remain technologically impossible. Cumulina and her sisters have changed all that.

What Will Animal Cloning Be Used For?

So now we can clone sheep and mice. Apart from the possibilities for humans, what's the big deal? Why are scientists and pharmaceutical companies spending so much time and money trying to clone animals? Quite simply, the combination of the possible relief of human suffering from genetic disease with the potential to turn a handsome profit makes animal cloning nearly irresistible.

In the December 1998 issue of *Scientific American*, Ian Wilmut spells out some of the potential uses of animal cloning.{7} Principally, cloning will be used to create large numbers of what are called transgenic animals. Transgenic animals are genetically engineered to contain genes from another species. Wilmut and his colleagues created Dolly in an attempt to discover a more reliable method of reproducing transgenic sheep.

Creating transgenic animals is very tedious, difficult, and risky work. The Roslin Institute and PPL Therapeutics, for whom Wilmut works, transferred into sheep the gene for human factor IX, a blood- clotting protein used to treat hemophilia. With the proper genetic enhancement, sheep will produce this blood-clotting factor in their milk, which can then be harvested and sold on the market. The first transgenic sheep produced this way, Polly, was born in the summer of 1997. It is actually simpler to clone Polly than it would be to create another transgenic sheep through gene transfer.

Cloning offers many other possibilities for reproducing other kinds of transgenic animals. One is the production of animals containing transgenic organs suitable for organ transplants into humans. Pig organs are just about the right size for transplantation into humans. However, a pig heart, or liver, or kidney, would be severely and quickly rejected by our immune system. However, if the right human genes could be transferred into pigs, the organs they produce would be recognized as a human organ and not a pig organ. There would still be the problems associated with any organ transplant between humans, but these are much more manageable than cross-species immune rejection. At present, thousands die every year waiting for organs to become available. Cloning such transgenic animals could create a large and renewable source of organs for transplant.

Transgenic animals could also be created for research purposes to study human genetic diseases. Transferring defective human genes into appropriate animal hosts could produce more workable research vehicles for discovering new treatments and cures not possible using human subjects. Cloning of transgenic animals may also prove useful to create cells helpful in treating human diseases such as Parkinson’s disease, diabetes, and muscular dystrophy. In addition, cloning could be used to produce highly productive herds of sheep, cows, and pigs from animals that are already known to be excellent milk, meat, and

leather producers.

Obviously, the uses of animal cloning seem limited only by our imaginations. Of course, if you are already opposed to the use of animals in experiments, or even in their use for food, these ideas are fraught with ethical difficulties. As a Christian, however, I have answered this question. The Lord Himself produced the first skins for humans in Genesis 3:21 and later after the flood, the Lord allowed animals to be used for food (Gen. 9:2-4). While the utmost of care needs to be given to ensure that God's creatures, for whom we have been given responsibility (Gen. 1:26-28), do not suffer needlessly, the Lord clearly allows animals to be used to enhance our own lives, even if it costs them theirs.

New Uses for Human Embryo Research?

What if I told you that recent breakthroughs in human genetic research might make it possible to dramatically treat patients with Alzheimer's, Parkinson's, heart disease, diabetes, spinal cord injury, and a host of other degenerative diseases? In some cases, these treatments may actually cure many of these diseases and would not require the use of cells obtained from aborted fetuses. Hopefully, I've got your attention.

The November 6, 1998 issue of Science{9} announced the first successful attempts to cultivate human embryonic stem cells that have the potential to treat all the above diseases and more. However, they come with their own set of difficult and perhaps more serious ethical concerns.

First, just what are embryonic stem cells? Stems from plant seedlings give rise to all sorts of different structures such as trunks, branches, leaves, flowers, and eventually seeds and fruits. Animal embryonic stem cells do much the same thing. Stem cells have the potential to grow into just about any tissue that is present in the adult organism. Researchers call this potential totipotency, meaning they are potent to produce

all tissues. Embryonic stem cells have been isolated from mice since the early ’80s. Such research has been impossible in humans for ethical reasons. Stem cells only come from embryos in the earliest stages of development.

No one was willing to simply use embryos to obtain stem cells, thus killing the embryo, every time stem cells were needed. But, if stem cells could be isolated and cultivated in the laboratory so they could grow and divide and maintain their stem cell functions, then a continual supply could be maintained without risk to further embryos. What is called a stem cell line would effectively be created that could be used indefinitely. This research was greeted with such comments as “extremely important,” “very encouraging,” and “a major technical achievement with great importance for human biology.”{10}

What you may have noted in the above description is that a human embryo must still be used to create this stem cell line. In fact, the study reported in Science indicates that thirty-six embryos obtained from in vitro fertilization clinics in Madison, Wisconsin and Israel were used to create five stem cell lines. The embryos were obtained with the consent of the individuals whose eggs and sperm were used to create them and the approval of the local institutional review board.

The major concern expressed so far is for the legality for other labs to use these cells. Since there is a ban on the use of federal funds for research involving tissues derived from human embryos, this research was carried out using private funds from Geron Corporation, a Menlo Park, California biotechnology firm. The availability of these stem cell lines now raises the question of whether these cells can be used by other labs currently funded by government grants. Predictably, one researcher is applying for grant money to use these stem cells to deliberately test, and hopefully repeal this restriction.{11}

Proponents of stem cell research criticize the federal ban by suggesting that this leaves the government out of the regulatory picture since no guidelines have been issued for private research. I agree that the lack of guidelines for private industry is an oversight, but opening up government funding is not the answer. The ban should remain in force. Guidelines need to be issued that forbid this important work as long as human embryos are sacrificed to produce these cell lines. Research in animals should be encouraged to see if stem cells could be produced by other means. The end does not justify the means.

The Prospects for Human Cloning: The Enigma of Dr. Richard Seed

I am frequently asked how soon I think the first human clone will be produced. I usually respond that somewhere in the world within the next five to ten years, someone will announce the creation of the first human clone. But if we are to believe Dr. Richard Seed, the first human clone will appear before the year 2001. In December 1997, Dr. Richard Seed, physicist turned fertility specialist, announced that he intends to clone human beings. He said, “I know of at least fifteen people who want to clone humans, but haven’t got quite up the nerve to do it.”{12} When asked if he had the nerve, Seed replied, “I have the nerve.”

Richard Seed appeared in the news again in September of 1998 when he announced his plans to clone himself in two years and that his wife agreed to carry the baby!{13} Seed reported that he had received hundreds of calls from individuals that want either themselves or their dying children cloned. Seed thinks this is a first step to human immortality. On January 7, 1998 Seed affirmed on ABC News Nightline his remarks from a National Public Radio interview, that cloning technology will allow us to “become one with God. We are going to have almost as much knowledge and almost as much power as God.”{14}

Right now you're probably thinking this guy is a kook. Why worry about him? Well, that's precisely why we need to pay attention to him. He has the ability; he perfected embryo transfers in humans. He certainly has the motivation and nerve, and he is still seeking the cash to carry it out. But if he is accurate in the number of calls he has received, money may not be a problem for long. And even if the U.S. Congress passes a bill banning human cloning, Seed has said he will move his operation to Tijuana, Mexico.

People like Richard Seed fully explain why I believe someone, somewhere in the world will produce a human clone very soon. The question is, Are we going to just throw up our hands and surrender, or will we continue to stand up for the sanctity of human life and the sacredness of the human embryo?

If we don't think this through carefully and organize a cogent response to this threat to human dignity, the attitude of people like Prof. James Robl at the University of Massachusetts at Amherst will prevail. He said:

> *There is no clear-cut definition for what is life. And this is something, I think, that society is going to have to think about, is going to have to make some definitions, and those definitions may not be permanent, they may change as new technologies are developed. There is a fine line, and the line, at the early stages, is really based on your intentions of what they are to be used for as opposed to necessarily what they are. So the question of what is life seems to change, I think, in people's minds based on what their concerns are or their own interests are in how we might use whatever it is we are producing.{15}*

What Professor Robl calls for is an entirely utilitarian ethic. We define life, he says, based solely on what new technologies we develop. If a new technology, such as cloning or human stem cell production from human embryos becomes

available, yet this technology threatens human dignity, we simply redefine human life to encompass the new technology. This is the frightening specter of a brave new world. We must oppose it and we must articulate why.

Notes

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Sexual Purity – A Biblical Worldview Perspective Remains Truth

Dr. Bohlin uses a passage from Proverbs to provide us insight into the importance of sexual purity for our age. This important biblical worldview concept is still valid today even in this age where sexual promiscuity is trumpeted from the media.

Medical Reasons for Sexual Purity

As our society prepares to enter the 21st century, one trend and long-time staple of our culture looms ever larger on the horizon. The places to which one can escape in order to avoid sexual temptation continue to shrink. Children cannot be allowed to roam unsupervised through the neighborhood video stores because of the racks of videos with alluring covers of scantily clad exercisers and playmates of the year. The aisles of popular new releases contain images from R-rated movies that were only found in skin magazines thirty years ago. A

trip to the grocery store can take you past the book aisle with suggestive covers on romance novels which contain graphic descriptions of sexual encounters. Billboards for beer, cars, and movies all use sex to sell. Radio stations readily play songs today that were banned from the airwaves decades ago. A trip to the mall takes you past stores with only sex to sell. Your home is invaded with sexually explicit images over even the free non-cable channels and your home computer. Unwelcome mail enters your home selling well-known sex magazines that continue to earn millions of dollars every year.

From the moment Adam and Eve were ashamed of their nakedness, sexual temptation has been in our midst. But except for brief periods in declining cultures, the temptations had to be sought after. There were places where one could be relatively safe from the sights and sounds which inflame lust and desire. Those days are over. Oh, sure, you can have blocks installed on your computer or phone and the local video store will allow you to put a screen on your children's rentals. But the fact that such systems are necessary and only voluntary should be enough to tell us of the pervasiveness of sex in our society. Sexual purity is a rare and often scorned virtue today. When a Hollywood couple makes it known that they are saving sex for marriage, people ask, "Why would you do that?"

While sex is clearly pervasive in our society, you don't have to look very far to find plenty of reasons to avoid sexual relations outside of marriage. The biblical words for *fornication* or *sexual immorality* refer to all sexual activity outside of marriage, and the Scriptures clearly state that all such activity is forbidden (Lev. 18 & 20; Matt. 15:19; 1 Cor. 6:9-10,18; 1 Thess. 4:3). But a person may rationalize that while sexual activity outside of marriage is sin, "I can always be forgiven for my sin, and as long as I am not found out, who gets hurt?" Paul answers this resoundingly in Romans 6. "May it never be!" cries the apostle. By allowing sin to reign in our hearts we effectively say that Christ's death and

resurrection has no power in our life.

If this is not powerful enough, consider the physical consequences of sexual immorality that exist today. In the 1960s there were only two STDs: syphilis and gonorrhea. Today there are over 25, and 1 in 5 Americans between the ages of 15 and 55 has a viral STD. That number is 1 in 4 if bacterial infections are included. There are 12 million new infections every year with 60 percent of these among teenagers.

Chlamydia and gonorrhea can lead to pelvic inflammatory disease which often results in sterility. Human Papilloma Virus (HPV) frequently produces genital warts which can develop into cancer. Rampant HPV infection is the primary reason that women are urged to have Pap smears on a yearly basis. If you are sexually active outside of marriage and "lucky," you may only contract herpes, but even this is an embarrassing, bothersome, incurable infection. But you may get AIDS, which will kill you. Since the human immunodeficiency virus (HIV) can lie dormant for years before developing into deadly AIDS, your sex partner may not know that he or she is infected. The fact is, if you are sexually active outside of marriage, it is almost guaranteed that you will contract at least one STD.

But information is not enough. Why is sexual purity within marriage so important to God? And what do we do to avoid falling into sexual sin with so much temptation swirling around our heads? We will now turn to explore some time tested advice from Scripture to see what we must do and why.

The Naturalistic Rejection of the Mystical Nature of Marriage

In his book *Reason in the Balance*, Phillip Johnson brilliantly documents the vise grip of philosophical naturalism in science, law, and education in the United States. Our populace has been taught for so long that matter, energy, space, and

time are all that exists that it has infected every form of cultural discourse, including our sexual behavior. Freedom of choice and personal fulfillment are praised as the ultimate virtues because, for the naturalist, sex is just a physical act that fulfills a basic need and instinct of every person. People should be free to pursue whatever sexual expression they choose to meet that basic physiological need. And this need is only created by our fundamental drive to reproduce and spread our genes into the next generation. In the naturalistic worldview, sex becomes simply a basic need and marriage just a relative cultural expression to satisfy that need for some, but not all people.

That is why so many people, including Christians, look at Scripture's clear statements condemning sex outside of marriage as antiquated and old-fashioned. "Oh," they say, "they applied to the people of that time, but not now. Not as we prepare to enter the 21st century!" But this raises some important questions. First, do the Scriptural injunctions against any sex outside of marriage really apply today? The answer, of course, is, "Yes, they do." We recognize readily what the Bible has to say about sex, and we see all about us the physical, emotional, and relational consequences of sexual immorality. Since God is sovereign, He established these consequences as warning signs not to transgress His principles. But second, just why is sexual fidelity so important to God?

The first reason is because God's intentions for marriage were clearly stated right from the beginning. Genesis 2:18-25 makes it plain that God's design was one man and one woman for life. Jesus used this passage as the basis for His teaching on divorce in Matthew 19: "What God has joined together, let no man break apart." As Creator, God has every right to tell us what He wants.

Second, the Father has used the marriage union as an analogy

for His relationship with Israel in the Old Testament and the church's relationship with Jesus in the New Testament. Isaiah 1:21, Jeremiah 2:20, 3:1-10, and especially Ezekiel 16:15-34 accuse Israel of playing the harlot, chasing after other gods and ignoring her rightful "husband." God's union with Israel was to be forever. He was faithful, but Israel was not. The Lord rained down His judgment on the unfaithfulness of Israel and Judah. In Ephesians 5 Paul tells husbands that they are to love their wives as Christ loves the church. Elsewhere, Jesus is spoken of as the bridegroom and the church as His bride, another relationship that is to be forever. Jesus will be faithful. Will the church? Our marital and sexual relationships are to mirror the Lord's special relationships with Israel in the Old Testament and the church in the New. God hates divorce and any sexual relationships outside of marriage, because He hates it when His faithfulness to us is spurned by our turning to other gods. This is true whether they be the pagan gods of old, which are still around, or the modern gods of self, money, power, and sex.

Well, we may know what is right, but knowing what is right is often not the same as doing what is right. Now, I want to look at a passage in Proverbs that instructs its readers concerning dangers, both obvious and subtle, of sexual temptation.

A Young Man Lacking Sense Meets a Harlot

It is hard for some to imagine that the Bible contains explicit advice on how to avoid sexual temptation. But the entire chapter of Proverbs 7 is devoted to exactly that. In the first five verses, Solomon essentially pleads with his son to listen and guard his words carefully concerning the adulteress.

My son, keep my words,
And treasure my commandments within you.

Keep my commandments and live,

(sounds like serious stuff!)
And my teaching as the apple of your eye.
(actually the "pupil" or "little man of your eye." This was meant therefore to be a precious truth to be closely guarded and kept.)

Solomon goes on in verse 3:

Bind them on your fingers;
Write them on the tablet of your heart.

Say to wisdom, "You are my sister,"
And call understanding your intimate friend.

That they may keep you from an adulteress,
From the foreigner who flatters with her words.

In verses 6-9, King Solomon takes the role of an observer, telling his son what he sees unfolding before him.

For at the window of my house,
I looked out through my lattice,

And I saw among the naive,
I discerned among the youths,
A young man lacking sense.

Passing through the street near her corner;
And he takes the way to her house.

In the twilight, in the evening,
In the middle of the night and in the darkness.

Solomon speaks of one who is young, inexperienced, and lacking judgment. His first clue was that he purposefully walks down her street and actually heads straight to her house in the middle of the night. As Charlie Brown would say, "Good grief!" The young man's intent is probably harmless. He is curious, perhaps hoping for a glimpse of the adulteress plying her wares to someone else on the street. Sin is probably not on

his mind. He just wants to see what the real world is like. That kind of thinking is still heard today. “I just need to know what is out there so I can warn my family and others around me.” In reality, our young fool was looking for titillation and was confident that he could withstand the temptation.

This is precisely why Solomon says he is lacking sense. The apostle Paul warns in 1 Corinthians 10:12, “Therefore let him who thinks he stands take heed lest he fall.” Overconfidence is our worst enemy in the face of temptation. I am reminded of two contrasting characters in J.R.R. Tolkien’s *Lord of the Rings* trilogy, Boromir and Faramir. Boromir and Faramir were brothers. Boromir, the elder, was renowned for his exploits in war. He was his father’s favorite and the principal heir. He was confident, however, that were he to wield the One Ring, the Ring of Power, he would not be corrupted by it and could use it to defeat the armies of the evil Sauron. However, his overconfidence and lust for power lead him to attempt to steal the ring from the designated Ring- bearer. His foolishness caused the Fellowship of the Ring to be split apart under attack and led eventually to his death. He thought he could stand, but he fell.

His brother Faramir, however, had a more realistic picture of his sinful nature. When confronted later with the same opportunity to see and even hold the Ring, he refused. He knew the temptation would be strong and that the best way not to yield to the lust for power was to keep the temptation as far away as possible. Faramir, though perceived to be weaker than his brother, was, in a sense, actually the wiser and stronger of the two. He took heed and did not fall and later played a significant role in the final victory over the forces of evil.

What about you? Do you consider yourself strong enough to resist the temptations presented in movies, books, commercials, etc.? Do you walk into the movie theater blindly, lacking sense, uninformed as to why this movie is R-rated or

even PG-13? Are you a headstrong Boromir, or a wise Faramir who knows his weakness in the face of temptation and avoids it whenever possible?

The Schemes of the Adulteress

As we continue in our walk through Proverbs 7, Solomon now focuses his attention on the schemes of the seductress. Our young man lacking sense is walking down her street, right past her house. Solomon continues in verse 10:

And behold, a woman comes to meet him,
Dressed as a harlot and cunning of heart.

She is boisterous and rebellious;
Her feet do not remain at home;

She is now in the streets, now in the squares,
And lurks by every corner.

Wow! What a surprise! A woman comes to meet him! Can't you just hear Gomer Pyle exclaiming at the top of his lungs, "Surprise! Surprise! Surprise!" Surprise, indeed! This is only what was expected. Her boisterousness lends an air of fun and frivolity. Let's face it, if sin weren't so enjoyable we wouldn't fall prey to it so easily. Solomon next gives the impression that she is everywhere to be found. As I pointed out earlier, that is even more true today. Even a widely proclaimed family movie like *Forrest Gump* surprised many with scenes that were unnecessary and sexually explicit. If you were surprised, you shouldn't have been. Check these things out beforehand. Don't act like a young man lacking sense and wander down the street of temptation unaware. Remember that Jesus extended the moral law from our actions to our thought life. If we simply lust after a woman, we have already committed adultery in our hearts (Matt. 5:27 28).

Solomon next turns to the woman's tactics:

So she seizes him and kisses him,
(Suddenness can put you off your guard unless you have predecided what you would do, whether it is a real seduction, a scene in a movie, TV program, or book. Will you close your eyes, leave, change channels, skip a few pages? What? Know beforehand!)

And with a brazen face she says to him:
"I was due to offer peace offerings;
Today I have paid my vows.
(I'm not such a bad person. See, I do a lot of the same things you do. You're not going to reject and judge me, are you?)

Therefore I have come out to meet you,
To seek your presence earnestly, and I have found you."

Ah, the ultimate weapon with a man: female flattery. Men are suckers when they're told that they are needed. It was he, particularly, that she was waiting for. Not just anybody. If a man senses he is needed, he will be very reluctant to say no. Men usually hate to disappoint.

Solomon continues:

"I have spread my couch with coverings,
With colored linens of Egypt.

I have sprinkled my bed
With myrrh, aloes and cinnamon.

Come, let us drink our fill of love until morning;
Let us delight ourselves with caresses."

As she continues her assault on the male ego by indicating all the trouble she has gone through just for him ("Don't hurt my feelings now," she says), she creates a sensual picture that is meant to arouse him and draw him in. Be realistic. This sounds inviting, even from the pages of Scripture. This should be a loud tornado siren in your ear to tell you: "There, but

for the grace of God, go I!” The adulteress finishes her seduction with the assurance that no one need ever know, in verses 19 and 20. She says:

“For the man is not at home,
He has gone on a long journey;

He has taken a bag of money with him,
At the full moon he will come home.”

This rationalization of “no one will know” is true not only of an affair, but also of what we allow into our minds through the privacy of our computer, videos rented when no one else is home, magazines stashed away in a secret place, or visits to parts of town where we certainly don’t expect to find anyone we know. But it’s a lie. These things cannot be hidden for a lifetime. Either you will slip up sooner or later, or you will poison your mind to such an extent that the outward temptation can no longer be resisted. Moses speaks to Israel in Numbers 32:23 warning them that if they do not obey the Lord, “their sin will find them out.”

The Young Man Capitulates and Must Face the Consequences

As we have seen, the young man in Proverbs 7 has walked right into temptation’s snare and has been totally mesmerized by the pleas and schemes of the adulteress. I have made many parallels to today as to how prevalent sexual temptation is. Now we will see the young man’s demise and the consequences of his actions. Beginning in verse 21:

With her many persuasions she entices him;
With her flattering lips she seduces him.

Suddenly he follows her,
(probably as if in a trance)
As an ox goes to the slaughter,

(silently and dumbly)
Or as a stag goes into a trap,

Until an arrow pierces through his liver,
As a bird hastens to the snare,
(again blindly and without knowledge)
So he does not know that it will cost him his life.

He capitulates without a word, mesmerized by her seduction. The analogy to the ox, the deer, and the bird point out that each of them walk blindly, silently, and unknowingly to their death. So it is with the young man lacking sense. While he will not die in a physical sense, though he may if he contracts AIDS, he will die in the sense that his life will never be the same. Not only will the shame and guilt be difficult to overcome, but there will be severed relationships that may never be repaired. There may also be consequences that can never be removed and scars that may never be healed, such as a child out of wedlock or a broken marriage in which children are the real victims. But even if the sin is with pornography, remember your sins will find you out. You may keep up appearances for awhile but your ministry, your family, and your relationship with God will slowly rot from the inside out. Solomon closes with some final warnings and observations:

Now therefore, my sons, listen to me,
And pay attention to the words of my mouth.

Do not let your heart turn aside to her ways,
(do not give your mind opportunity with impure material)
Do not stray into her paths.

For many are the victims she has cast down,
And numerous are all her slain.

Her house is the way to Sheol,
Descending to the chambers of death.

Your best defense is to first realize that none are immune.

Remember Boromir and Faramir from Tolkien's *Lord of the Rings*. Boromir, the stronger, older brother, thought he could resist the power of the One Ring and use it to defeat the enemy. In the end, his lust for power drove him to irrationality and eventually to his death. Faramir, however, assessed his weakness correctly and refused to even look at the Ring when the opportunity arose, knowing its seductive power. He not only lived but was used mightily in the battles that followed. No one was capable of totally resisting the power of the Ring. Those who actually gazed upon the Ring, handled it and even used it, resisted only through an extreme exercise of will often aided by the intervention and counsel of others or circumstances (Frodo, Bilbo, and Samwise). Those who totally yielded to it were destroyed by it (Gollum).

Many have faltered before you and many will come after you. Your first mistake would be to think of yourself as above this kind of sin or immune to it. Don't kid yourself. It can ruin you physically! It can ruin you emotionally! It can ruin you spiritually!

Purity affirms who we are; we are made in the image of God. Purity affirms our relationship to Jesus Christ as His bride. Purity affirms women as a treasure God created for us as a companion and helpmate and not as an object for us to conquer.

Pray and ask forgiveness for any involvement in pornography, R- rated movies, and lustful thoughts. Commit to predecide what to do about those sudden temptations, commit to purity, commit to wives and husbands (or future wives and husbands) to be faithful in the power of the Holy Spirit. Martin Luther said that you cannot stop birds from flying over your head, but you can certainly stop them from making a nest in your hair. Some temptation is unavoidable, but as far as it depends on you, give it no opportunity to set up residence in your mind.

“There is No Satan, No Hell, and No People Born Bad”

I believe after 25,000 hrs of study and research, that WE should teach more about Creation and nature, along with philosophy and science, at a early age.

Western man starts his voyage of life thinking, he/she is bad, a sinner and always going to hell with Satan. There is NO Satan. There is no hell. These are for all serious realists a level of evil conciousness. Our children are not born into a world of sin. No more than a new born fawn, calf, bird etc. etc. We all have the knowledge of knowing right from wrong. In the Eastern cultures, primarily the Buddhist, teach their young that they are good boys/girls.

The orthodox churches take hold of one’s spirit and give it fright and scare. The conformist and orthodoxy are nothing more than a industrialized money making venture. Now our new president wants to give our tax dollars to the same groups.

Somewhere, somehow America must change. This earth will probably be here for a very long time. When we think on terms of eternity, infinity and the finite, let us teach the truth about nature and clean up this planet, and the young minds. We continue to tell our youth of how bad they are, they believe this. No, this gives them the license to murder, child molest, rape and a total criminal behavior. What would one expect, but our terrible bad society. Every generation this grows worse.

I’m not sure why you sent us this recent message except perhaps as a mild rebuke of our Christian Theistic worldview. Let me just point out that setting yourself up as an authority by stating the number of hours you have studied this subject

and simply stating your position as categorically true with no attempt at argument or persuasion conforms to the standard practice of propaganda and not rational discourse.

If you want to challenge something specific on our site, please write us stating what you disagree with and why and we will respond as best we can. I'm afraid your e-mail as it stands accomplishes little more than an opportunity for you to state your opinions to no one in particular. Therefore, there is no reason to specifically respond to any of your speculations.

Respectfully,

Ray Bohlin, Ph.D.
Probe Ministries

Contact: A Eulogy to Carl Sagan

The Paradox of the Movie *Contact*

At the very beginning of the movie *Contact*, you should have noticed in the lower right corner of the screen a little dedication which read, "For Carl." This, of course, is Carl Sagan (1934-1996), the Cornell astronomer and science advocate to the public, whose 1985 novel was the basis for the movie.(1) Sagan passed away in December 1996, before the movie was released, after he struggled for several years with a rare blood disorder.

The movie serves as a fitting eulogy for the most visible member of the scientific community within popular culture. The

phrase “billions and billions”, attributed to Sagan, has become a part of the public’s lexicon of scientific phrases, even though Sagan never actually used the phrase in print or in any of his public broadcasts or appearances. Sagan used it self-effacingly as the title for his final and posthumously published book.

Many of us know of Carl Sagan, but we know very little about him. As a planetary astronomer, Sagan made significant contributions to the fields of chemical evolution, Martian topography, and Venusian meteorology. He also served as an official adviser to NASA on the *Mariner*, *Voyager*, and *Viking* unmanned space missions. Carl Sagan led the charge both to the public and in the Congressional halls of government funding for space research and particularly SETI, the Search for Extra-Terrestrial Intelligence.

Sagan was awarded the Peabody Award and an Emmy for his stunningly influential public television series, Cosmos. The accompanying book by the same title is the best-selling science book ever published in the English language.(2) He earned the Pulitzer Prize for his book Dragons of Eden on the evolution of human intelligence, and numerous other awards and honorary degrees. He is the most read scientific author in the world, and upon awarding him their highest honor, the National Science Foundation heralded his gifts to mankind as “infinite.”

The main character of *Contact*, Ellie Arroway, played by Jodie Foster, portrays Sagan’s life in miniature. While not sharing Sagan’s awards and rapport with the public, Ellie Arroway is a brilliant, driven, self-reliant young astronomer obsessed with SETI. Dr. Arroway endures scorn and ridicule from the public and science for her dedication to discovering signs of extraterrestrial life, just as Sagan has. Arroway, like Sagan, confronted with the demons of superstition, fundamentalism, and scientific jealousy, fought back with reason, sarcastic wit, and sheer perseverance.

Arroway parrots Sagan's views on the need for a rational, non-religious view of reality to solve our problems, his hope for an extraterrestrial savior to save us from our technological adolescence, and the wonder and beauty of the cosmos pointing to our species as a curious, brave, precious accident of the universe. What is paradoxical about *Contact* is not the conflict between faith and reason, but who is forced to rely on faith and experience instead of evidence. Following Ellie's trip through the galaxy and her conversation with an alien, she returns with no documentation. What was an 18-hour experience for Ellie appeared to be an uneventful few seconds to everyone else. She must ask a Congressional panel to accept her account of events on *faith* with no evidence. If you were paying close enough attention as the film wound down, however, you could discover that this paradox is only apparent. Ellie's data instruments recorded a full 18 hours—not a few seconds—of static. There was evidence of her experience, but it was withheld from Ellie by apprehensive government officials. The scientific validation once again highlights Sagan's conviction that science is mankind's only reliable tool in the discovery of truth, and that faith only covers up our fears and stifles our search for answers.

Contact is a must-see film for those who wish to comprehend and knowingly confront our culture's hostility towards faith that relies on revelation.

The Paradox of Sagan's Views of Religion

One of the most perplexing aspects of the movie *Contact* is the seemingly confusing portrayal of religion. The confusion, I believe, is only superficial. If you reflect on how the different traditional religion is discarded as irrelevant at best and dangerous at worst.

Sagan's disdain for traditional religion is clear from the beginning. Events from Ellie's childhood flashback through the early part of the movie and lay the groundwork for her

rational rejection of traditional Christianity. In the novel, Ellie's father is portrayed as a skeptic of revealed religion; he views the Bible as "half barbarian history and half fairy tales."(3) In the movie, Ellie admits to Palmer Joss that her father was asked to keep her home from Sunday School because she asked too many questions that could not be answered, such as "Where did Cain get his wife?" Although this and other objections offered in the novel are easily answered, they are left unchallenged as apparently sturdy nails in the Bible's coffin.

When Ellie's father dies in the movie, the clergyman offers harsh and uncaring words about some things being hard to understand, that we aren't meant to know, and that we just have to accept it as God's will. This deliberately presents the God of the Bible as unknowable, cruelly inscrutable, and demanding of our acceptance. Ellie's response to the minister's attempt to be consoling is to berate herself on where she should have left extra medicine where it could have been reached in an emergency. Self-reliance and analytical thinking easily out-compete the minister's feeble lecture. In a conversation with Palmer Joss, Ellie confidently asserts that we created God so we wouldn't feel so small and alone. He's just an emotional crutch.

Two other characters in the film outline Sagan's view of the modern evangelical right. The long-haired preaching zealot is portrayed as a dangerous man, out of control and out of touch with reality. He later borrows a trick from Muslim fundamentalists by sacrificing himself in an attempt to derail the multinational project to build the travel machine. Richard Rank, the presidential advisor, represents that portion of the religious right that hungers and thirsts not for righteousness, but for political power. At a cabinet meeting, Rank offers sanctimonious drivel about science intruding into areas of faith and the message being morally ambiguous. If his remarks made you cringe with anger, they were supposed to.

And then there is Palmer Joss, the enigmatic, amoral, has-been priest. Palmer Joss's New Age religion sees truth as relative and the real issue as oppression. Joss has no quibble with the conclusions of science, just its attempts to overstep its boundaries and rule our lives. His knowledge of God is limited to an experience on which he does not elaborate and that intellect cannot touch. Perhaps the attraction between Joss and Arroway is the challenge they represent to each other. Joss's religion is at least scientifically informed and therefore intriguing to Ellie, and she is scorned by the same scientific establishment that Joss distrusts. A match made in Hollywood.

Sagan left no room for any faith that does not embrace the conclusions of a scientific materialism. This needs to be kept in mind when Joss challenges her about her belief in God during the hearings. When the other multinational members speak up in defense of Joss's question, it is clear they are only referring to some politically correct supreme being, not the God of Abraham, Isaac, and Jacob.

Sagan's Extraterrestrial Hope

Even in a scientifically sophisticated film such as Carl Sagan's *Contact*, we run into our culture's preoccupation with life beyond our planet. Though Carl Sagan spent some of his time combating the UFO crazies, he nevertheless held out a hope that there are civilizations out there waiting to discover us, or us them. Where does this conviction come from? For a scientific materialist and humanist like Carl Sagan, this confidence comes from two sources. First is the notion that if life evolved here, it is presumptuous of us to think that we are alone. Certainly life has evolved elsewhere! Second is Sagan's and others' fear that our species sits on the brink of self-destruction and we will need some outside help to overcome our predicament.

In a conversation with Palmer Joss, Ellie Arroway gives a

calculation of sorts to explain her confidence in life having evolved elsewhere. She is looking up into the plethora of stars in the nighttime sky and says, "If just one in a million of those stars has planets, and if only one in a million of those has life, and if just one in a million of those has intelligent life, then there are millions of civilizations out there." It is a little surprising that a film of such high caliber would get this one wrong. If you take each of those probabilities and multiply them together, that's one in a million million million, or a billion billion, or in scientific notation, 10 to the 18th power. Current estimates suggest that the stars number approximately 10 to the 22nd power. That would technically leave only 10,000 civilizations in the universe, not millions. That would mean that we are alone even in our own galaxy.

In another essay (Are We Alone in the Universe?) I summarized the calculations of Christian astronomer Hugh Ross. Ross estimated the probabilities of all the necessary conditions for life occurring by natural processes. Ross concluded that if all we have to depend on are physical and chemical processes, then we are alone in the universe. Life could have evolved nowhere else. Even the biochemical complexities of living cells are revealing that life requires intelligence (See my review of *Darwin's Black Box*.). Sagan's confidence that life is super-abundant in the universe is grossly out of proportion.

The second reason for Sagan's hope of other civilizations was expressed well by Ellie Arroway. An international panel, assigned the task of choosing the one individual who would enter the machine and perhaps visit this alien civilization, queried each candidate what one question they would ask. Ellie said she would want to know how they survived their technological adolescence without destroying themselves. Sagan has been a tireless supporter of nuclear disarmament. He truly feared that we would destroy ourselves before we reached our

full potential. In the opening scene of his Cosmos television series, he remarked that our species was “young and curious and brave; it showed much promise.”(4) Couple this fear with the conviction that there is no God, and the only source of hope for a salvation from ourselves is another civilization more advanced than us, giving us some pointers for survival.

This confidence that an alien culture that could contact us would be more advanced than us is not unreasonable. If they have the technology to purposefully contact us, and this is something we cannot do, then their technology must be beyond ours. What is never explained, however, even though it is raised in the movie, is why we would expect this alien culture to be benevolent. It is just as likely, if not more so, that an alien civilization would be more of the variety depicted in the movie *Independence Day*. This hope reflects more on Carl Sagan’s optimistic cosmic humanism that any scientific reality.

Who Will Save Us, God or Aliens?

The movie *Contact* tells us of a more realistic scenario for a first encounter with an alien civilization, than, say, *Men in Black*. A radio signal is received from space that is broadcast at a frequency that is equal to the value of hydrogen times pi and gets our attention by counting the prime numbers from 1 to 101 in sequence. The message is authenticated as coming from the star Vega, 26 light years away. The message is eventually decoded and found to contain the plans for constructing a machine for one person to apparently travel out into the galaxy. Ellie Arroway, a young astronomer who discovers the message, eventually boards the machine and travels out into space for a close encounter of a supposedly more realistic kind.

A very tantalizing line is repeated three times in the course of the film. When Ellie Arroway, as a child, asks her father if there are any life forms out in the universe, he says that

if there isn't, it would be an awful waste of space. Palmer Joss repeats the line to an adult Ellie as they engage in a conversation under a starry sky in Puerto Rico. It is a poignant scene as Ellie clearly is stunned as she recalls her father saying the same thing. Ellie, herself, repeats the phrase at the end of the film as she is addressing a group of school children and is asked if there is life out there in space.

Sagan has drawn a bead on the argument for the existence of God from design, or the teleological argument. Waste implies misdirected design. If the universe was created for us and we are alone, why does it have to be so big? Surely we could have survived quite well in a much smaller and economical universe. But if you think about it, Scripture proclaims that the heavens declare the glory of God, not man (Ps. 19:1). Indeed, if the universe was created only for man's benefit, then it is a waste of space. We don't deserve it. But if the main purpose of the universe is to glorify the splendid, eternal, all-powerful God, it could never be big enough.

Another interesting theme is the form that the alien takes. After Ellie travels through the galaxy, she arrives at a large docking space station. She is somehow transported to a beach, resembling a picture of Pensacola, Florida she drew as a child. Eventually, a figure approaches. It is her father. The alien appears to her in the form of her father. He tells her that they thought this would make it easier for her.

It's fascinating that Sagan often complains that if God exists, why doesn't he make himself plain? Why not a cross in the sky or a mathematical formula in the Bible? Why is everything so obscure? One answer from Philip Yancey's book, *Disappointment with God*, is that God did reveal himself plainly to Israel during the Exodus and they still rebelled, and Jesus performed incredible miracles and still most rejected him. The Father does not want to coerce our love. So isn't it interesting that in Sagan's own story, when a

superior intelligence wants to make contact with us, they put us in familiar surroundings, take on our form, and speak our language?! If they appeared to us in their true form, we would be repulsed. Isn't that precisely what the Father did for us in sending Jesus to live among us? It appears that Carl Sagan has unwittingly answered his own objection.

The Worldview of Carl Sagan

Carl Sagan began his highly acclaimed public television series Cosmos with a grand overview of the universe and our place within it. With a crashing surf in the background, Sagan declares,

> *"The cosmos is all that is or ever was or ever will be."(5)*

Sagan eloquently expresses his conviction that matter and energy are all that exist. He goes on to describe his awe and wonder of the universe. He describes a tingling in the spine, a catch in the voice, as the greatest of mysteries is approached. With excitement, Sagan tells us our tiny planetary home the Earth is lost somewhere between immensity and eternity, thus poignantly emphasizing our simultaneous value and insignificance.

In the movie *Contact*, Dr. Ellie Arroway expresses this awe and wonder at several points in the film. The most dramatic episode occurs during her galactic space flight when she is confronted with the wonders to be seen near the center of the galaxy. She is at a loss for words in the face of such beauty and humbly suggests that a poet may have been a better choice to send on the trip.

While this is all very moving, the great emotion seems strangely misplaced and inappropriate. If the cosmos is indeed all there is or ever was or ever will be, why get excited? If we are lost between immensity and eternity, shouldn't our reaction be one of existential terror, not awe? Sagan borrows

his excitement from a Christian worldview where the heavens declare the glory of God, which *should* produce a tingle in the spine and a catch in the voice.

In the next to final scene in *Contact*, Ellie attempts to defend herself by finally admitting that she has no evidence of her trip through the galaxy. But she has been given something wonderful, a vision of the universe that tells us how tiny, insignificant, rare and precious we are. In *Cosmos*, Sagan reflects that while we are a species that is young and curious and brave, our place in the universe is to be compared to "a mote of dust that floats in the morning sky."(6)

How can we be tiny and insignificant and rare and precious at the same time? Clearly Sagan cannot live consistently within his own worldview. His view of the universe dictates that all is meaningless chance and we are nothing special, yet he irrationally rejects the despair that logically follows in favor of being curious, brave, rare, and precious.

As Sagan neared death, many around the world were praying for him. Though clearly an enemy of the faith, the closing sentences of the novel *Contact* indicated a belief, a hope, in an intelligence that antedates the universe. Might he see the whole truth before he passes into eternity? In his final book *Billions and Billions*, his wife Ann Druyan writes, "Contrary to the fantasies of fundamentalists, there was no deathbed conversion…. Even at this moment when anyone would be forgiven for turning away from the reality of our situation, Carl was unflinching."(7) In reflecting on the many cards and letters she received upon his death from people telling of the impact Sagan had on their lives, she writes, "These thoughts comfort me and lift me out of my heartache. They allow me to feel, without resorting to the supernatural, that Carl lives."(8) Sadly, Carl does live, but not as she believes. Remember that enemies of the faith are lost and in need of a Savior. But even though they may be prayed for and witnessed to by colleagues up to the end, many, including Carl Sagan, will

still, defiantly, die in their sins. It is a bitter, needless grief.

Notes

1. Carl Sagan, *Contact* (NY: Pocket Books [Simon and Schuster], 1986).

2. Carl Sagan, *The Demon-Haunted World* (New York: Ballantine Books, 1996), p. 459.

3. Sagan, *Contact*, p. 20.

4. Carl Sagan, *Cosmos* Video, "Episode 1: The Shores of the Cosmic Ocean" (Turner Home Entertainment, 1989).

5. Ibid.

6. Carl Sagan, *Cosmos* (New York: Random House, 1980), p. 4.

7. Carl Sagan, *Billions and Billions* (New York: Random House, 1997), p. 225.

8. Ibid., p. 228.

See Also:
• Probe Answers Our E-mail: "You Are Full of Hatred and Bigotry"

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.