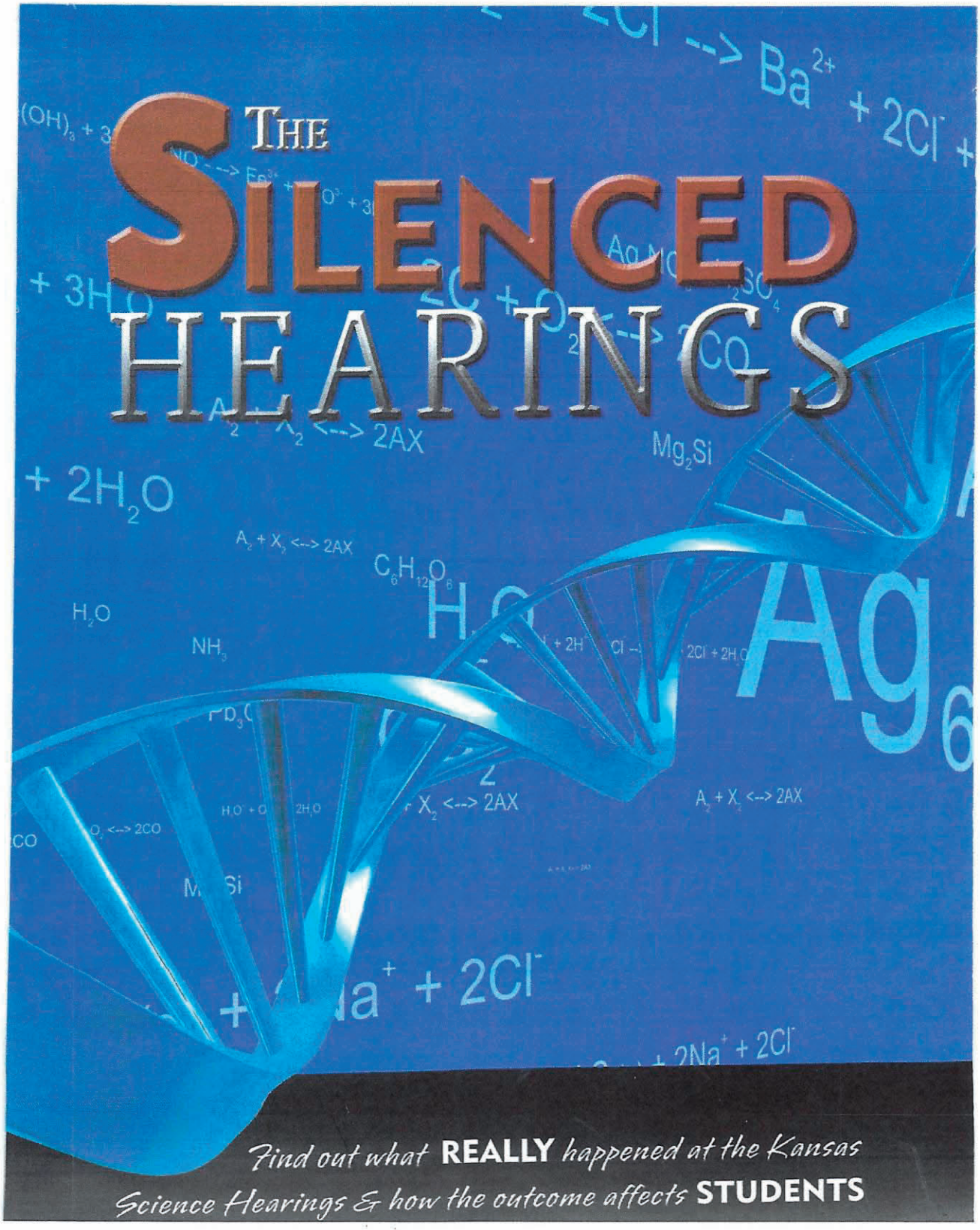
THE
SILENCED
HEARINGS
Find out what REALLY happened at the Kansas
Science Hearings & how the outcome affects STUDENTS

The Silenced Hearings

by Deanna Schoenberger

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Acknowledgments

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Preface

The controversy over the Kansas Science Standards for the State's public schools made the news not only in Kansas but across the nation with such titles as:

***Kansas School Board Redefines Science*, CNN**

***Kansas Drops Study of Evolution*, ABC News.com**

***In Kansas, A Sharp Debate on Evolution*, The Boston Globe**

***U. Of Kansas Class Seeks To Debunk Intelligent Design*, NBC10.com**

***[Governor] Sebelius: Kansans Should Follow Ed Board Races*, Garden City Telegram**

So, if it was so well publicized, why is this book called "The *Silenced* Hearings"? Well, while we heard many opinions about the science standards, we heard little, if any, actual coverage of the science hearings. The science hearings were held by the State Board of Education for the purpose of clarifying science education issues so that the Board could determine what was needed in the science standards.

I'm not a scientist or an expert on the evolution versus intelligent design debate, but I'm a voting citizen and I take that seriously. Our State Board of Education was, as evidenced by the hype, making huge decisions concerning Kansas science standards. As the 2006 election year approached I knew that who we elected to serve on that Board would decide critical issues regarding education, and essentially, our future. My vote is not won by hollow persuasion. Although opinions have their place, I want to base my vote on facts. That's why I did what anyone can do; I obtained the public records from the State Board of Education web site and read them. What I learned was surprising. Within this brief report is the *REAL SCOOP* that everyone deserves to know!

Because my goal for this book was to provide a brief report that even non-scientists could appreciate, I took liberty to explain what some of the experts were talking about in more simplified language. Also, note that I did not address everything that the hearings or submitted reports covered. The proposed changes to the science standards by the Harris Group were generally discussed, found scientifically valid, educationally appropriate and preferable to the Krebs Group's.

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Introduction

Camera men lined the walls at the Science Hearings which were held on May 5th–7th and 12th of 2005.

There weren't many smiles or sounds of laughter in the Memorial Hall auditorium in Topeka, Kansas on May 5th of 2005. Though groups greeted each other warmly and spoke quietly among themselves, most people were silent with solemn expressions as they waited in the court-like setting.

Media cameras lined both side walls in the auditorium. Eighty seats had been reserved for the media, which included reporters from London, Canada, Japan and Turkey as well as *The Associated Press* and others from the States.

Blue security uniforms were seen in every direction one looked. A number of state police were on duty to assist the usual Capital security. During the lunch break they set up airport like security with metal detectors. After lunch, they screened everyone coming into the hall.

On the stage, opposing attorneys and their aides sat across from each other. The State Board of Education subcommittee sat at a separate table on the floor across from the witness' podium. The witnesses waited near the front with the audience for their opportunity to testify.

Dr. Steve Abrams, a veterinarian, stood up with his microphone in his hand and all eyes fixed on him, "I welcome you to these hearings. My name is Steve Abrams, I am chair of the State Board of Education and also chair of the science subcommittee.

My fellow board members with me here on the subcommittee are Mrs. Connie Morris, and Mrs. Kathy Martin. The purpose of the hearings that will be held over the next several days is to assist us, as board members, in understanding the complex and oftentimes confusing issues regarding science education."

In June of 2004, the Kansas State Board of Education received two entirely different recommendations for science standards regarding the origin of life and its diversity from the 26-member science writing committee. The two proposals were written by competing factions within the committee.

One faction, which I refer to as the Krebs Group, consisted of members led by the Chair of the high school life sciences subcommittee of the writing committee, Mr. Jack Krebs. Mr. Krebs is a math teacher who holds an undergraduate degree in Anthropology and is also the Vice President of Kansas Citizens for Science. The proposal they submitted was supported by a majority of the members of the writing committee and was often referred to as "Draft Two," or the "Majority Report." I refer to them as the "Krebs Group Standards."

The other faction, which I refer to as the Harris Group, consisted of eight members and was led by William S. Harris, Ph.D. Dr. Harris is a research biochemist, professor of Medicine at the University of Missouri at Kansas City and Co-Managing Director of Intelligent Design Network, Inc. (IDnet). IDnet is a non-profit organization that seeks institutional objectivity in origins science. The science standards they submitted were referred to as the "Minority Report." I refer to them as the "Harris Group Standards."

[The advocates of Darwinism] have consistently and remarkably, in my mind, refused to engage in a discussion of the scientific substance of the issue.
—Dr. William Harris

The primary disagreement between the two factions is whether there is relevant scientific evidence that challenges evolutionary theory which is being withheld from the public schools. The Harris Group proposed an objective teaching of the controversies. Steven Case, head of the Kansas science standards committee was quoted in the Washingtonpost.com on May 5, 2005, saying, "there isn't a scientific debate and there's nothing for the kids to weigh. They say there's a controversy. We say there's not."

Members of the State Board of Education Subcom-mittee starting with the closest: Mrs. Kathy Martin, Mrs. Connie Morris, and Dr. Steve Abrams.

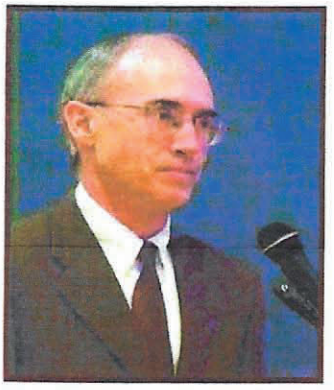
Unfortunately, Kansas Citizens for Science avoided the "scientific controversy" debate altogether by boycotting the hearings. Their president, Harry McDonald, claimed that the hearings were rigged against evolution and the board's conservatives had already decided to support the Harris Group.

Dr. Harris expressed his disappointment with the boycott saying, "They have consistently and remarkably, in my mind, refused to engage in a discussion of the scientific substance of the issue."

Regardless of the boycott the hearings proceeded. John H. Calvert, J.D. and Edward Sisson, J.D. were the spokesmen and representatives for the Harris Group. They presented 23 witnesses. The Krebs Group was represented by Pedro L. Irigonegaray, J.D. who also served as their only witness.

The formal public science hearings, which resembled legal hearings, were arranged to publicly gather information about this complex but important educational issue. The participants had agreed upon rules to allow each witness a specific presentation time. Representatives of the opposing model and members of the State Board hearing committee were given time to ask questions following each presentation. These rules were explicitly followed by all the witnesses presented by the Harris Group. However, Mr. Pedro Irigonegaray surprised everyone by refusing to take any questions following his two-hour speech. Due to this breach of the rules, Mr. Calvert was allotted time to respond to his testimony. This is the reason that you'll see two chapters in this book featuring Mr. Calvert.

Why Do We Need Objective Standards For Origins Science



All of us are professional scientists who are really committed, as I think most scientists are, to follow the evidence wherever it leads—regardless of its religious implications. That is the crux of science.
—Dr. William H. Harris

Dr. Harris, the biochemist who led the Harris Group in writing new science standards, is an internationally recognized expert in the omega-3 world in cardiovascular health. He recognized there was a need for origins science to be taught objectively when he was in college. Origins sciences are subjects that deal with such topics as the origin of life, the origin of organs, the origin of humans, and the origin of the universe. When pursuing origins science one asks questions like "where did we come from, and where did life come from." On the other hand operational science asks such questions as "how does the world operate today, and how does it work."

Up to this time in his life, Dr. Harris had been involved in operational science and not origins science, so it never occurred to him to question evolution. He had thought there was good evidence for evolution because so many people believed it. But when he became a Christian his worldview changed and he started getting interested in looking into it. When he investigated evolution he found "tremendous leaps of faith that were being taken in the absence of scientific data."

Scientists generally use methods of natural investigation; they don't consider spiritual forces to account for what they observe in the world. "And that's fine to look for natural causes," Dr. Harris said, "but when you don't find any natural causes it's time to fess up and say 'we don't know' instead of saying there was a natural cause."

Dr. Harris explained that in the origin of life field where they attempted to use, "natural environments" to produce even some of the simplest chemicals of life, they consistently failed. "Since the 1950's they have failed and failed and failed and failed and yet they are still in the textbooks presented as the plausible explanation for how life arose, but those experiments have failed! It's dishonest in my view

to portray failures in the laboratory as successes in the textbook."

Dr. Harris explained that there are controversies on how the scientific evidence is interpreted in two major aspects of evolution theory: chemical evolution (the arrival of life from nonlife) and macro-evolution.

A fundamental principle to understanding the science standards controversy has to do with understanding the difference between micro-evolution and macro-evolution, which are the short and long-term perspectives of the biological evolutionary theory.

Biological evolution, according to the Harris Group, is a scientific theory that seeks to explain present day similarity and diversity among living organisms and changes in non-living entities over time. The modern theory of evolution postulates that change occurs through an unguided combination of random variation and natural selection.

Micro-evolution, the short-term perspective of biological evolution, is the on-going adaptation of organisms to environmental challenges and changes. Examples include: dogs changing into various breeds of dogs; and survival in certain environments of birds with stronger beaks. Micro-evolution is agreed upon by both parties in this debate so it is not part of the Science Hearings except to determine its limitations.

Macro-evolution, the long-term perspective of biological evolution, is the descent with modification of different lineages from common ancestors. It is also sometimes called "Darwinism." Examples include: dinosaurs evolving into birds, and apes evolving into people.

The way we teach origins science is important because it impacts religion. Every major religion in the world has a story to tell about where we came from. When the State, via public education, asserted an answer to that question they entered a religious arena. When science weighs in with only one perspective, which is based on a philosophy that says it had to be by natural processes, then they're presenting data that's philosophically driven rather than scientific and data driven. That, according to Dr. Harris, is a problem.

When they limited the answer to the question of where we came from to naturalistic undirected, unguided processes, they essentially ruled out any intelligent cause for our being here. Jacquest Monud, the Noble Prize winner, summed it up, "Man has to understand he is merely an accident."

"Now, I think part of our overall goal is to remove the bias of religion that is currently in schools," explained Dr. Harris. He explained that to remove the religious bias, all the scientific data that is relevant to origins needs to be available to

students. This includes critical scientific analysis of evolutionary theory. He said that it is not scientifically acceptable to have one side of the controversy presented without presenting the data that's contradictory to that hypothesis. "Our hope," he explained, "is that at the end of these hearings we will be allowed to teach the controversy that does exist over origins."

Dr. Harris also said that by removing the bias and teaching origins science objectively, the state will relieve classroom tension.

According to Dr. Harris, "Objectivity ought to guide science education." The Science Standards that the Harris Group proposed do not introduce religion into the classroom; rather they insist upon scientific objectivity that yields religious neutrality. They do not mandate the teaching of Intelligent Design in the classroom; rather they stop the censorship of critical analysis of evolutionary theory.

***It's dishonest, in my view, to portray failures in the laboratory as successes in the textbooks.* —Dr. William Harris**

At the hearings the Harris Group addressed the following questions:

1. Are There Suppressed Controversies Over Chemical Evolution?
2. Are There Suppressed Controversies Over Macro-Evolution?
3. Does Origins Science Impact Religion and Philosophy?
4. Are Students and Teachers Repressed by Evolution Dogma?
5. Is It Legal To Suppress the Controversy?

"We have an obligation, we think, to teach origins science in the most neutral way possible without religious bias, without naturalistic or philosophical bias. And that way we can do the best science and end up neutral with respect to the constitution," Dr. Harris explained.

Intelligent Design: Intelligent design is a scientific theory that disagrees with evolutionary claims that the apparent design of certain natural phenomena is an illusion that can be adequately explained by material causes.

Outline of the Harris Group's Proposed Changes to the Science Standards

1. Revisions to the Introduction:
   a. Add the word "informed" to the mission statement. The standards that were in place at the time of the hearings say, "equip students to make reasoned decisions." When it was proposed to the writing committee to change it to, "equip students to make informed and reasoned decisions," the committee voted it down. Dr. Harris explained that "if a decision is poorly informed, it's not going to be well reasoned." One can come to the wrong conclusion if they don't have good information.

   b. Use an evidence-based definition of science rather than a naturalistic definition of one. (See pg. 27)

   c. Promote advice provided by Congress in adopting the No Child Left Behind Act of 2001, which states:

      > "The Conferees recognize that a quality science education should prepare students to distinguish the data and testable theories of science from religious or philosophical claims that are made in the name of science. Where topics are taught that may generate controversy (such as biological evolution), the curriculum should help students to understand the full range of scientific views that exist, why such topics may generate controversy, and how scientific discoveries can profoundly affect society."

   d. Acknowledge the fact that science has answered some important questions, but not all of them. Dr. Harris explains that there are many unanswered questions in science such as where did we get the fundamental laws of the universe, what is the origin of life and what is the origin of the genetic code?

2. Revisions to 7th Grade Standard 3, BM 5 (dealing with evolution) (page 8). A minor addition to a teacher's note seeks to make it clear that evolution is a theory and that the observed facts may not always be consistent with its explanations and predictions.

3. Revisions to 12th Grade Standard 4, BM 2 (page 9) and Standard 1, Benchmark 1 (page 12) dealing with historical hypotheses and institutional bias. These suggestions have students understand methods for investigating and testing hypotheses about the cause of remote historical events not susceptible to direct observation and experiment.

Another change makes it clear that students should consider the possibility of institutional as well as personal bias.

4. 12th Grade, Standard 3, Benchmark 2, dealing with DNA and the genetic code (page 14). This suggestion will have students understand that the order of the nucleotide sequences within genes is not dictated by any known chemical or physical law, a fact critical to evolutionary theory and the origin of life.

Now I think part of our overall goal is to remove the bias of religion that is currently in the schools.
—Dr. William Harris

5. 12th Grade, Standard 3, Benchmark 3, dealing with evolution (page 15). This proposal offers a more complete description of biological evolution, the evidence that supports it and the scientific controversies that surrounds it.

6. 12th Grade, Standard 7, dealing with the history and nature of science (page 20). These proposals encourage students to understand that science:

a. affects beliefs about a broad range of issues
b. uses empirical methods where possible; and
c. has influenced both positive and negative cultural consequences.

7. Revisions to the glossary to reflect the above suggestions (page 25).

Are There Suppressed Controversies Over Chemical Evolution?

The Fruitless Search For a Theory

***Students need to appreciate the difficulties associated with the origin of life and the lack of adequate scientific explanations. … Hiding the problems or pretending they don't exist is disingenuous at best—outright dishonest at worst.* —Dr. Edward T. Peltzer**

Dr. Peltzer, a chemist, oceanographer and expert in chemical evolution, explained that chemical evolution is foundational to Darwin's theory for the origin of species. He said, "If life doesn't originate by solely 'natural' means, then it is unlikely that solely natural means are responsible for the diversification of species." Chemical evolution is the naturalist's view of the processes and reactions that are thought to have occurred prior to the origin of life on Earth. But how life could have developed from non-life has been a challenging question.

Dr. Peltzer explained the history of natural explanations for the origin of life:

Spontaneous generation (the belief that maggots just spontaneously arose from rotting meat, mice from dirty hay, etc.) was still considered plausible when Darwin wrote "Origin of Species." It was disproved by Louis Pasteur within a few years of Darwin's publication, *On the Origin of Species*.

Abiogenesis or as it's sometimes called, molecules to microbes, is the supposed development of living organisms from non-living matter. It was first proposed by Darwin (after spontaneous generation was disproved) as a "warm little pond" with "just right" conditions. Darwin, of course, had no perception of the complexity of a "simple" cell.

The modern version of the theory of abiogenesis begins with a simple atmosphere of reducing gases (such as water, hydrogen, methane and ammonia). Various energy sources acting on these gases have been shown to produce amino acids, fatty acids, simple sugars, purines and pyrimidines. This is what Stanley Miller demonstrated in his famous electric discharge experiment.

According to the theory, the next step is the fatty acids polymerize to make lipids, and amino acids polymerize to make peptides. The simple sugars polymerize to

make carbohydrates and the purines and pyrimidines after combining with a simple sugar and phosphate, polymerize to make RNA and DNA.

Dr. Peltzer points out that it looks very logical, just like a biochemist would design a pathway. However, none of these polymerization steps have ever been shown to happen by natural *non-biological* processes. One of the many problems for it to happen by natural processes is the need for information. The odds against making just one biopolymer are enormous; it becomes ridiculous when you consider that you have to make the "right ones." The simplest heterotrophic bacterium (e.g. pelagiobacteria ubiquens) has 1200 genes. Dr. Peltzer describes the odds, "like one person winning ALL of the lotteries in every country during the same week—and even that would be easy compared to the synthesis process ..."

If you did happen to get the information then there's the assembly problem. "One has to get all of those polymers, the DNA and RNA necessary to produce them, and all of the chemical intermediates in the organism's primary metabolism together in a volume less than 2 microns in diameter and all at the same time."

To avoid these enormous problems, scientist Walter Gilbert, proposed the "RNA world." Dr. Peltzer explained that in the RNA world "life began not as an organism, but as a self-replicating organic molecule similar to RNA." However, there are still many major problems, particularly with RNA's lack of stability and its tendency to be attacked by sugars via a Maillard type reaction.

To expalin the Maillard reaction, Dr. Peltzer cited a few well known examples: the compounds forming the light brown crust of baked bread or the browning of cheese on pizzas are some of the products of this reaction. Other products form the distinct aromas we smell and find so appetizing when these foods are baked. The Maillard reaction itself (named after its discoverer) is actually a collection of several chemical reactions that begin when amino acids from the protein of food, react with reducing sugars such as glucose, fructose (the sugar in fruits) or lactose (the sugar in milk). In fact, culinary experts have learned to exploit this reaction in order to achieve the pleasant aromas and colors we all associate with cooked foods, or in some cases to avoid the reaction entirely as when sucrose (common

DNA (deoxpribonucleic acid) is a nucleic acid that contains the genetic instructions used in the development and functioning of all known living organisms.

RNA (ribonucleic acid) plays several important roles in the processes of translating genetic information from DNA into proteins.

table sugar) is used as a sweetner. Sucrose is not a reducing sugar and it does not react with protein or free amino acids.

Where the Maillard reaction comes into play with regards to the theories of the origin of life is that this reaction is a very effective competitor for the same compounds needed to form the essential biopolymers—before the free amino acids or nucleobases have a chance to form proteins or DNA/RNA like molecules, they will have certainly been attacked and consumed by the Maillard reaction. Thus, by natural processes, these compounds, in just a short amount of time, produce melanoids and kerogen, which would block the production of the biopolymers needed in the formation of life.

The next chemical evolution explanation for the origin of life was the PNA (peptide nucleic acid) world, introduced by Bohler, Neilsen and Orgel. It took care of some of the problems but still suffered from the Maillard reaction.

To treat [the philosophy of naturalism] fairly and appropriately and to honor the intelligence of the students, we need to be honest about it and identify [the philosophy of naturalism] where it crops up.
—Dr. Edward T. Peltzer

Realizing the tremendous problems facing the origin of life on earth, Francis Crick and Leslie Orgel re-introduced in 1973 the concept of *directed panspermia*, the theory that life came to earth from outer space by an intentional process. This theory solves the problem of how life began *on earth* by moving it to another planet where it is presently conveniently beyond our abilities of scientific investigation. It does nothing however to solve the ultimate question of how life began in the universe.

Dr. Peltzer appreciated the proposed changes that the Harris Group made to the standards. He said, "Many of the changes that have been proposed provide a more balanced approach, one that doesn't have this underlying philosophy of naturalism." He went on to say, "The philosophy of naturalism has been so ingrained in the science recently that it's hard to see. That doesn't mean it's not there. And to treat it fairly and appropriately and to honor the intelligence of the students, we need to be honest about it and identify it where it crops up."

A Highly Speculative Experiment

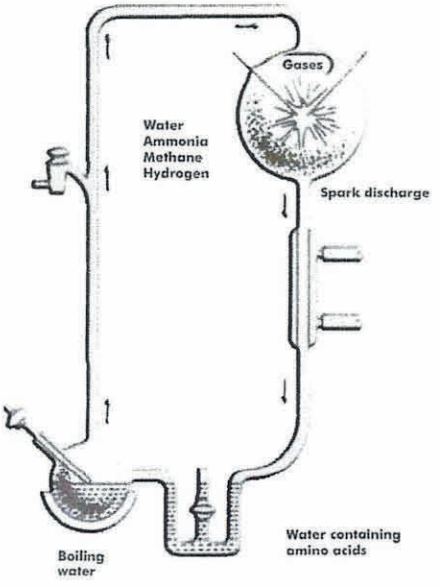
[The idea that life can arise from nonlife] is a highly speculative theory and if you have a highly speculative theory that is unchecked by criticism—there's a real danger there—especially with student minds, to draw the wrong conclusion and think that speculation is really solid knowledge when it isn't. This is a highly speculative theory. **—Dr. Charles Thaxton**

Dr. Thaxton, a chemist and co-author of *The Mystery of Life's Origins*, explained the importance of teaching the critical analysis of controversial theories such as the Stanley Miller Experiment (see diagram at right).

Stanley Miller's Experiment consisted of a concoction of the chemicals which evolutionists believed life sprang from (prebiotic soup). He passed an electric charge, which represented lightning, through the mixture and when they analyzed it they found some amino acids had formed. Since amino acids are in living proteins, they believed that this suggested that life can arise from non-life. However, as Dr. Thaxton pointed out, there are a number of problems for it:

1. There is no evidence that there was ever a reducing atmosphere on planet earth.
2. There is no geological evidence that there was ever prebiotic soup on planet earth.

1953 Stanley Miller



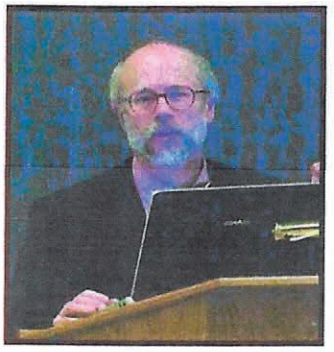
3. There's a problem with optical activity. Amino acids of proteins are actually only left handed—but Miller's reaction flasks produced both right and left handed.
4. There's an inefficient time frame for these chemical processes to produce life. In the 1960s scientists believed there was around a billion years. Now you hear that it had to be a very quick process, too quick for geological time measures to deal with. So, in effect, as soon as we have the earth cooled enough to bear life, there's geological evidence that life already exists.
5. There would also be a problem with interfering cross reactions which would lead to nonproductive dead ends. In a real water body environment, you would find amino acids reacting with sugars, other amine, even reacting with other amino acids, as well as with other types of chemical reactions.
6. There's a problem that the prebiotic soup would have to be very diluted—probably no more concentrated than today's oceans.
7. Undirected energy flow is a huge problem. Dr. Thaxton explains, "Yes, there's ample energy around but... [it is] not directed in any way to give something meaningful." It would be the same problem that you'd have if you put a stick of dynamite under a pile of bricks. Although you would have a lot of energy liberated, it does not produce anything effective. The undirected energy cannot produce a house or anything else.
8. The most difficult problem is that there is no abiotic source of information. The same year that Stanley Miller came out with his famous experiment, Francis Crick wrote to his son about his discovery. Within the DNA was a written code that worked just like a newsprint to convey a message. Francis Crick, being a devout evolutionist, said that when considering DNA, "Biologists must constantly keep in mind that what they see was not designed, but rather evolved," *What Mad Pursuit*, p. 138.

***It is ideology that needs protection from criticism, not science.* —Dr. Charles Thaxton**

To teach Stanley Miller's experiment without also teaching the criticisms, is not good science. Dr. Thaxton says, "Criticism is, and has always been, an important part of science. Without criticism, speculation can easily be construed as knowledge. It is healthy for any theory to endure the fires of criticism, and it is considered a better theory when it survives. It is ideology that needs protection from criticism, not science."

Are There Suppressed Controversies Over Macro-Evolution?

Signs of Purposeful Intelligent Design

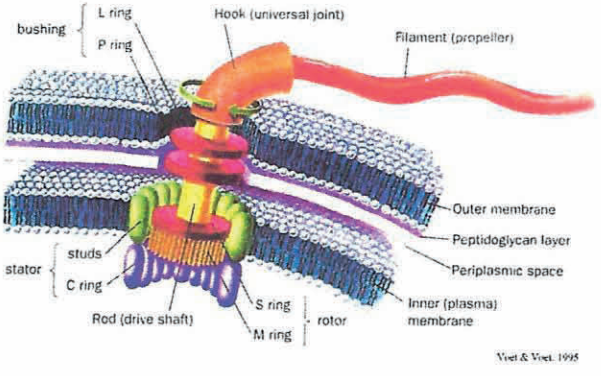


Why are some scientists skeptical that Darwinian processes can account for what they see, especially at the molecular level of life? Because in the past 50 years, science has discovered ... that the cell, the basis of life, is composed of machines, literally machines made out of molecules.
—Dr. Michael J. Behe

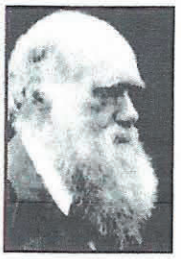
These machines, Dr. Behe, a biochemist, explains, are "irreducibly complex." They are a system consisting of a number of different parts that interact to produce a function and the removal of any one of the parts results in dysfunction. Dr. Behe explains, "the cell is chock full of molecular machines like [the bacterial flagellum]." The bacterial flagellum (pictured below) operates like an outboard motor. It has:

- a propeller which pushes against the water, pushing the bacterium toward food or away from danger as the rotor spins.
- a hook region which acts as a universal joint to attach the propeller to the drive shaft.
- a drive shaft is attached to a rotor, which uses a flow of acid from the outside to the inside of the cell.

The Bacterial Flagellum



- a part that acts as a stator to keep it clamped onto the cell membrane—just like an outboard motor has to be clamped onto a boat as the propeller turns.



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. —Charles Darwin, On the Origin of Species, p. 158

Like an outboard motor, the parts of the bacterial flagellum all work together to perform a task, but if the machine does not have all the parts, it is useless. Dr. Behe says, "Now, things like this are a problem for a gradual theory like Darwin's because the function of an irreducibly complex system only appears, essentially, when the system is complete. In intermediate stages, there's nothing for natural selection to select. And after it's finished, there's not a whole lot for natural selection to do. So things like this are challenges to Darwin's theory of gradual evolution." Charles Darwin himself said, "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."

The bacterial flagellum is one example from Dr. Behe's book, *Darwin's Black Box, The Biochemical Challenge to Evolution*. His book spurred many reviews from the scientific community. Though some disagree with him, a number of scientists—not just Intelligent Design advocates—agree that the micro-evolutionary processes cannot explain macro-evolution, especially in molecular biology. For instance, Richard Restak, writing for *Brain Work*, liked the book. Other scientists who recognize the macro-evolutionary problem include:

- Stewart Kauffman (a professor at the University of Calgary), who wrote in his book, *The Origins of Order: Self-Organization and Selection in Evolution* (published by Oxford University Press) in 1993, "It is not that Darwin is wrong, but that he got hold of only part of the truth. Regarding the answer to the sources of the order we see all around us, it overwhelmingly appeals to a singular force, natural selection. It is this single force view which I believe to be inadequate, for it fails to notice, fails to stress, fails to incorporate the possibility that simple and complex systems exhibit order spontaneously."

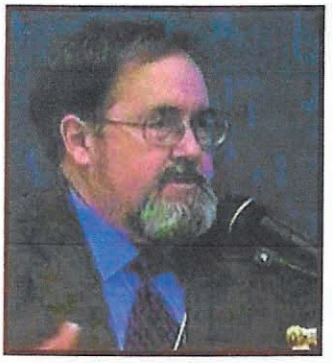
- Bruce Alberts, the editor of a 1998 science journal, "Cell," and President of the National Academy of Sciences, states, "We have always underestimated cells. Undoubtedly, we still do today. But at least we are no longer as naive as we were when I was a graduate student in the 1960s. ... The chemistry that makes life possible is much more elaborate and sophisticated than anything we students had ever considered.... Indeed, the entire cell can be viewed as a factory that contains an elaborate network of inter-locking assembly lines, each of which is composed of a set of large protein machines."
- James Shreeves, a science writer, is recorded in the *New York Times*, "Mr. Behe may be right that given our current state of knowledge, good old Darwinian evolution cannot explain the origin of blood clotting or cellular transport."
- James Shapiro, professor of microbiology at the University of Chicago wrote, "There are no detailed Darwinian accounts for the evolution of any fundamental biochemical or cellular systems, only a variety of wishful speculations."
- Franklin Harold (emeritus professor of biochemistry at Colorado State University) wrote in his book, *The Way of the Cell*, "We should reject as a matter of principle the substitution of Intelligent Design for the dialog of chance and necessity (Behe 1996); but we must concede that there are presently no detailed Darwinian accounts of the evolution of any biochemical system, only a variety of wishful speculations."

And if you look at it, the evidence suggests that, in fact, many systems in the cell show signs of purposeful Intelligent Design. **—Dr. Michael Behe**

- Jerry Coyne, professor of evolutionary biology at Chicago University wrote, "There is no doubt that the pathways described by Behe are dauntingly complex and their evolution will be hard to unravel. We may forever be unable to envisage the first proto-pathways."

The argument of Dr. Behe's book is, "what science has discovered in the cell in the past 50 years is poorly explained by a gradual theory such as Darwin's. And if you look at it, the evidence suggests that, in fact, many systems in the cell show signs of purposeful Intelligent Design."

Much of the Evidence Conflicts With Evolution Theory



There are discrepancies between Darwin's theory of evolution and the evidence from molecules, fossils, and embryos. Science students should know about them.
—Dr. Jonathan Wells

Dr. Wells, a molecular and cell biologist and author of "Icons of Evolution," explained that he does not disagree with *micro*-evolution, but the evidence does not support *macro*-evolutionary claims. Macro-evolution has been challenged in recent years by evidence in molecular data, the fossil record, and embryology.

Molecular Data

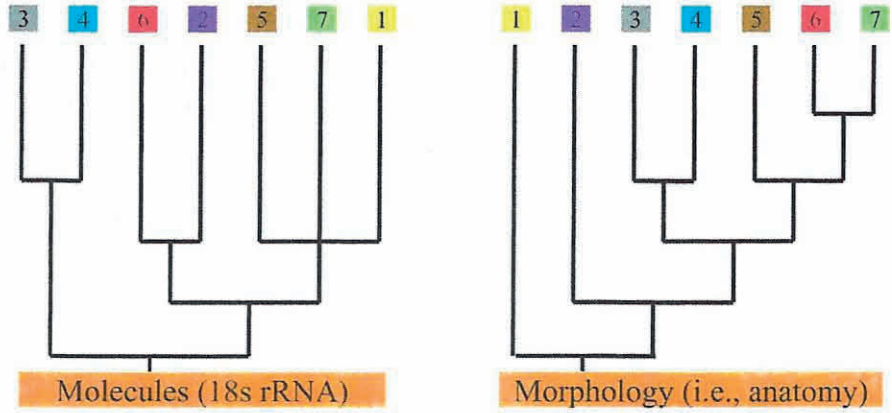
Evolutionary biologists initially expected that molecular data would confirm how all living things are related, but the data has become increasingly problematic for them. Dr. Wells said, "So the inconsistencies in the evolution tree based on molecular comparisons have to actually be explained away in the light of evolution theory."

When grouping phyla (body plans) by different molecules to show relationships, the results are often inconsistent with a single Tree of Life. Using the groups of animals (body plans or phyla) below, Dr. Wells showed, on the following pages, how evolutionary trees actually vary depending on the data used to construct them, even though the theory predicts that the trees should be consistent.

Some Major Animal Groups
(Body Plans or Phyla)

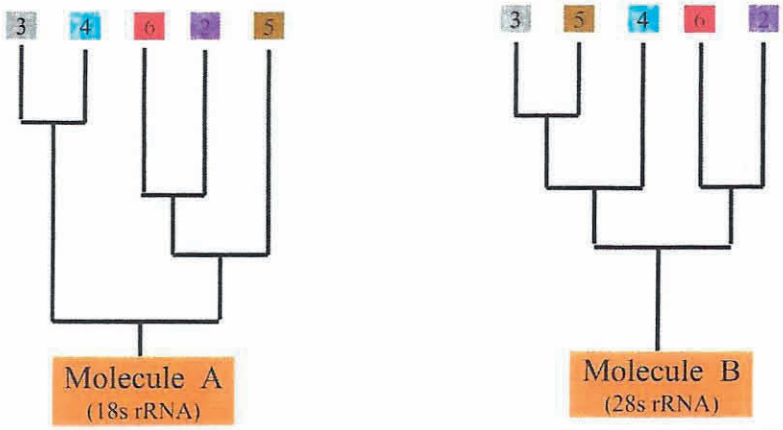
1. Nematodes (roundworms, hookworms)
2. Platyhelminthes (flatworms, tapeworms)
3. Echinoderms (starfish, sea urchins)
4. Chordates (fish, reptiles, mammals)
5. Mollusks (clams, snails, octopuses)
6. Arthropods (crabs, centipedes, insects)
7. Annelids (leeches, earthworms)

Evolutionary trees based on molecules are often different from trees based on anatomy.



Anna Marie A. Aguinaldo and James A. Lake, *American Zoologist* (1998)

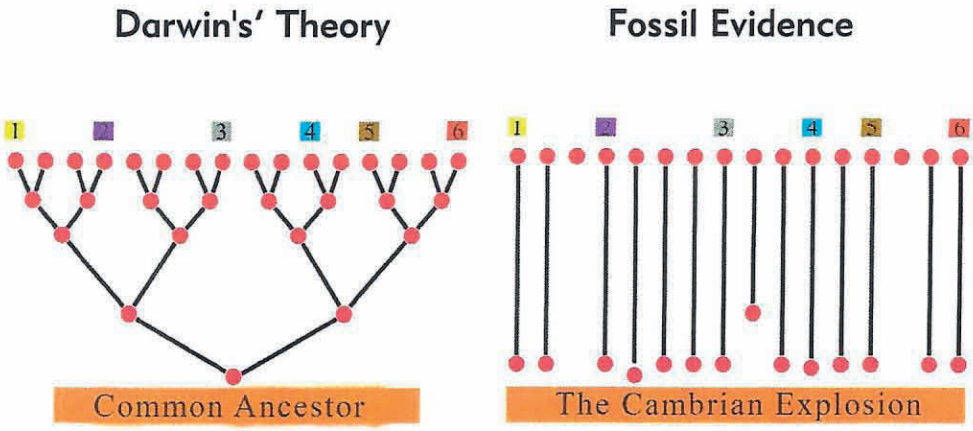
Evolutionary trees based on one molecule may be different from trees based on other molecules:



R. Christen, et al., EMBO Journal (1991)

Fossil Record

Darwin himself recognized that the fossil record presented a "serious problem" for his theory. If species gradually evolved from lower life forms into higher life forms, as his theory proposes, we should find a great number of fossils representing the in-between stages. However, in a rock layer called the Cambrian, most major animal groups ("phyla") appear suddenly, in a striking phenomenon known as the "Cambrian Explosion." The fossils represent fully formed and functional body forms rather than evolving forms. "Fossil records of the Cambrian Explosion," Dr. Wells explained, "certainly do not fit the branching tree patterns of Darwin's theory."



Embryology

Darwin considered the similarity of embryological form in organisms having significantly different adult forms as the best evidence for his theory that all are related to a common ancestor. To illustrate the point, Ernest Haeckel, a contemporary of Darwin's, made a famous drawing in 1868 to purportedly show the actual animals in early development. **Even though Haeckel's drawing was found to be a fraud soon after its publication, it still appears in some biology text books today as factual.**

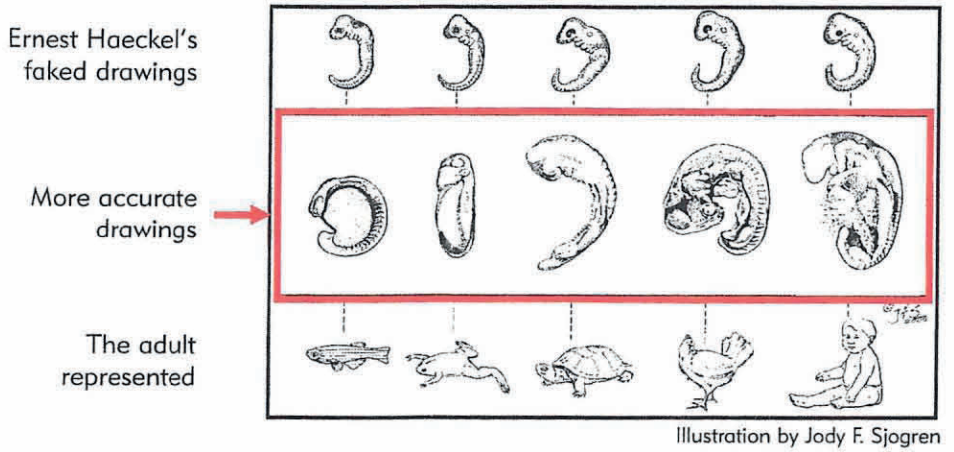
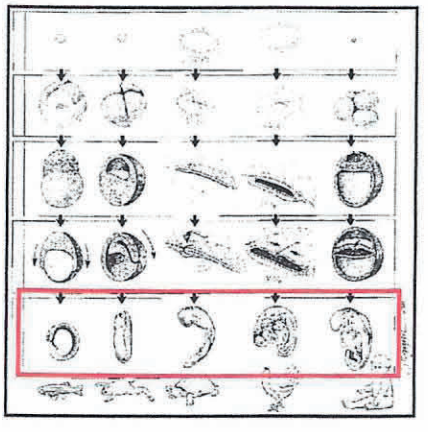
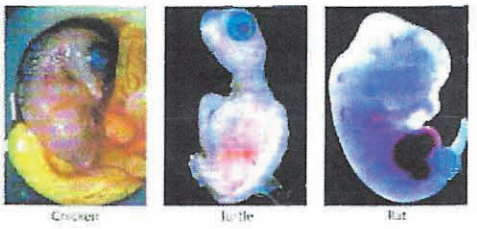


Illustration by Jody F. Sjogren



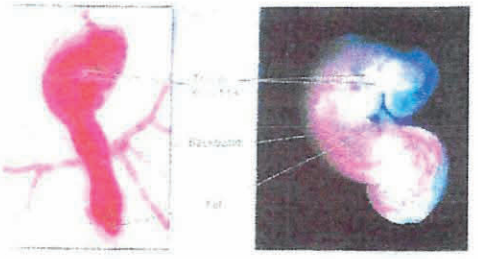
Haeckel not only misrepresented the evidence by distorting the drawings, he drew embryos at the midpoint of their development and completely omitted the earlier stages, which show great diversity.

Even in textbooks that no longer use Haeckel's drawings, embryo pictures are used to misrepresent the truth by omitting the earliest developmental stages and exhibiting only animals that look the most similar.



On page 385, K. Miller and J. Levine's textbook, *Biology* (2002), carefully selected this picture from conflicting evidence to make the following claim:

"In their early stages of development, chickens, turtles, and rats look similar, providing evidence that they shared a common ancestor."



On page 303, Campbell, Williamson and Heyden's textbook, *Biology: Exploring Life*, carefully selected this picture from conflicting evidence to make the following claim:

"Even at this early stage of development, the kinship of vertebrates is evident."

Dartmouth embryologist, William W. Ballard, *BioScience* 26 (1976): 36–39, says it's **"only by semantic tricks and subjective selection of evidence," by "bending the facts of nature," that one can argue that the earliest stages of vertebrate embryos "are more similar than their adults."**

Defining Science

"I would not like to see science become an enterprise where we're told at the outset what sorts of explanations we're supposed to find. For me science is an exciting, open ended search for truth. And the way that's conducted is through hypothesis testing. And I think the [Harris Group] view replacement definition here is much more in line with that than the definition of science as seeking only natural explanations," Dr. Wells stated. (The added emphases is mine)

The following is the definition of science used in the Harris Group Standards:

> "Science is a systematic method of continuing investigation that uses observation, ***hypothesis testing***, measurement, experimentation, logical argument and theory building to lead to more adequate explanations of natural phenomena. Science does so while maintaining strict empirical..."

The definition contained in the Krebs Group Standards are:

> "Science is the human activity of seeking ***natural*** explanations for what we observe in the world around us. Science does so through the use of observation, experimentation, and logical argument while maintaining strict empirical... Science is restricted to ...using only natural causes."

When the Krebs Group Standards limits the outcome to "natural explanations" it excludes all intelligent causation. So, when science asks the question, "Where do we come from?" the definition in the Krebs Group Standards permits only one answer: material or natural causes.

Dr. Wells compared the two definitions of science to other states in the United States. The definition used in the Harris Group Standards was found consistent with definitions used by those states. However, Dr. Wells found the definition in the Krebs Group Standards to be "absolutely unique"—no other state used that definition.

The Genome is an Instruction Manual Degraded by Mutations

Most of my career I've been an atheistic evolutionist. ... I had friends who basically said, "Have you looked at the other side?" And I said, "What other side?" **—Dr. John Sanford**

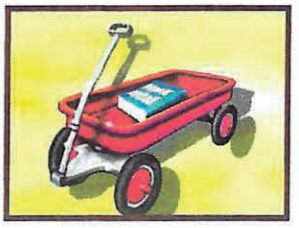
Dr. Sanford, a Geneticist, inventor of the Gene Gun, and author of *Genetic Entropy And the Mystery of the Genome*, confesses that he never actually applied evolutionary principles in his field of operational science. However, he said, "I would have argued that evolutionary theory is critical to being a good scientist."

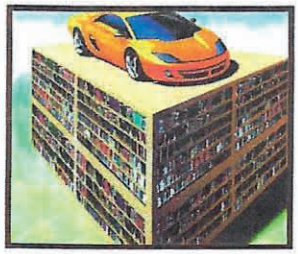
Dr. Sanford, like many scientists, honestly didn't know there was a legitimate position which contested evolutionary assumptions. Upon accepting his friend's challenge to look at the other side he found "a time of great intellectual excitement." Over the next several years Dr. Sanford basically reassessed everything he had believed. He went from believing evolution to believing theistic evolution to becoming a Bible-believing Creationist.

Dr. Sanford's research on the genome supports his current beliefs. He explained that the genome is like an instruction manual for the human body, though it specifies more information than that required to specify for any known human technology. Some geneticists refer to the genome as "the Book of Life."

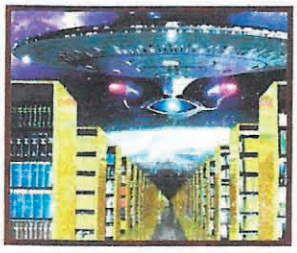
How does macro-evolution work in light of what they now know about the genome? Dr. Sanford used the following analogy to demonstrate how evolution would have to work. The genome is like an instruction manual and it evolved through mutations, which are like misspellings in the manual, and natural selection, which is like selective screening.

1. The evolution analogy begins with a little red wagon and the instruction manual that goes with it. The manual includes information on how to make the metal, the wheels, the rubber, the paint, and then how to assemble the parts.





2. Next we'll represent mutation and selection by introducing typographical errors into the information and selecting the purpose as superior performance. So, over time you might imagine that misspellings into the manuals have enabled the building of an internal combustion engine, power brakes, even robotic assembly lines and all the rest to create the specified complexity that goes into a flashy high-performance Corvette.



3. Then imagine more misspellings in the manuals and more selection to arrive at the final step—the Starship Enterprise. Starship Enterprise's fictional technology with its warp-speed engines and holodeck was the closest analogy that Dr. Sanford could think of to compare to the human body—but it's still not nearly as complex.

This is a reasonable analogy for describing the primary axiom of today's evolutionary theory. Now, here's the big question: Can the added misspellings into the little red wagon's instruction manual bring in the information that changes that manual into one that has the information to build and maintain a high-performance Corvette?

Consider the misspellings in the little red wagon's instruction manual. A single misspelled word is going to be incredibly trivial and very hard to select. Even if you introduce several misspellings it's not going to have any visible effect on its evolution into an automobile. However, it would be very difficult to read the manual because of corruption. How many misspellings would it take to improve the content? Dr. Sanford confirms, "That would be exceedingly rare, wouldn't it?"

This same scenario is true with genetics. There's a huge problem with the idea of mutations advancing a species—real genetics is concerned with them eliminating the species. For example, K. Higgins and M. Lynch reported in Proceedings of the National Academy of Sciences (98:2928-2933 in 2001), "We find that the accumulation of new, mildly deleterious mutations fundamentally alters the scaling of extinction time... causing the extinction of populations that would be deemed safe on the basis of demography alone."

Also, the notable evolutionist, Dr. Fred Hoyle, revealed in his book, *Mathematics of Evolution*, that the evidence does not support the idea that natural selection is able to advance or even preserve the species. He wrote, "The aging process shows, indeed, that statements one frequently hears to the effect that the Darwinian theory is as obvious as the earth going round the sun, are either expressions of almost incredible naiveté or they are deceptions..." He goes on to say, "When the environment is not fixed there is slow genetic erosion, however, which natural selection cannot prevent." And also states, "This long term inability of natural selection to preserve the integrity of genetic material sets a limit to its useful life...."

A significant number [of scientists], like myself, openly reject evolutionary theory. However, most of the scientists who see evidence of design, keep their heads down and their mouths shut.
—Dr. John Sanford

Because scientific evidence to support macro-evolution is lacking, Dr. Sanford believes that thousands of modern scientists, especially in the applied sciences, seriously question its validity. He says, "A significant number, like myself, openly reject evolutionary theory. However, most of the scientists who see evidence of design, keep their heads down and their mouths shut."

Historical Science Requires Critical Analysis

Origins science is inherently controversial because it is historical science. Dr. Sanford said that it is very important to distinguish historical science from operational science. Operational science requires reproducibility and historical science is not reproducible. He illustrated the difference between operational and historical science using the following example:

Some people say that Josephine poisoned Napoleon Bonaparte. They say, "Look, we have scientific proof that she did it because we found arsenic in the bones of the person who's buried in Napoleon's grave."

Dr. Sanford explained that when we test for arsenic in the bones, we are doing operational science. We can send the bones to a number of different laboratories and they'll all give us a fair agreement about how much arsenic is in those bones. Operational science is reproducible and everyone can agree to it.

But when we say Josephine poisoned Bonaparte we're doing historical science. Dr. Sanford asked:

1. Are you sure that it was Napoleon who was buried in "Napoleon's grave"? Given the importance and political intrigue associated with Napoleon, it may not be. Dr. Sanford explained that is an inference.
2. Was Napoleon exposed to arsenic by accident or on purpose? Again, we don't really know. That, too, is an inference.
3. If Napoleon was exposed to arsenic on purpose, did his wife or some one else give it to him, or did he give it to himself?

Dr. Sanford showed that there is a great deal of inference to this story.

So you can see that it is operational science to say, we found bones and we found arsenic in the bones in the grave of Napoleon. It is historical science that says Josephine poisoned her husband. Dr. Sanford explains, "It's incredibly important to distinguish these two things."

Dr. Sanford said, "If you are a novelist and you wrote about the story of how Josephine poisoned her husband, that's called historic fiction." He went on to say, "I'm seeing a lot of novels being published today by evolutionary scientists." The problem is historical science can easily blur into historical fiction because of lack of accountability. That is why it is so important to allow critical analysis of evolutionary theory in the classroom.

Evolution's Report From the Lab

You can do cool stuff evolving bacteria.
—Dr. Ralph Seelke

Dr. Seelke, Professor of Biology at the University of Wisconsin-Superior, is involved in experimental evolution. His interest is in determining by experimental methods, the capabilities and limitation of the evolutionary process. He also actively researches experimental evolution and teaches courses in cellular and molecular biology.

Dr. Seelke primarily uses bacteria in his experiments. Bacteria can literally evolve for thousands of generations in short periods of just months or years. It's possible to model trillions of organisms and literally tens of thousands of generations. Because bacteria have been the focus of much research, scientists can often track some of the changes that occur as the organism evolves. So it's possible to really see what micro-evolution can do. However, Dr. Seelke says that students need to **"understand the large difference between being able to do that and being able to produce new body forms ... [or] even the other modest steps that would be needed in the macro-evolution scenario."**

A particular interest of Dr. Seelke's is whether bacteria can evolve a new function when multiple independent steps are required. This interest was spurred by Michael Behe's book, *Darwin's Blackbox, The Biochemical Challenge to Evolution*. Dr. Behe asserted in his book that within a cell there are molecular systems consisting of a number of different parts that interact to produce a function. If all the parts are not present the system fails.

Dr. Seelke has developed a set of bacteria in which one, two, three, or four events are required for the evolution of a new function. And he is in the process of testing whether those requiring multiple events can, in fact, evolve a new function. He reports, "My results so far indicate that they cannot." The experiments show that a population of bacteria can eventually correct one error in a knocked out gene sequence and thereby return function to that gene, but so far they have not experimentally demonstrated the capacity to cure two errors necessary for function.

He reported that scientists have produced "very interesting changes in existing

body plans, such as flies with four instead of two wings, and flies with legs growing out of their heads instead of antennae. All these changes are detrimental; the extra pair of wings do not work and having legs growing out of your head is not exactly an evolutionary step forward." These are examples of micro-evolution; macro-evolution has not been observed in the laboratory, though Darwinists infer it.

Dr. Seelke explains the reason it's inferred comes from an assumption that nature is all there is. Therefore, some believe, "it must have worked even though it doesn't look like it could work." Dr. Seelke exclaims, "If it's a bad explanation, go back to your assumption. You won't work beyond that assumption." The scientific name for the assumption is "methodological naturalism" or "scientific materialism."

According to Dr. Seelke, learning how micro-evolution works can be exciting. When he teaches his students how bacteria use lactose, he involves them by asking, "What would you do if you were a bacteria?"

They might answer, "Well, if you've got lots of other sugars around (and lactose is hard to use) I'd use that first."

Dr. Seelke, "Well, that's exactly what the bacteria do. If you have a bunch of genes that are needed to make lactose, when are you going to turn those on?"

"Well, let's turn them on when the glucose runs out."

"Good idea. That's exactly what the bacteria do."

[Scientists] have produced very interesting changes in existing body plans, such as flies with four instead of two wings, and flies with legs growing out of their heads instead of antennae. ... the extra pair of wings do not work and having legs growing out of your head is not exactly an evolutionary step forward. **—Dr. Ralph Seelke**

Dr. Seelke points out that teachers don't have to say that bacteria are rational or designed when students recognize these characteristics. If teachers want they can quote the renowned Darwinist, Richard Dawkins, and say, "things simply appear designed." But please don't squelch the student's enthusiasm to put it to the test.

Evolution by Design

So I think I bring a little bit of a different perspective to this whole issue. Because I'm actually trying to change biological systems by design and I think that gives me a perspective on how hard it is to get what you want without getting a lot of side effects.
—Dr. Robert DiSilvestro

Dr. DiSilvestro, a Biochemist and Professor of Nutrition at Ohio State University, designs pharmaceutical and nutraceutical interventions that affect biological processes for a desired purpose.

"My research has evolved over the years but with design," Dr. DiSilvestro jokes. Even though he and his research team have studied life processes, it's hard to get what they want without getting bad consequences when changing biological systems. He says that the idea that Darwin's random chance processes could do a better job than their planned processes is rather hard to believe.

We've all heard the optimistic Darwinian comment that given enough time, the unlikely becomes likely. Dr. DiSilvestro says, "Well, all I can say is given enough time there's much more of a chance that things can go wrong..." Information in biological systems is incredibly complex.

How important is Darwinism to applied science? Dr. DiSilvestro said, "I've read hundreds of biomedical research papers, I've been to hundreds of talks, and evolution is only brought up once in a great, great while. For the most part, it's never even brought up.... "In reality, there are a handful of people that have really gone through the Darwinian ideas, [and] have come to the conclusion that they make compelling sense. There are a few, like myself, who questioned those ideas and have come to the conclusion that they make compelling nonsense. But the overwhelming majority of scientists have never even thought about the question."

Red Flags in the Laboratory

I was raised in biology and chemistry. With regards to evolution, I never questioned evolution. It was in the textbook, I was taught that... I just never questioned it. It never came up, until later in my life I started getting questions about it and my research started bringing up some red flags.
—Dr. Daniel L. Ely

Dr. Ely, Professor of Biology at the University of Akron, Akron, OH and a medically trained cardio-vascular physiologist, has researched high blood pressure for the past 30 years. His field has led him into the areas of gene therapy, gene targeting, molecular biology, and the genetics of animal breeding.

The area of molecular genomics, according to Dr. Ely, "is just beginning to unravel some of the mysteries of life." Molecular genomics is the study of the functions of the many newly discovered genes: (1) as they apply to basic function, (2) interactions of genes and proteins, and (3) mutations which can cause disease processes.

Before Dr. Ely got involved in this study he never questioned evolution. His research team was focused on "what causes high blood pressure," they weren't looking for difficulties for evolutionary theory—it was "totally a secondary effect." Following are three discoveries that Dr. Ely witnessed which are inconsistent with key predictions of evolutionary theory:

- We once embraced a dogma that one gene produces one protein. Now we know that one gene can produce many proteins through mechanisms in the nucleus.
- The majority of DNA we once thought was junk with no function, seems to have function.
- Ancestral trees in evolution based on fossil structure, called morphology—do not match with ancestral trees based on molecules or DNA and proteins. Dr. Ely points out that the textbook examples of evolutionary trees "look quite nice as you develop from a longer limb or something develops into a wing and so forth. However, when you look at the molecules themselves they're very inconsistent."

The Need To Think Outside the Box

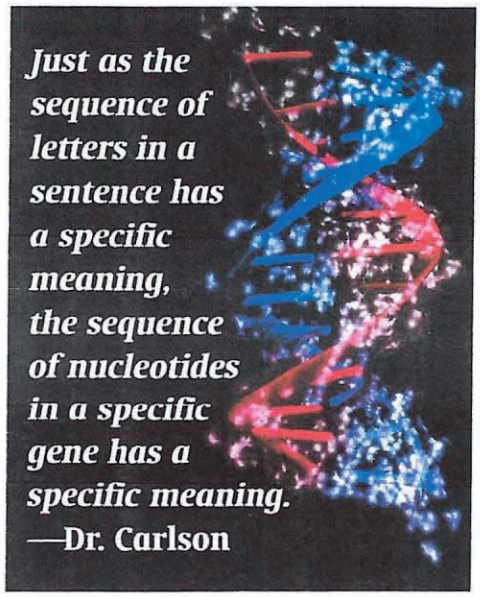
Science should be in search of the truth and scientists, teachers, and students should be able to follow the evidence wherever it leads. It's not, in my opinion, appropriate to force all evidence into a 150-year-old Darwinian box. We need both teachers and students that are [able to] critically evaluate evolutionary theory and think outside the box.
—Dr. Russell W. Carlson

Thinking outside the Darwinian box is not a well accepted idea in mainstream science. Dr. Carlson, professor of biochemistry and molecular biology at the University of Georgia, explained that the editor of a peer review magazine, "Biological Society," printed Dr. Stephen Meyer's article on biological information. Dr. Carlson said, "No one really criticized the content of the article—they were criticizing the fact that it was published in a peer review journal." He then explained that these comments reflected the commonly held view stated by a famous evolutionary biologist, Theodosius Dobzhansky, "Nothing in biology makes sense except in the light of evolution." Dr. Carlson said, "And when you use that as a filter for science articles that are reviewed, then the peer review process becomes converted into a peer pressure process."

The Harris Group Standards has also seen that kind of peer review. Several science organizations objected to the proposed science standards, but their reasons failed to detail any substantive rational for their objections. One such example was from criticism to the following sentence addressing the "biological information" in the DNA: "The sequence of the nucleotide bases within genes is not dictated by any known chemical or physical law." The reviewer objected and said, "Natural selection is the law that dictates the sequence."

Dr. Carlson pointed out the problem with this Darwinian thinking: natural selection cannot dictate the sequence, because "the information has to already exist in order for there to be something for natural selection to select."

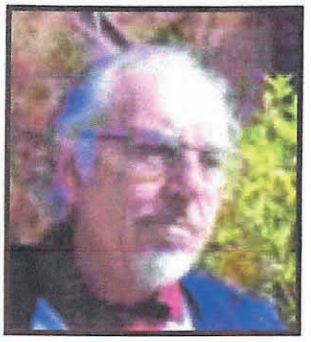
Dr. Carlson explained the "information" this way: "A gene is a specific sequence of nucleotides that dictates the order of amino acids in a protein and it is the precise order of these amino acids in the protein that determines its function. For example, insulin is a small protein with a specific function required for the regulation of glucose levels. This function requires a specific alignment of amino acids which is dictated by a specific sequence of the nucleotides in the gene for insulin. That specific sequence is not determined by the attractive or repulsive forces of the nucleotides. The nucleotide sequence of a gene is information; information that results in a specific function.



"Just as the sequence of letters in a sentence has a specific meaning, the sequence of nucleotides in a gene has a specific meaning.... There are starting points, like capital letters at the beginning of a sentence, as well as stopping points, like periods. The information in the nucleotide sequence of a gene can be written in ink (atoms of carbon) on a piece of paper, on a computer, or 'written' in the arrangement of atoms in the sequence of nucleotide bases. The information cannot be equated with the matter and energy that comprise the nucleotides themselves any more than the meaning of a sentence can be equated with the ink with which it is written."

There's a fascinating world of information within the nucleotide waiting to be explored by people who can think outside the box.

Evolution Fails To Explain Form



The truth is that man has remained what he had always been. At the parting of ways the molecules and chromosomes of human beings were already there.

—Dr. Giuseppe Sermonti in his book, *Why is a Fly Not a Horse*, on page 77

Dr. Sermonti is a retired Professor of Genetics and discoverer of genetic recombination in antibiotic producing Penicillium. Because of his strong Italian accent, the transcriber for the Hearings did not record his testimony. So, I obtained a description of his key testimony from John Calvert.

The provocative title to Dr. Sermonti's book identifies a key mystery unsolved by modern evolutionary theory—the origin of organismal forms. Why is the form of a fly different than that of a horse? The recent mapping and comparisons of entire genomes show that the number and differences in the genes that comprise only a small portion of the genome are similar both in content and in number. This suggests that extraordinary differences between the fly and horse is not attributable only to genes, but lies elsewhere, perhaps in the 98% of the genome previously thought to be junk.

Dr. Sermonti says that there was hope that evolution would find support in mapping chromosomes. However, the studies have not revealed solid correlation between chromosome numbers and the evolutionary belief of kinship. For example, a donkey has 31 chromosomes, a horse has 32, and a zebra, which is believed to be closely related, has only 16.

A major problem for evolutionary theory is that mutations are almost always harmful and natural selection can only conserve already present information—it cannot produce a new form. As he states in his book on page 56, "unless there is a preestablished design, nothing—nothing at all!—can come into existence."

Does Origins Science Impact Religion and Philosophy?

Ethics, Theology, And Politics Are At Stake

The very power of methodological naturalism depends on the fact that teachers are dealing with a student: a student who thinks he is 'doing' his 'Science' and has no notion that ethics, theology and politics are all at stake.
—Dr. Angus J. L. Menuge, an adapted quote from C.S. Lewis

Dr. Menuge, a professor of philosophy and author of "Agents Under Fire," explained the danger of methodological naturalism in our schools. To understand what Methodological naturalism is, one must first understand what philosophical naturalism is.

Philosophical naturalism "is a doctrine that cause and effect laws, [like] physics and chemistry, are adequate to account for all natural phenomena and that teleological conceptions of nature are invalid," according to the Webster's Dictionary. In other words it is the belief that everything that exists (including apparent design, mental capacities, emotions, instincts, etc.) can be explained by undirected material causes (matter, energy and the forces). It is a philosophy that rejects a creative God or any intelligent causes to explain natural phenomena.

Methodological naturalism "is a practical rule of scientific method, which says that scientists should proceed as if philosophical naturalism is true," explained Dr. Menuge. Methodological naturalism requires scientists to limit themselves to materialistic explanations. Since design requires a designer, they assume that any appearance of design in nature is an illusion. For example, noted Darwinist Richard Dawkins, wrote in his book *The Blind Watchmaker, 2nd ed.*,

> "Biology is the study of complicated things that give the appearance of having been designed for a purpose … Natural Selection, the blind, unconscious, automatic process that Darwin discovered … has no purpose in mind. If it can be said to play the role of watchmaker in nature, it is the blind watchmaker."

The following are statements of methodological naturalism in the Krebs science standards (the added emphases are mine):

1. Science is the human activity of systematically seeking *natural explanations,*
2. As it's practiced in the late 20th and early 21st centuries, science is restricted to explaining only the natural world *using only natural causes.*
3. ...scientific knowledge is knowledge of the *physical world in terms of matter, energy and forces.*

One does not find the words "methodological naturalism" in the science standards, but the concept is present. In fact it would be better for the students if they were told outright that their education was slanted by methodological naturalism. If methodological naturalism was openly discussed with the students, then they could at least understand there is another perspective which may include additional evidence. As it is, they don't even know that they don't know the whole story.

Methodological naturalism should be removed from the Kansas Science standards because it prevents students from being properly informed on matters relating to the scientific controversy.

Dr. Menuge summarizes the controversy as "Darwinian evolution claims all apparent design in nature is an illusion." Whereas Intelligent Design argues that "at least some of the design in nature is real."

Methodological naturalism requires scientists to proceed as if there is no design in nature, and it prevents the Darwinian claim that design is an illusion from being tested. The scientific evidence that supports Intelligent Design and the scientific evidence that is problematic for evolutionary theory are not allowed into the classroom.

If, in a criminal investigation, known evidence is withheld, it would be a failure of full disclosure. It's like what the Enron Company was found guilty of—they provided only positive financial indicators and allowed people to come to a faulty conclusion.

Dr. Menuge further clarifies, "It's what's known in logic as a 'fallacy of suppressed evidence,'" A fallacy of suppressed evidence is making a conclusion seem much more certain than it actually is by only presenting that evidence which supports the conclusion and all the while suppressing the evidence which points in a contrary direction.

Methodological naturalism should be removed from the Kansas Science standards because it fails to be neutral and non-ideological by advocating a single perspective on a controversial issue.

The current science standards state that they infer the "best current explanation" in origins science. However, as Dr. Menuge says, "Without open and vigorous competition, the 'best' explanation considered need not even be a good one. If the range of admissible explanations is artificially restricted, it is possible that the truly good explanations are all excluded, making the best competitor explanation simply the 'best of a bad lot.'" Methodological naturalism restricts the competitors to only those that are 'naturalistic.'

Dr. Menuge explains that when it comes to origins science there are a limited number of competitors, "Either life arose by chance, natural necessity (self-organization), a combination of chance and necessity, or via the agency of an intelligent being." There are only two substantially different competitors—naturalistic explanations or intelligent agency.

The "intelligent being" perspective in origins science is currently disqualified from the competition, although intelligent design can be scientifically detected. Other areas of science such as archaeology, cryptography, criminal investigation, and the search for extraterrestrial intelligence recognize intelligent agents have the capacity to redirect the normal course of nature. These sciences detect intelligence using the same scientific definitions that can be used in origins science.

As a result of disqualifying the competition, Darwin's claim that the apparent design in living systems is an illusion, is no longer a testable, scientific theory. Darwinism is actually a testable theory, but methodological naturalism prevents it from being tested and forces it to be treated as an unquestionable ideology.

Methodological Naturalism should be removed from the Kansas Science standards because it fails to be "secular" (as defined by the National Assessment Governing Board) by favoring naturalistic religions over non-naturalistic religions.

Dr. Menuge explained "It is often supposed that a belief-system qualifies as a religion only if it involves belief in God, belief in the supernatural, or subscription to revealed texts. In fact, this is not the finding of authorities in philosophy of religion or of the U.S. judicial system." One example is the *Smith v. Board of commissioners of Mobile County, 655 F.Supp. 939 (S.D. Ala. 1987)*. It states:

> "For purposes of the first amendment, secular humanism is a religious belief system, entitled to the protections of, and subject to the prohibitions of, the religion clauses. It is not a mere scientific methodology that may be promoted and advanced in the public schools."

Religions such as Secular Humanism, Buddhism, or Atheism are based on Naturalistic beliefs; religions such as Christianity, Judaism, and Islam are based on non-naturalistic beliefs. Methodological naturalism suppresses the non-naturalistic perspective and favors the naturalistic.

The religious implications of Darwinism, if it's taken to be the full account of everything that we observe, is that "nothing is designed or has a purpose, that human beings in particular are just occurrences, we're products of this random process and that we have no preordained value, meaning, or significance," stated Dr. Menuge.

Unfortunately, science presents itself in modern culture as the prime means of discovering objective truth. Dr. Menuge explains that because students do not realize that methodological naturalism is applied, they assume "that science has discovered that certain religions are lacking in objective evidence." Consequently, it influences the students' beliefs which are foundational to one's ethics, theology and politics. This happens without the student even realizing there is any validity to an alternative view.

For purposes of the first amendment, secular humanism is a religious belief system ... It is not a mere scientific methodology that may be promoted and advanced in the public schools.
—Smith v. Board of Commissioners of Mobile County

To remove the bias of methodological naturalism, Dr. Menuge says we must "disclose where an assumption is made, what its consequences are, and then allow discussion of the arguments for and against."

A Science Built On Assumptions Belongs in Philosophy

The debate over the Kansas state science standards is NOT between science and creationism or between science and Intelligent Design. The debate is between science (the Harris Group Standards) and methodological naturalism (the Krebs Group Standards).
—Dr. John M. Millam

Dr. Millam, a theoretical quantum physicist, has a special interest in the historical origins of science. He set aside time from his work to testify at the science hearings because he felt, "It is my duty as a scientist to defend the practice of good science." His concern stems from the definition of science in the Krebs Group Standards, which he says is not science but methodological naturalism.

What is science?
"Science in the broadest sense," states Dr. Millam, "is simply investigation of the natural world." Modern science, which developed in 16th and 17th centuries in Europe, was based on:

- an emphasis on testing, experimentation, and falsification
- use of scientific method
- use of Ockham's razor (or principle of simplicity)

On the other hand, methodological naturalism is not science, but a philosophy. Dr. Millam then explains, "Immanuel Kant (18th century) was a major driving force for the development of methodological naturalism." He made three claims:

- Infinite static universe (uncreated universe)
- Copernican principle (no design in the universe)
- Natural process evolution (proto-Darwinism)

These assumptions, which hinder investigation and promote ignorance, are the pillars for methodological naturalism. Methodological naturalism does not belong in the science classroom—it belongs in the philosophy department.

Darwinism Has Become a Worldview

The idea that natural selection provides a complete explanation for not only living organisms but human beings and all of our characteristics, I think, is simply false. I think it's a philosophical framework. It's a worldview. It's metaphysics, but it's not an empirical claim that can be shown or demonstrated. **—Mr. James A. Barham**

Mr. Barham, an independent Philosopher of Science and author of numerous articles on the Philosophy of Science, focuses on recognizing what's observable and what's inference. Though he is a naturalist and believes that macro-evolution is a fact, he concedes that it is an inference and not something we can observe.

On the other hand, he recognizes that natural selection does not explain how macro-evolution works, particularly in light of the "functional coordination" which we can observe in nature. He says, "The basic problem is all [natural] selection can do is winnow. It can't produce anything. So the question is, 'Where does the coordination come from in the first place?'" However, he believes that they will find a natural explanation for macro-evolution and that we don't need to conclude that there must be a "mind external to the universe." "I, as a naturalist," Mr. Barham said, "believe that there will be an answer found, but that's a kind of faith that I have." He mentions some work being done in condensed matter physics "to get coherence from internal law-like processes, but not random processes."

Darwinism is widely accepted by scientists yet it is an inference and not observable, so it may be called a "comprehensive doctrine." Based on that idea Mr. Barham refers to John Rawls (Nagel, 2003) and suggest that it would be "an abuse of power for any government to enforce a comprehensive doctrine upon its citizens." Then he concludes, "If Rawls is right, then one can only conclude either that other metaphysical and religious worldviews ought to be taught in our public schools alongside Darwinism, or else the latter ought not to be taught at all."

Public Education Needs to Take Your Values And Views Seriously

A few years ago we thought that it was all right to leave blacks and women out of the cultural conversation. I think we now all realize that's wrong, but what we still haven't come to realize is it's wrong to leave religious voices out of the discussion. The problem is the same; it's disenfranchising people. It's saying, "We're not going to take your values and your views seriously."
—Dr. Warren A. Nord

Dr. Nord, a Professor of Education at the University of North Carolina at Chapel Hill, is an advocate for liberal education. A liberal education introduces students to the major ways humankind has developed to make sense of the world. It includes conservative, liberal, secular, and religious views.

The current problem is that our education only introduces students to secular ways of making sense of the world, leaving religious ways out of the discussion, i.e. science is shaped by methodological naturalism, as Dr. Menuge explained. Dr. Nord says "... by excluding design explanations, methodological naturalism undercuts evidence for theism." This disenfranchises people, which is a civic justice problem.

Our failure to provide a liberal education not only creates a civic justice problem, it also results in a constitutional problem. In 1947, in Everson versus the Board of Education, Justice Black said, and the Court has agreed ever since, that the state must be neutral between religion and non religion. Dr. Nord explains how that is applied, "There isn't any such thing as a neutral point of view. Rather, neutrality must mean fairness—taking different people, different cultures, [and] different traditions seriously."

Our failure to provide a liberal education "short circuits critical thinking within science." A liberal education enables students to think critically about alternative

ways of making sense of the world and living their lives. Dr. Nord adds, "Questions relating to evolution and origins (among many others) are of sufficient importance that students should be informed about them."

The purpose of upper level undergraduate science courses is to train scientists. However, that is not the purpose in high school or even in undergraduate school. Dr. Nord explains that the purpose of a liberal education is to "educate students by locating them within historical and contemporary cultural controversies about how we understand nature." This perspective also agrees with the National Science Standards which says that science should be studied in historical and cultural context.

Dr. Nord also explains that for our public school teachers to provide this type of education, "they need substantial help by ways of training and resources. They also need to be protected from public pressures to influence their teaching on questions of great controversy."

Dr. Nord concludes, "Now, to wrap up this part, where this leads is to the idea that public education must take religion seriously, must include religious voices in the conversation, not just in the context of the distant past, but now as live alternatives, as a matter of liberal education, as a matter of civic justice, as a matter of constitutional neutrality."

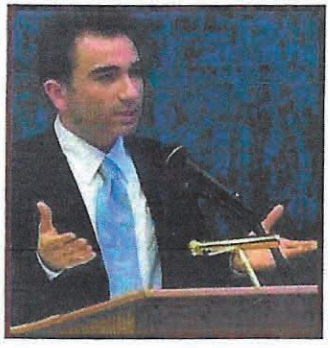
Methodological Naturalism Argument in the Krebs Group Standards

It is suggested that the following statement from the Krebs Group Standards demonstrates that it doesn't advocate methodological naturalism: "There are many issues which involve morals, ethics, values or spiritual beliefs that go beyond what science can explain but for which solid scientific literacy is useful."

Dr. Nord's response:

1. "The fact that there's a single statement like that in the [Krebs Group Standards] doesn't mean that everything else in the report doesn't undercut that particular statement."
2. The idea that science can't tell us anything about morals, ethics, values, or spiritual beliefs, but it can tell us everything about the world, about nature, and about reality is believed by many intellectuals and others in the 20th Century. However, their conclusion is morality, values and ethics don't have anything to do with the world—they're things that we make up.

The Far Reaching Implications



[The Kansas science standards are] very important for me because I think this is an issue which will have implications beyond Kansas, beyond even the United States. It will have an impact in the minds of the people, and it will create a sense of what America is in the minds of people.
—Mr. Mustafa Akyol

Mr. Akyol is an internationally known science writer and Turkish Muslim journalist who writes against Islamic extremism and terrorism. He was previously involved with an Intelligent Design organization in Turkey and he supports the Harris Group Standards. While speaking at a Turkish university he quoted Dr. Michael Behe and someone questioned him as to why he'd quote an American scientist saying, "Well, aren't all of them materialistic?" Mr. Akyol replied, "No. As you will see, some of them are not."

Then Mr. Akyol said to the science hearing's audience, "And I just sensed that that started a change in his perception about America."

Muslims have formed opinions about what Americans are like from the media. When he was a child there was some positive perception of America. The TV show, "Little House on the Prairie" spurred positive opinions. He said, "Muslim culture with families all loved it, and they said, 'Oh, look at these American values, and they're so noble values,' and they just admired it. And now times have changed. Now they see MTV, they see Hollywood, and I mean that's, of course, materialism in a cultural sense, in terms of hedonism and just caring about profit and don't have any ethical values."

Materialism, Mr. Akyol explains, also has a philosophical side, which we call naturalism. It is the idea that nature is all there is. When that philosophy—which has no scientific justification—becomes the dominant force in science education in the United States, it is more evidence that Americans are simply materialistic.

"What is true, what is needed," Mr. Akyol explains, "is just a science education which doesn't try to indoctrinate kids, children, with any philosophy. That's good, that's necessary for science education, and it's also necessary for just getting rid of some stereotypes, getting [rid of] misconceptions about the United States."

Students Need To Understand How To Test Controversial Historical Hypotheses

[Darwinian evolution is] a historical scientific theory...but it also is a scientific theory that raises larger philosophical issues. The theory of intelligent design...also is a historical scientific theory that raises larger philosophical implications, so the two are equivalent in that respect. **—Dr. Stephen C. Meyer**

Dr. Stephen C. Meyer, a philosopher of science and the director and senior fellow of the Center For Science and Culture at the Discovery Institute in Seattle, was unable to attend the hearings in person so was interviewed telephonically with a conference speaker phone.

Dr. Meyer's doctorate dissertation focused on the methodology of historical sciences and the history of origin of life research. He has published on both the scientific and the philosophical aspects of the issue of the origin of life. He explained that origins science is historical. Historical sciences deal with remote historical events. They don't formulate laws and describe repeating patterns in nature like experimental based sciences.

Dr. Meyer explained that when you're reasoning in historical sciences, you reason from clues back to causes. He said, "You can't observe the cause itself directly, but you try to infer what it was from the evidence left behind." He refers to the noted Darwinist, Stephen Jay Gould's explanation, "In the historical sciences you must infer history from its results."

It is often alleged, explained Dr. Meyer, "that historical theories cannot be tested because the events cannot be replicated in the laboratory under controlled conditions." Though it is true they can't be tested in the laboratory, it doesn't mean that hypotheses in the historical sciences can't be and are not tested. He says, "In fact, they are tested by comparing the explanatory power of the hypothesis against its competitors."

Currently, evolution is not tested and is "presented in an uncritical and dogmatic way in most textbooks," Dr. Meyer explained. This could cause students to "infer that it is an uncontested truth in science." So, you can see how important it is to allow historical sciences to be tested. This is especially true of origins science because it raises larger philosophical implications.

Many other witnesses confirmed Dr. Meyer's testimony. The testimonies show that the historical nature of chemical and biological evolution makes it inherently controversial from a scientific standpoint. Explanations are controversial because they substitute imagination and biased assumptions for gaps in the data. This yields differing interpretations and conflicting opinions about the cause of events. The scientific controversies are heightened because they unavoidably impact belief systems affecting religion, ethics and morals.

"You are on a fact finding mission," Dr. Meyer challenged the Board of Education members. He explained that it is the Board's job to determine whether or not there is legitimate scientific criticism of evolution theory that is absent from existing textbooks.

Speaking from his research work, Dr. Meyer said, "I certainly think there is a tremendous amount of criticism of the theory that students should be permitted to know about." Dr. Meyer co-edited and contributed several chapters to a book called *Darwinism, Design, and Public Education*. The book includes a chapter called "Teaching the Controversy," which is a model of scientific education taught objectively. Put simply he recommends that students:

- learn the neo-Darwinian theory and the standards called biological evolution
- learn the strengths of the neo-Darwinian theory
- learn the scientific weaknesses of the neo-Darwinian theory

Teachers should also be permitted to discuss alternative theories such as self-organization, structuralism, intelligent design, or punctuated equilibrium. He also stressed that the mode of instruction be based on evidential concurrence. "That is to say the starting points should be the evidence that scientists are using to support or challenge the theory."

Dr. Meyer reviewed the Harris group indicators relating to historical science and said that it "is a rational statement of precisely how historical science hypotheses are tested..."

Are Students and Teachers Repressed By Evolution Dogma?

The Cost of Giving Students Information

I gave a presentation to our honors forum entitled "Critical Thinking on Evolution."... The next day ... my boss, the vice president of Academic Affairs, came in and told me that I would not be serving as division head the next year. **—Dr. Nancy Bryson**

Dr. Bryson, a physical chemist, had been division head of Science and Mathematics at Mississippi University for Women for a year and a half. When the school offered the annual extracurricular honors forum, which allowed faculty the opportunity to present on topics of interest to them, she submitted the title of her presentation, "Critical Thinking on Evolution."

Right after the talk, which focused on the origin of life scenarios and the fossil record, a professor read a prepared statement to the assembly. The gist of the statement was, "This is just religion masquerading as science." Students had warmly received Dr. Bryson's presentation and were appalled at the professor's diatribe against her.

The next morning when Dr. Bryson was advised that she was being demoted, she was also given the impression that she likely would not be asked to return after the end of the school year. No explanation was given for the change in her status.

The American Family Association picked up the story and there was a big outcry in the State of Mississippi about the whole issue. So, after about three weeks of public outcry over her treatment, the immediate decision to demote Dr. Bryson from her position as division head was reversed.

However, when Dr. Bryson's faculty evaluations came out she received a very negative evaluation and was demoted. This happened in spite of the fact that she had obtained for the school the only grant that anyone had there, had written all the reports, managed the budget and kept it in the black. She also had been a past recipient of several teaching awards and a faculty member of the year award. Eventually the circumstances at the school forced Dr. Bryson to look elsewhere for employment.

Dr. Bryson also said that after her incident, she had students come to see her after

hours to talk. They complained that they too, weren't allowed to challenge evolution theory or even to ask any questions about it.

Concerning the Science Standards proposed by the Harris Group, Dr. Bryson expressed her support. She appreciated the additional information presented on evolution and particularly the information about the Cambrian Explosion, which is evidence from the fossil record of the sudden appearance of many fully formed and functional body forms. "The Cambrian Explosion," Dr. Bryson commented, "is often not mentioned in general biology textbooks at college level."

"Why," she asked, "wouldn't we present all the information to students?" Dr. Bryson explained that in general chemistry they always present the pros and cons of chemical binding theories. She went on to say, "If you want to have a bunch of robots as your students, then you just feed them only the data that you want them to have. But if you want them to be critical thinkers, you give them all the data and let them decide."

Harris Group Standards

Grades 8–12, Standard 3, Benchmark 3

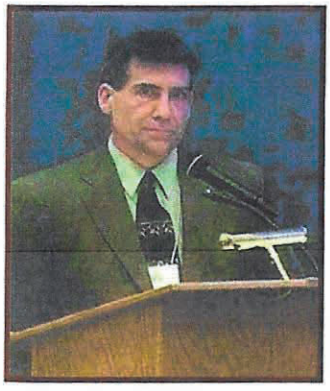
f. "The view that living things in all the major kingdoms are modified descendants of a common ancestor (described in the pattern of a branching tree) has been challenged in recent years by:

(i) Discrepancies in the molecular evidence (e.g. differences in relatedness inferred from sequence studies of different proteins) previously thought to support that view.

(ii) A fossil record that shows sudden bursts of increased complexity (the Cambrian Explosion), long periods of stasis and the absence of abundant transitional forms rather than steady gradual increases in complexity; and

(iii) Studies that show animals follow different rather than identical early stages of embryological development.

Evolution is a Sacred Cow



When I did my master's research thesis and when I did my post doctoral research and when I did my 15 years in companies with their research, everything, everything is held up to scrutiny and skeptical analysis. Nothing is left untouched, nothing is taken for granted, nothing is taken on faith—everything must be proven.
—Dr. Bruce M. Simat

Dr. Simat, a professor of biochemistry and human physiology for Northwestern College, stresses that science is held accountable in all other science disciplines *except evolution*. Evolution is the "Sacred Cow." Some people get very upset at those who want to put evolution to the test. Evolution theory is protected from scrutiny. The outcry against the Kansas science hearings is just another example of them protecting their Sacred Cow.

Dr. Simat read an article on a web site that was complaining about the biochemist coming to Kansas to testify at the hearings. An individual replied to the writer's concern saying that it was okay because biochemists usually don't know much about evolution anyway. He said, "I twinged at that a bit and I realized that that was absolutely true." In all his undergraduate biology, master's degree biology and doctoral biology, evolution was presented very superficially. He knew all the standard theories, jargon and propositions, but in all his operational science positions he never applied evolutionary theory.

Now, however, Dr. Simat is teaching it and he said, "The students provoke me to know everything about evolution because they come up with so many questions." His students aren't questioning micro-evolution, but they have questions about how macro-evolution can work.

First the students learned in genetics that "mutations are deleterious—that there are insertions, deletions, et cetera and that they cause problems with the function of that gene." Then when they come to the chapter on macro-evolution, the book

declares that macro-evolution can lead to new life and this happens by mutations. But when it explains how, it uses soft verbs. No longer is it "we know," "we have tested," or "data shows." It's now "should have," "could have," and "must have been."

For mutations to be considered as agents for macro-evolution "One has to come up with a very fast mutation rate that is still good and we don't have any information that you could have a fast mutation rate and still be reasonable and not kill things. In fact, we don't have data to show that slow mutation rates give you something positive that you could actually develop with." The problem with macro-evolution is that there are a lot of stories out there but no data to back it up.

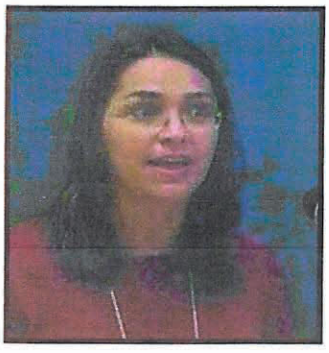
My students coming out of a Christian college, are now armed with all of evolution—exactly what it teaches and exactly what its downfalls are or its shortcomings. They know what it can show and they know what it can't show.
—Dr. Bruce Simat

One such story is referred to as reverse engineering. Basically, they explain how something very complex could have come from nothing by working backwards. You start with something complex and you make it a little less, a little less, until you come back to rudimentary molecules. Then you talk about how all those got together, and over a very long period of time ended up with this very complex process.

Dr. Semat explains that, "the story is fraught with problems.... As a biochemist I realize that there are so many patterns and so many lines of biochemistry and they all interrelate and in fact, depend on each other. So to talk about how just one gets through the system and it doesn't affect the rest of them is very naive."

Dr. Simat agrees with the Harris Group Standards which allows scientific evidence to be taught that is both supportive and problematic for macro-evolution. He developed new science curriculum that allows evolution to be put to the test for Northwestern College, a Christian college where he is currently employed. He says, "My students coming out of a Christian college are now armed with all of evolution —exactly what it teaches and exactly what its downfalls are or its shortcomings. They know what it can show and they know what it can't show."

Indoctrination Robs Students of Their Rights



Based on my classroom observations, I come to the conclusion that my students believe this is a huge controversy.
—Ms. Jill E. Gonzalez Bravo

Deciding to testify about the controversy was a difficult decision for Ms. Gonzalez, a Kansas public school teacher. She explained, "Though encouraged to boycott, I felt that this issue is not about me, it's about the students and their rights."

As a teacher of seventh and eighth grade science at an alternative middle school, Ms. Gonzalez found students generally difficult to motivate. But when evolution was taught she said it would turn into a "heated argument—with me as the target."

Ms. Gonzalez identified the problem with two key questions:
1. Why does this topic evoke strong opposition from the majority of my students?
Ms. Gonzalez toyed with this question over a long period of time. It wasn't until she became pregnant with her first child that she began to understand why evolution disturbed so many of her students.

While she was pregnant Ms. Gonzalez became interested in her baby's development. She also observed how her body compensated during pregnancy. She said, "I was amazed how my child's nourishment was immediately provided by me and it clicked." She understood what the students felt, "Students cannot comprehend how a process largely founded on chance could be so specialized."

Also, the students expressed to her that "it took from them the idea that they were born for a purpose." Ms. Gonzalez explained the science education indoctrinated them with "something completely counter to their mind-set and their beliefs and that troubled me."

2. Why was I apprehensive about providing my students with the academic freedom to investigate and question what they perceived to be controversial?
Ms. Gonzalez's had become fully versed in evolutionary theory at college and had learned that evolution "was an undebatable fact among many of my professors." She

had also been taught that there was no controversy in scientific evidence over origins and anyone who thought otherwise "was not considered a true intellectual."

Another reason why Ms. Gonzalez was apprehensive to allow students to investigate evolution comes from the National Science Teacher's Association. They encourage teachers not to do anything that would diminish or weaken evolutionary theory. Ms. Gonzalez expressed that she didn't want to be a "rule breaker." However, she said, "I continue to feel as though I do not teach this content as thoroughly as such a topic deserves."

[Evolution] took from them the idea that they were born for a purpose.
—Ms. Jill E. Gonzalez Bravo

Ms. Gonzalez also addressed two common themes that opponents express:

1. We should only teach what scientists think about scientific topics.

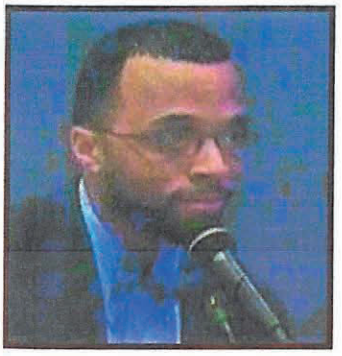
The implication, Ms. Gonzalez explained, was that no scientist supports anything counter to evolution. "I would say that by today's testimony this just is not the case. I am more concerned that perhaps censorship has been applied to these scientists because they hold views that are counter to the secular humanists' worldview."

2. Allowing discussion into the criticisms of evolution could force the educator to acknowledge an array of other viewpoints within the classroom. For instance, what if a student is interested in the occult?

Ms. Gonzalez said, "I already allow for free exchange of ideas and respect the views of my students when I cover a wide variety of topics. ... So if a student showed interest into some aspect of the occult that was dealing with an area of what they perceived science to be, I would encourage them to apply the steps of scientific method and research this interest."

In conclusion, Ms. Gonzalez believes the Harris Group Standards allow for greater academic freedom because: teachers would be provided with information on areas of controversy surrounding Darwinian Evolution; and students could research data from a variety of sources and evaluate support for, or in opposition to, controversies surrounding Darwinian Evolution.

Curriculum Should Be Focused On the Students



Which of the following would be more interesting for you to learn?

- ☐ ***Scientific interpretation supporting macro-evolution only.***
- ☐ ***Scientific interpretation supporting and challenging macro-evolution.***

—Mr. Bryan Leonard's student survey

Student surveys played an important role in Mr. Leonard's curriculum development for the Ohio State Board of Education. Ohio adopted science standards in 2002 that allowed students to learn both the scientific evidence that supports and challenges evolutionary theory (like the Harris Group Standards). Mr. Leonard, a public high school teacher, served as the primary developer for Ohio's tenth grade curriculum.

To Mr. Leonard the most important thing to remember when implementing new material is the students. So, throughout his presentation he displayed the word "students" in red as a reminder to "focus on students."

Teaching the controversy will increase interest in macro-evolution. Mr. Leonard says that we put our students in the best position to learn about macro-evolution when we "find out what students are most interested in and teach towards their interests." In Mr. Leonard's poll of 350 students, 89 percent said they would be more interested in learning the scientific information supporting and challenging macro-evolution.

Teaching the controversy will increase test performance. Mr. Leonard pointed out that "heightened student interest equals higher test performances." In the book *Motivating Students to Learn (2nd edition)*, by Jere Brophy, we learn, "When reading in areas of individual interest, students display heightened attention, concentration, positive effect, immediate comprehension of the material and subsequent test performances."

Teaching the controversy will increase understanding of macro-evolution. Jere Brophy's research agrees that presenting contradictory information forces students to recognize that the issue is more complicated than they thought, and stimulates students to develop more complete understandings.

Teaching the controversy will increase critical thinking skills. G. Wiggins and J. McTighe, authors of *Understanding by Design*, (Association for Supervision and Curriculum Development) state as one of their facets of understanding that students should have multiple points of view on the same issue. "They must develop and use critical thinking skills to determine, on their own, the strengths and weaknesses of the theories, explanations, proofs, and arguments they confront...."

Teaching the controversy will increase the likelihood of having a more enjoyable experience learning an emotionally charged subject by generating a balanced and neutral environment. Mr. Leonard reported that in his experience, parents, administrators and students have been very supportive of the new curriculum. He says, "Kids love it!" Parents have been "overwhelmingly supportive of it. I received calls, emails, parents pull me aside in the hallway as they come through the school."

Teaching the controversy will increase the likelihood of exploring more about macro-evolution outside the classroom. This would be due to stimulating the students' interest.

Mr. Leonard believes the Harris Group Standards, which teaches the controversy, would benefit students.

Mr. Leonard did an exit survey at the end of his class; the following are some of the student responses:

I liked it because I was not forced to believe one certain thing, but I could choose for myself.

I feel much more knowledgeable knowing both sides.

I felt I was given a choice to choose my views rather than have it chosen for me.

I learned a lot more. By teaching only supporting information, it's like teaching only half of the information out there.

I feel that it is good because you are covering both sides.

It's a way to stimulate minds.

If it is just supporting [evidence of evolution] it is dull.

Scientific Evidence That Challenges Evolution is Forbidden

***There's no other way to say it—I was censored.* —Mr. Robert DeHart**

Mr. DeHart taught origins evolution in high school biology using all the textbook material and then supplementing it with one day of Intelligent Design material for ten years. He allowed students to critically analyze it—students wrote position papers stating three of the best evidences for or against Darwinian evolution. Then a balanced team of students volunteered to debate the topic in front of the class.

How did the students react to their origin's study? Mr. Dehart reported, "Well, overwhelmingly these students saw that as the favorite part of biology."

But all that changed when someone logged a complaint with the American Civil Liberties Union (ACLU). The National Center of Science Education also joined the offense—they wanted the school to notify all of Mr. DeHart's former students and inform them that they had received objectionable material and that they were denied the proper science education that they were entitled to.

Mr. DeHart's superintendent conducted a year long investigation to determine if students were being proselytized in the classroom or if any impropriety had taken place. He found no evidence of any wrong-doing and he, along with the school board, backed Mr. DeHart 100 percent.

However, the next year a new superintendent, who did not support Mr. DeHart, threatened the school board that they would be individually responsible if the ACLU filed a lawsuit. After that Mr. DeHart worked to find a compromise with the school district working through a curriculum review committee.

First, Mr. DeHart offered to not teach any material on Intelligent Design, but only to present alternative views of the textbook perspective. His supplements were all initially rejected because they "overshadowed the existing curriculum" or because they were written by Jonathan Wells, author of the well known book, *Icons of Evolution*. It didn't matter to them that they were published in the *American Biology Teacher*—the most

widely reviewed journal for biology teachers. Then the committee decided that they would allow Mr. DeHart his submitted article that demonstrated DNA as information.

However, an opposing group formed, local newspapers got involved, then outside groups threatened much of their school district. The board reacted by reversing their decision to allow the one article.

Mr. DeHart then proposed to use only articles written by scientists who were committed to Darwinism and published in mainstream scientific journals. He offered such articles as one about Haeckel's embryos in *Natural History* by Steven J. Gould, and one about the peppered moths by Jerry Coyne that appeared in *Nature*. Mr. DeHart's supplemental articles were sent to the University of Washington and to Western Washington University along with a handwritten summary of what he was planning to say to the students. Eventually his proposals were all rejected and he was reassigned to Earth Science.

***What you try to do as a teacher is the higher levels of learning where you get kids to critically think and be able to evaluate evidence.* —Mr. Robert DeHart**

Discrimination against Mr. DeHart doesn't end there. He went to another school and was very up front with them during his interview for the job about the controversy at the previous school. They hired him and gave permission to him to supplement the textbook with scientific evidence that challenges evolution, allowing students an open education. Unfortunately, three days before he was to take the position the school reassigned him to Earth Science. The superintendent confessed to having been pressured by emails.

Some supportive teachers at the new school who knew of his situation told him that they weren't sure that they'd be able to do what he did. Mr. DeHart said another teacher, a member of the National Center for Science of Education, notified him, "I know who you are and I'm going to keep an eye on you. I've been asked to do that."

Mr. DeHart, now at a Christian school, again teaches Darwinian evolution supplemented with Intelligent Design material, which allows the students to learn critical thinking. Mr. DeHart says, "That's what we as teachers want to do....with our age of computers you can look anywhere and find knowledge, but what you try to do as a teacher is the higher levels of learning where you get kids to critically think and be able to evaluate evidence."

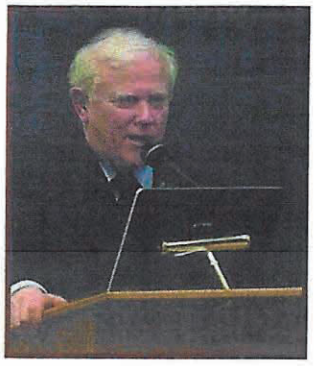
The National Science Teachers' Association

Mr. DeHart said that he feels the National Science Teachers Association (NSTA), which influences biology teachers throughout the country, creates tension in the classroom by not recognizing scientific controversy in origins science. The NSTA effectively directs schools to oppose any efforts to encourage an objective teaching of evolutionary theory. The following is an excerpt from their position statement on the teaching of evolution:

> *Policy makers and administrators should not mandate policies requiring the teaching of "creation science" or related concepts, such as so-called "intelligent design," "abrupt appearance," and "arguments against evolution." Administrators also should support teachers against pressure to promote nonscientific views or to diminish or eliminate the study of evolution.*

Is It Legal To Suppress the Controversy?

The Nature of the Controversy Requires It To Be Taught Objectively



What prompts me to be here today, is not necessarily a lack of evidence for evolution, it was my becoming aware that science had stacked the deck about origins with the use of methodological naturalism.

—Mr. John H. Calvert

Mr. Calvert, the representative for the Harris Group is an attorney who also has a degree in geology. In the mid 1980's he recognized that evolution was "propped up by a methodological or philosophical construct." Then, in 1999, after someone asked him to look at the science standards, he realized that the state of Kansas had embraced methodological naturalism. Since then, he's been hooked on this debate and has specialized during the past five years in constitutionally appropriate ways to teach origins science.

The philosophical bias is what Mr. Calvert found most disturbing, because it takes relevant information off the table. As a securities lawyer specializing in stock fraud, he had learned over the years that the principle mechanism of stock fraud is not misrepresentation—it is omission. The same problem applies to the teaching of evolution. Scientific evidence that challenges macro-evolution is omitted from public education because it might "weaken" the evolutionary theory.

The testimonies have demonstrated that there is scientific controversy, it impacts religion, and one side of that controversy is omitted. Selectively excluding information not only creates a scientific problem, it also creates a constitutional issue.

Mr. Calvert explained, "Whenever you have a bias in a religious discussion, you're not going to have neutrality, and [neutrality is] essentially what the Constitution calls for." Otherwise, we "trigger Establishment Clause responsibilities." An essential question concerning the bias in our schools is whether or not the textbooks explain the bias so students would at least "know the purpose and effect of it." Mr. Calvert said, "The analysis we conducted shows that the definition usually covered in the introductory chapter of the biology textbooks we reviewed simply discussed

the scientific method, and did not discuss any methodological or naturalistic exception to the method."

He said that some textbooks include statements that restrict science to natural phenomena and that's okay. However, when the textbook couples that with a statement like, "Many people believe that a supernatural force or creative deity created life,"and then fails to explain that they've omitted evidence that supports that belief, the textbook fails to be honest.

Whenever you have a bias in a religious discussion, you're not going to have neutrality, and [neutrality is] essentially what the Constitution calls for.
—Mr. John H. Calvert

The naturalism bias in our science textbooks rules out the evidence of design, which Mr. Calvert explains is the counter argument to evolution's core claim of no design. He says that when that counter argument is ruled out—when the only competitor is disallowed—that is a violation of the scientific method. Since this is, unfortunately, not explained in the textbooks, "the students are led to believe that this is really supported by empiricism rather than naturalism."

The standards that the Harris Group proposes are based on the scientific method, so it will allow schools to present the counter arguments. This objective approach will remove the religious bias from our schools, and this is what the constitution requires.

Mr. Calvert showed how two Supreme Court cases dealing with origins education favor the Harris Group Standards over the Krebs Group Standards. Epperson v. Arkansas was a Supreme Court case that said that when you enter into a classroom discussion about origins you cannot favor one view over another. The Court said, essentially, if you were going to discuss origins, the only neutral way you could do it is to show both sides or neither side. In Epperson the bias was against the evolutionary view of origins. The Krebs Group Standards do the opposite. It imposes a bias for the evolutionary theory that omits relevant scientific evidences that challenge it.

Similarly, the Louisiana case of Edwards v. Aguillard explains that origins education should be scientifically comprehensive. That is the formula specified by the Harris Group Standards. On the other hand, The Krebs Group Standards permits only one explanation rather than a comprehensive inquiry.

Public Polls Support the Harris Group Objectives

Mr. Calvert introduced a collection of recent polls concerning how origins science should be taught (see graph below). They show that the majority of people support the objectives of the Harris Group. Less than 20% of the population thinks we should teach only evolution in public schools.

Another interesting study that Mr. Calvert presented was an analysis of comments from four public hearings that were held in Kansas about the competing science standards. **Of those opposed to the Harris Group Standards:**

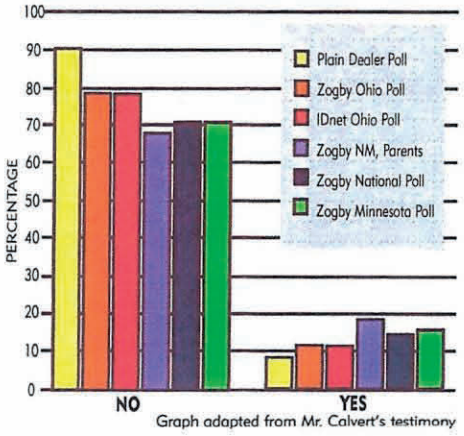
- Eight percent wanted only evolution taught in the classroom. They said such things as, "evolution is accepted science" or "evolution is a fact."
- Sixty-one percent of those who opposed the Harris Group Standards basically said they did not want Intelligent Design, creation science, or religion in the science classroom.

Mr. Calvert explained that the majority of these objections are based on misinformation, as evidenced by these Hearings.

Of those favoring the Harris Group Standards:

- Eight percent said such things as evolution is religion, or naturalism philosophy.
- Ten percent commented that evolution is not proven or is not a fact.
- Seven percent wanted Intelligent Design and/or creation science taught.
- Fifty-seven percent said, teach both sides.

Should Schools Teach Evolution Only?
Summary of 6 Poll Results

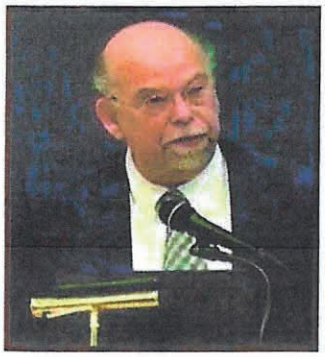


Graph adapted from Mr. Calvert's testimony

These, according to Mr. Calvert, "are very rational and legitimate concerns."

Closing Arguments

Discard Non-Scientific Testimonies



These hearings have been an unjustified waste of taxpayer money intended to justify the Board's support for inserting creationist claims into the science standards and to provide a showcase for the national Intelligent Design movement.
—Mr. Pedro L. Irigonegaray

Mr. Irigonegaray represents the Krebs Group and supports the boycott of the science hearings. About the costs of the hearings he says, "The Board spent many thousands of dollars on these hearings—$5,000 on expenses for witnesses." It's also estimated that transcription by the court reporter cost over a thousand dollars a day, and there are hours of the State department's staff time, resources, and costs for publishing.

Science Organizations oppose the Harris Group Standards and the Hearings
The Kansas Citizens for Science (KCFS) called for a boycott of the Science Hearings. Their resolution says in part, "Now therefore, be it resolved, that KCFS calls upon the Board of Education to dissolve the unneeded and ill-conceived Science Hearing Committee, or if that fails to occur, be it resolved, that KCFS calls on the entire science and science education community of Kansas to refuse to participate in the hearing proceedings. Science has its own validity and has made its position on these matters perfectly clear and unambiguous. [Intelligent Design] and other forms of creationism are not science."

Organizations that have joined the coalition include: The Kansas Academy of Science, Kansas Citizens for Science, Kansas Families United for Public Education, The Mainstream Coalition, Kansas Association of Biology Teachers, Kansas Association of Teachers of Science, and hundreds of individual signers.

The Coalition for Science is also opposed to the Harris Group Standards and the Hearings. They wrote, "The science standards writing committee appointed last year by the Kansas State Board of Education has developed a superb set of standards for teaching science at all levels in public schools, [the Krebs Group Standards], but instead of accepting the standards, the Board of Education has

subverted the process. ... We reject the show trial hearings whose purpose is to make it appear that intelligent design creationism and the well established science of evolution are on equal footing."

Also, forty-five Kansas University professors wrote, "The theory of evolution is the foundation upon which modern biological research has been built.... An effort focused on casting doubt primarily on the theory of evolution will only serve to obscure high school students' understanding of biology. We also believe that holding hearings on the relative merits of intelligent design versus evolution will be similarly detrimental to the goals of the taxpayer-financed Kansas Life Science Initiative.... [Intelligent Design] has not been tested scientifically and cannot even be called a hypothesis, much less a theory, since it has no predictions that have been scientifically tested."

Nineteen K-State professors wrote, "We view the proposed changes in Kansas Science Standards (the Minority Report which is likely to be adopted by the State Board of Education) with dismay and disbelief. The proposed changes attempt to define science as religion and to open the door to include Intelligent Design as a part of the curriculum.... An overwhelming amount of biologists agree that evolution is the best explanation for the diversity of life on earth."

And finally, the American Association for the Advancement of Science (AAAS) wrote, "After much consideration AAAS respectfully declines to participate in this hearing out of concern that rather than contribute to science education, it will most likely serve to confuse the public about the nature of the scientific enterprise." He went on to say, "Although scientists may debate details of the mechanisms of evolution, there is no argument among scientists about whether evolution is taking place."

The following legal concerns are associated with the Harris Group Standards

1. The establishment clause and separation of church and state. The Harris Group position advances a particular theological view and does not advance a secular purpose. The Harris Group projects the formula that evolution equals atheism which is a religion and it is endorsed by the State. Therefore, we must be permitted to bring our theistic view into the school curriculum.

   In McLean versus Arkansas Board of Education the defense argued that evolution was in effect a religion and that by teaching it the school created an establishment problem that could be redressed only by giving balance treatment to creation science. "The Court responded that if creation science

was in fact science and not religion, it was difficult to see how teaching it could neutralize the religious nature of evolution," Mr. Irigonegaray goes on to say, "Assuming that evolution was a religion or religious tenant, as the [Harris Group] would suggest, the remedy would be to stop teaching it, not to establish another religion in opposition to it, which is precisely the recommendation that the [Harris Group] is suggesting the Board should apply."

2. There are issues concerning the abuse of discretionary power by the Board. "The Kansas Constitution sets requirements for academic and financial responsibility for the State Board." As shown before, the Board has spent thousands of dollars on these unnecessary hearings.

3. There are issues involving the requirement of the Board to provide an adequate, able and suitable education for all children in Kansas. Mr. Irigonegaray said, "The board will be providing an inadequate education if they fail to support the teaching of mainstream science, confused issues of faith and science and teach failed anti-evolutionary critiques of science as if they were valid."

Concerning religion the Krebs Group Standards are more neutral
"[The Standards proposed by the Krebs Group] accurately represent science as neutral in respect to the nature of spiritual reality. The [Harris Group Standards], however, advances a narrow, theological view of science that conflicts with mainstream Christianity and many other faiths."

The Krebs Group Standards say, "Science is a human activity of systematically seeking natural explanations for what we observe in the world around us." It does not state that science is the only way of explaining the world, or that the physical world which science investigates is all there is to reality. In fact Standard 7 includes a statement written with the input of Harris Group stating, "The students understand there are many issues which involve morals, ethics, values or spiritual beliefs that goes beyond what science can explain, but for which solid scientific literacy is useful."

Referring to his visual aid Mr. Irigonegaray elaborated,

"1. Many people of faith, including many Christians, accept science as the limited enterprise of seeking natural explanations.

"2. This does not conflict with their theistic beliefs because they believe that God acts in the physical world through natural causes.

"3. They understand that science does not claim to answer all questions about the world, nor does it claim to offer a complete human explanation about any part of the world.

"Such people are often called 'theistic evolutionists' in respect to evolution." A group of clergy in Wisconsin wrote a letter, signed by over 3500 clergy, to school officials endorsing this position.

It is the Harris Group Standards, not the Krebs Group Standards that claims that biological evolution postulates an unpredictable and unguided natural process that has no discernable direction or goal. It is the Harris Group that says that biological evolution assumes that life arose from unguided natural processes. Theistic evolutionists believe that God guides evolution.

Although many people of faith believe that science and theistic beliefs can co-exist, the core argument of the Harris Group, according to Mr. Irigonegaray, is that science, by seeking natural explanations, is atheistic and materialistic. "This is one of the most boggle-some aspects of the [Harris Group's contentions. The [Harris Group] claims science is atheistic." He goes on to explain that they do this "in order to claim that their theistic beliefs, design, must be inserted into science. They want to change the definition of science to add supernatural causes."

Consequences of adopting the [Harris Group] proposals include harming the scientific education of children, harming the reputation of Kansas, harming our ability to attract bioscience and related industries to Kansas, and risking spending thousands of dollars on potential court cases.
—Mr. Pedro Irigonegaray

"The [Harris Group's] position on allowing supernatural causes in science and their denial of common descent are not genuine scientific controversies," says Mr. Irigonegaray. Also, "The [Harris Group] claim that they're not trying to insert Intelligent Design into the standards, but as [Keith Miller, a Kansas University Geology Professor] points out, the anti-evolutionary arguments presented in the [Harris Group] are all that Intelligent Design has to offer."

Multiple Concerns

Not only are the hearings a waste of money, the Harris Group Standards should not even be considered. Mr. Irigonegaray says, "Consequences of adopting the

[Harris Group] proposals include harming the scientific education of children, harming the reputation of Kansas, harming our ability to attract bioscience and related industries to Kansas, and risking spending thousands of dollars on potential court cases."

The Harris Group Standards and witnesses have also misrepresented many educational issues including the role of standards and the Krebs Group's position on teaching students the skills of scientific inquiry. "The role of standards is to outline core fundamental consents in a subject. Standards do not prohibit anything from being taught," Mr. Irigonegaray states, "And I want everyone to be clear on this, [the standards proposed by the Krebs Group encourage] critical thinking and the evaluation of alternative hypotheses."

[The standards proposed by the Krebs Group encourage] critical thinking and the evaluation of alternative hypotheses.
—Mr. Pedro L. Irigonegaray

In Mr. Irigonegaray's closing comments to the Kansas Department of Education he said, "For our future I urge you to discard entirely the non-scientific biased testimony that has been presented in this classroom, to keep out of our classroom the narrow theistic view that implies that evolution is being erroneously taught as faith because that is false."

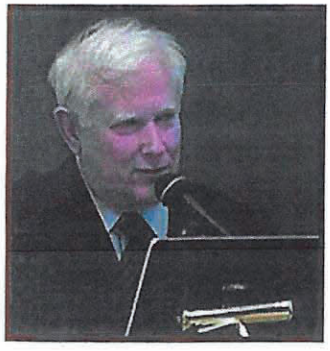
Written report submitted by Mr. Irigonegaray

What is Methodological Naturalism?

Science is a methodology, a limited way of knowing about the natural world. Scientific research proceeds by the search for chains of cause-and-effect, and confines itself to the investigation of "natural" entities and forces. This self-limitation is sometimes referred to as methodological naturalism (MN). Science restricts itself to proximate causes, and the confirmation or denial of ultimate causes is beyond its capacity. Science does not deny the existence of a Creator — it is simply silent on the existence or action of God. Methodological naturalism simply describes what empirical inquiry is. It is certainly not a statement of the nature of cosmic reality. Science pursues truth within very narrow limits. Our most profound questions about the nature of reality (questions of meaning and purpose and morality), while they may arise from within science, are theological or philosophical in nature and their answers lie beyond the reach of science.

Some Intelligent Design (ID) advocates argue that MN arbitrarily and unjustifiably excludes supernatural agency from scientific explanation. This exclusion of God from scientific description is believed to unnecessarily restrict the search for truth. It does nothing of the sort. If God acted in creation to bring about a particular structure in a way that broke causal chains, then science would simply conclude that—"There is presently no known series of cause-and-effect processes that can adequately account for this structure, and research will continue to search for such processes." Any statement beyond that requires the application of a particular religious worldview. Science cannot conclude "God did it." However, if God acted through a seamless series of cause-and-effect processes to bring about that structure, then the continuing search for such processes stimulated by the tentativeness and methodological naturalism of science may uncover those processes. Using an ID approach, the inference to "intelligent design" would be made, and any motivation for further research would end. Thus, ID runs the risk of making false conclusions, and prematurely terminating the search for cause-and-effect descriptions when none are yet known. Furthermore, how would a gap in the causal chain be discovered unless continuing effort was expended in searching for possible "natural " causes? Thus even the verification of gaps requires research conducted using MN assumptions.

We Need Evidence—Not Rhetoric!



What you heard today [from Mr. Irigonegaray] was simply oratory from a lawyer. What is significantly absent from the case is the data. Where is the data to support the claim of evidence so overwhelming that there can be no dissent?... There is no evidence. There is no data, only oratory. **—Mr. John H. Calvert**

Because Mr. Irigonegaray refused to take questions following his presentation, Mr. Calvert was allowed to respond extemporaneously for the set amount of time.

The Opposition's Strategy

"Science commits suicide when it adopts a creed." Mr. Calvert quoted Thomas Huxley and revealed the creed embraced by the opposition—"evolution cannot be criticized." This is the reason that the Science Hearings are one-sided. The opposition will tolerate no criticism of evolution.

Rather than debate the scientific evidence, the opposition has chosen to boycott the hearings. "Boycott" is defined as a mechanism designed to coerce silence. "It's a mechanism intended to intimidate," Mr. Calvert explained. "Jill Gonzalez Bravo was in fear, was literally in fear to come testify here. That is a situation that our society should not tolerate."

Rather than debate the scientific evidence, the opposition chose to boycott the science hearings and they chose a different strategy to win the debate. Kansas Citizens for Science's media contact, Liz Craig, posted it on their web site:

> "My strategy at this point is the same as it was in 1999: notify the national and local media about what's going on and portray them in the harshest light possible, as political opportunists, evangelical activists, ignoramuses, breakers of rules, unprincipled bullies, etc. ... There may be no way to head off another science standards debacle, but we can sure make them look like asses as they do what they do. ... Our target is the moderates who are not that well educated about the issues, most of whom probably are theistic evolutionists. There is no way to convert the creationists."

The opposition's strategy was to portray the Harris Group in the harshest light possible— as ignoramuses. Mr. Calvert asked, "Is that something a science association should be doing?"

The Opposition's Diversion

The witnesses who testified are far from being ignoramuses. While Mr. Calvert was getting ready for this debate he was going through the scientific credentials of some of the witnesses. Reflecting upon the curriculum vitae (CV) for his friend William Harris he said, "He is really an incredible guy. Dr. Harris is the most humble guy I think I've ever known and his brilliance is just mind numbing....[His] CV is set in ten point type—it's 26 pages long. He has written a book I didn't even know about." Dr. Harris' specialty is fish oils (omega-3 fatty acids) and cardiovascular disease. He was the developer of the Omega-3 Index, a new blood test to assess cardiovascular risk. "The guy is an internationally recognized scientist. He is doing work that could affect the lives of everybody in the entire world in a very positive way. And he is being derided as an ignoramus."

What is so fascinating about this strategy of portraying the competition as ignoramuses, you see, it is designed to achieve a really interesting purpose. What is the purpose? It's to keep you from looking at the specific provisions in the [Harris Group Standards].
—**Mr. John H. Calvert**

Dr. Russell Carlson has a Ph.D. in biochemistry and is a professor of microbiology at the University of Georgia. He directs the complex hydro carbohydrate research center at the University; has authored or co-authored more than 125 articles in various peer review journals—125; has given numerous lectures at various meetings and universities throughout the U.S., Europe and South America.

Daniel Ely has a Ph.D. in physiology and is a professor of biology at the University of Akron in Ohio. He directs a research team that was the first to identify a gene on the Y chromosome that raises blood pressure. The team is currently studying how the gene product influences an enzyme that can raise blood pressure. Professor Ely has authored or co-authored 101 peer review science journals.

The witnesses that testified here in Kansas are experts. The opposition calls them ignoramuses. Mr. Calvert said, "What is so fascinating about this strategy of portraying the competition as ignoramuses, you see, it is designed to achieve a really

interesting purpose. What is the purpose? It's to keep you from looking at the specific provisions in the [Harris Group Standards]."

The Opposition's Hidden Issues

One provision of the Harris Group Standards that the opposition opposes, is adding the word "inform" to the Standard's mission statement. Because there is scientific information that challenges chemical and macro-evolutionary theories, the opposition doesn't want the students informed.

Another provision in the Harris Group Standards is to allow scientific evidences that challenge evolution. Dr. Sanford had testified that they're finding problems in the mutation rates that suggest that rather than seeing mutations increasing complexity; mutations seem to be increasing degeneration. That evidence, at the molecular level, challenges evolutionary biology.

The opposition rejects evidences that violate Darwin's prediction that diversity arises in a purely gradual way. Mr. Calvert reminds us that the fossil record is really inconsistent with that prediction, which Dr. Wells demonstrated.

Dr. Behe talked about the challenge to natural selection. How could it build a molecular machine like a bacterial flagellum—where you don't have any function until the whole thing is put together and it takes thousands and thousands of steps to get that whole thing put together? Dr. Seelke testified to doing experimental evolutionary studies on bacteria. He's running populations of billions of organisms and he can't get it to do just two evolutionary steps.

Mr. Calvert explained that during the first three days of the science hearings "we heard evidence, we heard data, and what are we confronted with? Rhetoric, it's pure and simple rhetoric consistent with the policy of the organization [Mr. Irigonegaray] represents."

Mr. Calvert reminded the audience of the quote from the Kansas Citizens for Science, "Our target is the moderates who are not that well educated about the issues." He explained that the opposition is embracing a strategy to woo the uneducated, the uninformed, so they can influence them. Wooing the uneducated to keep them uneducated should not be the focus of public education.

The Opposition's Proselytization

About Mr. Irigonegaray's arguments for theistic evolutionists Mr. Calvert says, "Much of what we heard today was proselytization for theistic evolution, because that happens to be a religious concept that's consistent with evolution." Or anyway,

the public is led to believe that it is consistent. They are led to believe that somehow evolution is guided and so they can reconcile it with their religion. However, evolution in fact postulates an unguided process.

Mr. Calvert refers to the current Kansas Science standards which reference two high profile scientists, Ernst Mayr and Douglas Futuyma. Mr. Calvert reveals that Douglas Futuyma has said, "Is evolution a guided or unguided process? It is clearly unguided, because law and chance cannot guide anything."

Ernst Mayr has said, "First Darwinism rejects all supernatural phenomena and causation. The theory of evolution by natural selection explains the adaptedness and diversity of the world solely materialistically. It no longer requires God as creator or designer. Although one is still certainly free to believe in God, even if one accepts evolution, like he could also believe in Santa Claus or the tooth fairy."

Mr. Irigonegaray's answer to the religious problem for evolution is theistic evolution. Mr. Calvert speaks of a different approach. He explains, "When you're educating students and you decide to open a discussion with them about where we come from, the origin of life and the origin of diversity of life, you have chosen to engage in a discussion that unavoidably impacts religion." To deal with this problem, the Harris Group bring objectivity into the standards. Mr. Calvert explains that the way to bring objectivity into the standards is to "simply treat evolution honestly and candidly and subject it to the very same critical analysis that other scientific theories are [expected to embrace]."

In conclusion, we have heard credible witnesses at these hearings who demonstrated that there is scientific controversy concerning chemical and macro-evolution — and one side of the controversy is being suppressed for religious, not scientific, reasons. The witnesses' testimony "has not been rebutted by any evidence whatsoever. It's just been rebutted by rhetoric."

Science Community Defines Evolution as "Unguided"

Following the hearings, the Kansas State Board of Education received a letter from 38 Nobel Laureates urging them to "maintain Darwinian evolution as the sole curriculum and science standard." In their letter they described modern evolutionary theory this way:

"Logically derived from confirmable evidence, evolution is understood to be the result of an unguided, unplanned process of random variation and natural selection."

The Final Chapter

On November 9, 2005, the Kansas State Board of Education adopted science standards that included most of the Harris Group Standards. However, on February 13, 2007, a new Board adopted an action that replaced them with a revision of the Krebs Group Standards. The new Board even voted down a motion to retain the word "inform" in the mission of Kansas Science Education.

Another update concerning the Science Hearings involves one of the witnesses, Mr. Bryan Leonard. At the time of the hearings, Mr. Leonard had completed all of his requirements for a Ph.D. in science education at Ohio State University except for the defense of his dissertation on teaching evolution. Mr. John Calvert said that he had been concerned about asking Mr. Leonard to testify when he learned that he had yet to defend his doctoral dissertation, because of numerous instances of discrimination against those questioning the adequacy of evolutionary theory. A discussion allayed Mr. Calvert's fears so the presentation was scheduled. However, when Mr. Leonard returned to Ohio State to defend his dissertation, members of the science community asserted that his dissertation committee was not properly constituted and that one member needed to be replaced with an ardent defender of evolution. Other efforts were also made to discredit Mr. Leonard's work. Over two years have passed since his testimony and Mr. Leonard has still been unable to overcome all the roadblocks thrown up to prevent him from completing a doctoral program that then represented four years of study and expense.

Also, Dr. Ralph Seelke has given an update on his lab findings concerning the question of whether bacteria can evolve a new function when multiple independent steps are required. In the system they have been using to test this, they have found that a requirement of just two events for evolution to occur, stops evolution. They have tested more than 2 trillion cells, and have carried the experiment past 5,600 generations.

If you are interested in more information about the Kansas science standards, the Harris Group is, at the time of this writing, maintaining a web site that documents the history of the debate online at http://www.KansasScience2005.com.

Biographies and Index

Mr. Akyol is a Columnist in *Referans*,a Turkish daily newspaper. He is also a freelance writer in the U.S. media and Director of International Relations at the Intercultural Dialogue Platform, headquartered in Istanbul, Turkey. He was educated in Political Science and International Relations at the Bogazici (Bosphorus) University of Istanbul.

Mr. Akyol writes extensively on Islam and he argues against Islamic extremism and terrorism from a Muslim point of view. Some of his articles have recently appeared in American and international publications like *The Weekly Standard*, *The Washington Times*, *The American Enterprise*, *National Review*, *Frontpage Magazine* and *Islam Online*. He is currently working on a book titled *An Islamic Case for Liberty*

From 1996–2003, Mr. Akyol was a fellow at the Science Research Foundation (SRF), the main champion of the Intelligent Design cause in Turkey. He has spoken at more than 30 conferences across Turkey and in Europe about intelligent design, materialism, Darwinism, Islamic history and ethics.

Mr. Barham was born in Dallas, Texas, and trained in Classics at the University of Texas at Austin and in the History of Science at Harvard University. He also pursued advanced study towards a Ph.D. degree under the auspices of Harvard University in Athens, Greece, and Belgrade, Yugoslavia. He then worked for about 20 years as an independent scholar, publishing some dozen articles on evolutionary epistemology, the philosophy of mind, and the foundations of biology in a variety of print and electronic journals, including *Bio Systems*, *Evolution and Cognition*, *Rivista di Biologia*, and *Metanexus.com*. His work consists of a critique of the mechanistic and Darwinian images of life and mind, as well as an exploration of alternative means of understanding value, purpose, and meaning as objectively real, natural phenomena. He reentered graduate school in 2003, and is currently a Ph.D. candidate in the History and Philosophy of Science Program at the University of Notre Dame.

Dr. Behe grew up in Harrisburg, Pennsylvania. He did his graduate studies in biochemistry at the University of Pennsylvania and was awarded a Ph.D. for his dissertation research on sickle-cell disease. Subsequently, he did postdoctoral work on

DNA structure at the National Institute of Health. He served as Assistant Professor of Chemistry at Queens College in New York City, where he met his wife. In 1985 he moved to Lehigh University where he is currently Professor of Biochemistry. He has also served as Visiting Professor at the City University of New York, Queens College and at the Pennsylvania State University, Hershey Medical Center. In his career he has authored over 40 technical papers and one book, *Darwin 's Black Box: The Biochemical Challenge to Evolution*, which argues that living systems at the molecular level are best explained as being the result of deliberate intelligent design. *Darwin's Black Box* has been reviewed by the *New York Times, Nature, Philosophy of Science, Christianity Today*, and over one hundred other periodicals.

Nancy Bryson, Ph.D. **56**
Dr. Bryson did her undergraduate work in Biology at Mississippi University for Women and earned her Ph.D. in Physical Chemistry from the University of South Carolina. Her entire career has been devoted to teaching chemistry at the college level. She has received several teaching awards, including the "Bear Hug Award" (like a faculty-member-of-the-year award) from a 3200 student university, Shawnee State University.

John H. Calvert, J.D. **70, 80**
Mr. Calvert received a B.A. in geology from the University of Missouri in Columbia. After serving in the U.S. Army, he returned to receive the J.D. degree, also from the University of Missouri in Columbia. He served for 32 years with Lathrop & Gage LC, a large regional Midwestern law firm until retiring in 2001 to work full time in the area of origins science education. As a former Chairman of the Lathrop & Gage Corporate Department, he focused on Corporate Finance, Mergers and Acquisitions, Securities and Corporate Litigation, and Corporate Governance. During his practice he managed a number of legal engagements involving geology with respect to investments in the mining and oil and gas ventures. In 2001 his focus switched to Constitutional Law, primarily in the area of public education regarding origins.

Mr. Calvert is a co-founder and a managing director of Intelligent Design Network, Inc., a non-profit organization that seeks institutional objectivity in origins science. Since 1999, he has advised school teachers, school administrators, state and local boards of education, state legislative bodies and public officials as to constitutionally appropriate ways to teach origins science in public schools. Mr. Calvert has authored a number of legal opinions and memoranda that have been furnished to a variety of public entities and has written and lectured at a number of public

events and venues regarding this issue. He is a graduate of the Litigation Academy of the Alliance Defense Fund and is a member of the Honor Guard of that organization. Mr. Calvert co-authored *Teaching Origins in Public Schools* (IDnet 2001); "Intelligent Design, the Scientific Alternative to Evolution" (National Catholic Bioethics Quarterly, Vol 3, No. 3, Autumn 2003); and *The Rule: A one-act play about the trial of a biology teacher* (IDnet 2003).

Russell W. Carlson, Ph.D. 39
Dr. Carlson did his undergraduate work at North Park College in Chicago, IL. After serving four years in the United States Navy, he resumed his studies, receiving his Ph.D. in Biochemistry from the University of Colorado at Boulder. He then performed two years of postdoctoral research at the University of Colorado. Dr. Carlson served as Professor with the Chemistry Department at Eastern Illinois University in Charleston, IL. In 1988 Dr. Carlson became a member of the Complex Carbohydrate Research Center at the University of Georgia in Athens, GA where he currently serves as Technical Director, Professor of Biochemistry & Molecular Biology, and Adjunct Professor of Microbiology.

Roger DeHart, B.S. 65
Mr. DeHart has taught biology at the high school level for 28 years, with 20 of those years being in public schools. He currently teaches honors and AP biology at Oakes Christian High School, a college preparatory high school outside of Los Angeles. Mr. DeHart is the author of *Icons of Evolution—A Study Guide*, Coldwater Media.

Robert DiSilvestro, Ph.D. 37
Dr. DiSilvestro currently serves as a Professor of Nutrition at Ohio State University. He received his Ph.D. in Biochemistry from Texas A&M in 1982 and his B.S. in Biochemistry from Purdue University in 1975. He is a member of several scientific societies including, the American Institute of Nutrition and the Society for Experimental Biology & Medicine.

He has about 80 peer-reviewed scientific research journal articles, and has written various commentaries for both scientific publications as well as the lay public. Dr. DiSilvestro has a lab where he oversees five grad students, some undergrads, and a couple technicians. To a large extent what they do is design pharmaceutical and nutraceutical interventions that affect biological processes for a desired purpose.

He is a much sought after speaker. His speaking engagements include: the National Institute of Health workshop on the current state of zinc research; the

Functional Food Symposium 2000 annual meeting of the Institute of Food Technology; and Nutracon, 1998-2000.

Daniel L. Ely, Ph.D. 38

Dr. Ely holds a Ph.D. in Physiology from the University of Southern California, School of Medicine and has also performed post-doctoral studies at the National Institutes of Health. He has received a number of prestigious honors including: The University Teacher-of-the-Year, College Researcher-of-the-Year, Distinguished Research Award, and Outstanding Faculty Award.

Since 1976, he has been Professor of Biology at the University of Akron in Ohio. His research team is the first to identify a gene on the Y chromosome that raises blood pressure. Professor Ely has received 31grants, primarily from the American Heart Association and the National Institutes of Health, and has also served as a Grant Reviewer. In the past ten years, he has presented twelve invited lectures at universities or conferences in the United States, Sweden, and Brazil.

Jill E. Gonzalez Bravo, M.S. 60

Ms. Gonzalez grew up in Topeka, Kansas. She did her undergraduate studies in education at Kansas State University. After a two-year service in the United States Peace Corps, she received a Peace Corps Fellowship to attend Wichita State University. While pursuing her Masters in Curriculum Instruction, with an emphasis in Science and Technology, she taught at an alternative school for students who were unsuccessful in the mainstream school setting. She has written several successful grant initiatives and participated in professional presentations locally. After marrying, she took a position in Rose Hill, Kansas as an 8th grade teacher. While there, she has served on the science curriculum alignment and text book adoption committee and has assisted in the development of curriculum maps for science content.

William S. Harris, Ph.D. 9

Dr. Harris is a native of Kansas City and attended Shawnee Mission East High School. He obtained an undergraduate degree in chemistry from Hanover College in Hanover, Indiana, and a Ph.D. in Nutritional Biochemistry from the University of Minnesota. He did postdoctoral fellowships in Clinical Nutrition and Lipid Metabolism at the Oregon Health Sciences University, and then moved to Kansas University Medical Center where he became Director of the Lipid Research Laboratory. In 1996 Dr. Harris became the first recipient of the Daniel J. Lauer /Missouri Chair in Metabolism and Vascular Research at the Mid America Heart Institute of Saint Luke's Hospital in Kansas City. He currently is Co-Director of the

Lipid and Diabetes Research Center at Saint Luke's and Professor of Medicine at UMKC School of Medicine.

Dr. Harris' research has focused primarily on the effects of drugs and nutrients on lipid metabolism in humans. However, his specialty is fish oils (omega-3 fatty acids) and cardiovascular disease, a field in which he has gained an international standing. He was the developer of the Omega-3 Index, a new blood test to assess cardiovascular risk. Dr. Harris has been the Principal Investigator on two previous NIH-funded grants, and is currently examining the effects of niacin and fish oils on lipid metabolism in patients with the "metabolic syndrome" with funding from the National Institutes of Health.

Dr. Harris is a Managing Director of Intelligent Design Network, Inc., is a member of the Kansas Science Writing Committee and an author of the Proposed Revisions to the Kansas Science Standards.

Pedro L. Irigonegaray, J.D. **74**
Mr. Irigonegaray received his Juris Doctorate law degree from Washburn University in 1973. He is a native of Cuba and has lived in Kansas 44 years. His recent high profile cases include representing Topeka banker, Clinton Odell Weidner II, who was convicted of bank fraud in connection with the West Star Energies scandal.

Bryan Leonard, MS. **62**
Mr. Leonard earned a B.S. in Biology Education, and an M.S. in Microbiology. He has years of laboratory research experience and was a co-author of many peer reviewed publications. Currently, Mr. Leonard is a high school biology teacher and has been serving in this capacity for nine years. He is also a Ph.D. candidate in Science Education with a research interest in the area of evolution education in high school biology classes. He was selected to serve on the Science Model Curricula writing team in 2003–2004. While serving in this capacity, he was a part of the committee that generated the lesson entitled "Critical Analysis of Evolution."

Angus J. L. Menuge, Ph.D. **44**
Dr. Menuge is Professor of Philosophy at Concordia University Wisconsin and Associate Director of the Cranach Institute (www.cranach.org). He received his BA in philosophy (Class 1) from the University of Warwick, England and his MA and Ph.D. (both on action explanation) from the University of Wisconsin-Madison. Dr. Menuge is the author of *Agents Under Fire: Materialism and the Rationality of Science* (Rowman and Littlefield, 2004) and editor of three books, including *Reading God's World: The Vocation of Scientist* (Concordia Publishing House, 2004). He assisted

the editors William Dembski and Michael Ruse in the preparation of *Debating Design: From Darwin to DNA* (Cambridge University Press, 2004), a book which grew out of the Design and its Critics conference which he helped organize at Concordia University Wisconsin in 2000. Dr. Menuge has written articles on philosophy of mind, intelligent design, science and religion and Christianity and culture. Born in England, Dr. Menuge became an American citizen in February, 2005.

Stephen C. Meyer, Ph.D. **53**
Dr. Meyer received his bachelor's of science in physics and geology and practiced as a professional geophysicist with the Atlantic Richfield Company for four years. Dr. Meyer earned his doctorate in the History and Philosophy of Science from Cambridge University for a dissertation on the history of origin of life biology and the methodology of the historical sciences. After earning his doctorate, Dr. Meyer served as Associate Professor of Philosophy at Whitworth College in Spokane, Washington.

He is published in both the scientific and the philosophical aspects of the issue of the origin of life on (unintelligible) theory, focusing on the question of the origin of first life and the origin of the Cambrian phylum, sometimes called the "Cambrian Explosion." In the philosophical area, he has written on the question of the definition of science, the demarcation arguments that purport to define science, arguments that are used to define science normatively and to justify what's called methodological naturalism. His expertise in that area was acknowledged by an invitation to contribute to an encyclopedia that was published by Garland called "The History of Science and Religion in the Western Tradition." He also co-authored an article with David DeWolf of Gonzaga Law School and Professor Mark DeForrest also of Gonzaga Law School which was published in the Utah Law Review, it examined the constitutionality of discussing theories, in particular the theory of intelligent design as an alternative to neo-Darwinism and chemical evolution theory in the public schools. In 2003 Dr. Meyer also co-edited and contributed several chapters to a book called *Darwinism, Design, and Public Education* which was published by Michigan State University Press.

Currently, Dr. Meyer is the director and Senior Fellow of the Center of Science and Culture at the Discovery Institute in Seattle, Washington.

John M. Millam, Ph.D. **48**
Dr. Millam has been interested in science since at least high school, where he took as many science classes as he could. In college, he earned a Bachelor's Degree in both chemistry and physics at the University of Arizona. He combined both of

these interests by working on a Ph.D. in computational chemistry from Rice University. His doctoral thesis was on using sparse matrix techniques to allow standard quantum chemistry models to be applied to much larger molecules than was previously possible. Additional post-doctoral work was done at Wayne State University developing programs for simulating molecular dynamics of chemical systems. Today, Dr. Millam works for a software company called Semichem and continues to develop computational chemistry software that can be used by chemists, biochemists, pharmaceutical companies, and material scientists.

In addition to his professional interests, Dr. Millam is interested in showing how theology and philosophy are the ally of science rather than the enemy. As a "scientist to the layman," he is interested in communicating the findings of science in a way that is understandable to the ordinary person and how this integrates with philosophy and theology. This includes writing numerous electronic articles and giving public presentations on science, theology, and philosophy. Of particular recent interest is learning how theology historically gave birth to modern science and understanding the philosophy of science.

Warren A. Nord, Ph.D. 50
Dr. Nord did his undergraduate work at the University of Minnesota, served in the U.S. Army, and then resumed his studies, receiving his Ph.D. from the University of North Carolina at Chapel Hill—both degrees in philosophy. From 1979 to 2004 he was Director of the Program in the Humanities and Human Values at UNC Chapel Hill. He continues to teach the philosophy of religion and the philosophy of education in the Philosophy Department. While he was director of the Program in the Humanities and Human Values it sponsored over 700 seminars, workshops, and conferences, attended by more than 40,000 participants.

Dr. Nord has written more than thirty book chapters and articles in professional and scholarly journals, primarily on religion and education, and two books. His book *Religion and American Education: Rethinking a National Dilemma* (University of North Carolina Press, 1995) is the most comprehensive study of religion in secondary and higher education published in the last fifty years. His other book, which he co-authored with Charles C. Haynes, *Taking Religion Seriously Across the Curriculum* (ASCD Press, 1998) is a handbook for teachers on how to deal with religion in the public school curriculum. In both books, his aim was to chart a middle course in our culture wars, one that takes religion seriously, but in a constitutionally permissible and educationally sound way. He also addressed the role of science courses within liberal education (particularly evolution, religion and Intelligent Design theory).

Edward T. Peltzer, Ph.D. 16

Dr. Peltzer is an ocean chemist, currently employed as a Senior Research Specialist at the Monterey Bay Aquarium Research Institute. His research interests include the geochemistry of carbon dioxide in the ocean and the development of new analytical techniques for the study of natural and synthetic clathrate hydrates.

He earned a Ph.D. in Oceanography from Scripps Institution of Oceanography at the University of California, San Diego in 1979. While a graduate student with Drs. Jeffrey Bada and Stanley Miller, he was the first to identify the presence of extraterrestrial hydroxy and dicarboxylic acids in the Murchison meteorite.

Dr. Peltzer worked as a Research Specialist at the Woods Hole Oceanographic Institution for almost 20 years. He developed new techniques for measuring plant waxes and lipids in aerosols and studied the long-range transport of terrestrial organic matter in the atmosphere. Subsequently, he investigated the role of dissolved organic matter in the global ocean carbon cycle and collaborated in the development of a new technique for the measurement of dissolved organic carbon in seawater. Dr. Peltzer has participated in numerous scientific research cruises in the Atlantic, Pacific, and Indian oceans from the Artic to the Ross Sea, Antarctica.

John C. Sanford, Ph.D. 31

Dr. Sanford, Courtesy Associate Professor of Horticultural Sciences at Cornell University, holds a Ph.D. in Plant Breeding/Plant Genetics from the University of Wisconsin in Madison. The main thrust of his research has been to work at the interface between molecular genetics and plant breeding, for the purpose of crop improvement. His central research objectives have involved applying transformation technologies to horticultural crops, and studying new methods for the transfer of high molecular weight DNA into plants.

Dr. Sanford is the author of the book, *Genetic Entropy And the Mystery of the Genome*. He has over seventy publications and holds 27 patents. He is the primary inventor of the GeneGun technology, which has been used extensively in plant genetic engineering.

Ralph Seelke, Ph.D. 35

Dr. Seelke received his undergraduate education at Clemson University and then spent two years in the Army on active duty as a tank platoon leader. In 1977 he married a Minnesotan, and went to graduate school at the University of Minnesota and the Mayo Graduate School of Medicine. Finishing his work for a Ph.D. in Microbiology in 1981, he stayed at Mayo doing postgraduate work until 1983.

Dr. Seelke has been a professor at various places since then and at the University of Wisconsin in Superior since 1989. He has an ongoing interest in Christian apologetic, and is convinced that Christianity is not only true, but that it is perhaps the only way of viewing the world that allows both meaning and rationality in life.

Since 2000, Dr. Seelke's research interest has been in experimental evolution. His work in that area has been supported by the Merck Foundation/AAAS Undergraduate Science Research Program, which has supported the undergraduate research of over 10 students at UW-Superior. In 2004, he was a Visiting Scholar in the Department of Microbiology and Immunology at the Stanford University Medical School (laboratory of Dr. A. C. Matin), conducting research to further our understanding of evolution. His work has resulted in seven presentations at regional or national scientific meetings since 2001 on the capabilities and limitations of evolution in producing new functions in bacteria.

He is a co-author on eight publications in such journals as *Proceedings of the National Academy of Science, Journal of Bacteriology*, and *Molecular and General Genetics* and has also contributed to four book chapters.

Giuseppe Sermonti, Ph.D. 41
Dr. Sermonti, born in Rome, was appointed as full Professor of Genetics at the University of Palermo in 1965, and at the University of Perugia in 1970. He is presently the retired Professor of Genetics at the University of Perugia. Professor Sermonti discovered genetic recombination in antibiotic-producing Penicillium and Streptomyces and he presided over the Associa-zione Genetica Italiana in 1970–1971. In 1978 he served as Vice-President of the XIV International Congress of Genetics in Moscow. He was an organizer of the Working Group on the Genetics of Industrial Organisms and chaired the committee from 1979–1988.

In 1987, Professor Sermonti helped to found the Osaka Group for the Study of Dynamic Structure in Japan. Today, he is considered the leading critic of neo-Darwinism in Italy.

Since 1979, Professor Sermonti has been Chief Editor of Rivista di Biologia/Biology Forum (Genoa) founded in Perugia in 1919. Rivista di Biologia is one of the oldest extant biology journals in the world. It publishes research and essays in theoretical biology, in the broadest sense, from all biological disciplines—including evolution, development, genetics, biophysics and the history of biology.

Bruce M. Simat, Ph.D......58
Dr. Simat, the Associate Professor of Biology at Northwestern College in St. Paul, Minnesota, earned his Ph.D. in 1983 from the Department of Physiology at the

University of Minnesota. His dissertation research investigated how thyroid and growth hormones influence the regulation of messenger RNA production in the liver. He performed postdoctoral research in the flexibility of therapeutic drugs that were molecularly modified to reduce their toxic side effects, but retain their therapeutic value. Professor Simat has contributed ten papers to the scientific literature.

After earning his doctorate, he worked for two medical diagnostics companies, Sanofi Diagnostics Pasteur in Minneapolis, MN, and Abbott Laboratories in Chicago, IL. He held a variety of positions that centered around the invention and development of novel biomolecules for diagnostic blood tests. For the past eleven years he has taught courses at Northwestern College including: Genetics, Developmental Biology, Immunology, Animal Biology, Cell Biology, Biochemistry, and Human Physiology.

Charles Thaxton, Ph.D. 18
Dr. Thaxton holds his doctorate in Physical Chemistry from Iowa State University. He completed two post-doctoral programs, one in history of science at Harvard University and the second in the molecular biology laboratories of Brandeis University. He has specialized in the origin of life and in selected topics in the history of science, especially the origin of modern science. He is a Fellow of the American Institute of Chemists and of the American Scientific Affiliation, and a member of American Association for the Advancement of Science, American Chemical Society, and the International Society for the Study of the Origin of Life.

Dr. Thaxton is co-author of *The Mystery of Life's Origin* and also *The Soul of Science*. He is academic editor of the high school biology book *Of Pandas and People*. He has contributed significant chapters to the books *God and Culture*, *The Creation Hypothesis*, and *Finding God at Harvard*. He published numerous technical articles and has lectured widely in American universities, and at the Korean Advanced Institute of Science, the Russian Academy of Science, and in various universities in Romania, Poland, Hungary, and Czechoslovakia. He is president of Konos Connection, a non-profit educational organization.

Jonathan Wells, Ph.D. 25
Dr. Wells received two Ph.Ds.: one in Molecular and Cell Biology from the University of California at Berkeley where he focused on embryology and evolution; the other in Religious Studies from Yale University. He did research there on the 19th century Darwinian controversies, the religious and theological. Subsequently, he has performed postdoctoral research at UC Berkeley. He worked as the supervisor of Northbay Medical Center in Fairfield, CA and has also taught biology at

California State University at Hayward. He currently lives with his wife and two children near Seattle and is a Senior Fellow at the Center for Science and Culture at the Discovery Institute.

He is probably best-known as the author of his book, *Icons of Evolution: Why much of what we teach about evolution is wrong* (Regnery Publishing, 2000).