



The **BEACON**

News from The Coalition for Excellence in Science and Math Education

Volume XVI, No. 3 Queries? email M. Kim Johnson (next page) Copyright © November 2012

In this issue: President's Message, Ken Whiton. Message from the Editor. Clarification on the Urey-Miller Experiment (initial creation of organic molecules on Earth) that creationists never get right, Dr. Paul Braterman.

PRESIDENT'S MESSAGE

CESE is Getting Attention!

Welcome to The Beacon. Fans of Paul Braterman (aren't we all?) will be glad to see that he continues his tradition of excellence with another beautifully-written, timely and thought-provoking article.

The CESE Website* now contains a review of recent newspaper articles which highlight CESE's increasingly visible role in improving public education in New Mexico. The years of dedication and hard work this organization has invested in our children's future are now receiving the recognition they deserve. Of course, publicity was never the goal, but New Mexicans need the knowledge and expertise CESE has developed, and having media attention gets the message to the general public.

A reversal in Albuquerque Journal's main editorial opinion came as a result of CESE's impact. The Legislative Education Study Committee (LESC) asked CESE to analyze the Education Secretary-Designate's proposed school grading formula for ease in replication. Based on CESE's presentation of that analysis, objections to the formula were aired in a news release.

The Journal's first take was to be dismissive of concerns about the complexity of computing school grades. Their initial editorial response to the "naysayers" pointedly stated that anyone with a Wal-Mart calculator could replicate a school's scores.

The Journal then assigned a capable reporter to interview our own Kim Johnson who did a laudatory job

* **Note: The CESE website has changed to <http://CESE.org>**

of explaining the significant complexity of the state's newly-devised grading system. This conversation gave rise to CESE's new motto: "We're not a bunch of Schmucks." The newspaper even titled Kim's interview: "Group: Grading System Too Complex." Subsequently, the Journal changed course with a new editorial titled, "Simplify A-F Grading to Get Buy-In"

The Journal doesn't change it's "Editorial Page Mind" often, but CESE had the credibility to make it happen.

The work continues. Already, presentations of the "CESE Method" created by our statistician, Walt Murfin, have been made to several school districts. The method determines which schools to observe to replicate "best practices" after accounting for demographic effects. More presentations will follow. Much will depend on the newly-elected legislature which takes charge in January for a 60-day session. CESE's efforts and the resulting media attention have allowed us to open a dialog with the Public Education Department and the legislature. We have but one goal in this effort: improve education in New Mexico, regardless of political affiliation.

As a retired teacher, I'm often asked by folks with jobs, "What do you do with all that free time?" Thanks to the awesome effort and success of CESE, I can ask them if they've seen newspaper articles about a group of Scientists, Engineers, Statisticians and Educators that is advocating for better schools using rational, defensible analyses to lead the way. Their answer is

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usually very positive which allows me to tell them, with great pride, "I'm working with that organization." All this often leads to good discussions about improving teaching and learning in New Mexico. I invite all our members to help spread the word. We are doing important work and our momentum grows every day.

Ken Whiton, President, CESE

Stand Back - Here They Come Again!

Every two years in New Mexico, there comes about an interesting phenomenon. It starts in the middle of January, and ends in March. Its duration is 60 days. This is the long legislative session in which any legislator can introduce any bill they wish. It is important for the state in many ways, but it also brings out some of the very interesting people who do not understand what science really is, but are activists against science anyway. Admittedly, many people cannot define what science is. That is not something that can be done in a few words. But most people who do not understand the meaning or who have some understanding are more than likely willing to let the actual trained scientists determine what is and what is not science.

These very interesting activists against science have an agenda, though. Most are *against* one or more things that science has demonstrated to be highly probable and worthy of being called a scientific theory – something that is so overwhelmingly accepted by the mainstream of scientists who are specialists in the area and something that is so predictive of a natural phenomenon that it attains the label of accepted science. (Common usage of "theory" means a guess, as opposed to the scientific usage.) These anti-science activists, however, do not accept the standards that the world has set for scientists, but rather, they tend to make up their own definitions. Not only that, but they tend to misstate what the mainstream of science experts in a given area have said and do say.

These activists literally try to take what is generally a moralistic viewpoint and twist science to fit their particular definitions. Most often, these viewpoints derive from religious beliefs and have nothing to do with the process of deriving viable, natural explanations for natural phenomena. These activists represent the antithesis of real science.

Over the last decade or more, these activists have evolved the language they use so that it seems "*fair*" and worthy of consideration to the average person in the street or, for that matter, the average legislator who is rarely a scientist. And it is certainly alright not to be a scientist! But, as in any field of knowledge, it is not alright to twist the facts to fit a philosophical or religious based opinion.

During this coming legislative session, starting 15 January, 2013 and

<http://www.cese.org>

ending 16 March, 2013, these anti-science activists are almost certainly going to introduce yet another bill into either or both of the NM legislative houses. They have been doing this every other year since 2007, in which they first introduced a bill that was based on the Discovery Institute's draft anti-evolution bill. (For those who do not know, the Discovery Institute is the center for antievolution. They have disguised themselves as a pro-science institute by "claiming" that they are doing legitimate science. They have gone from decreeing that their goals (the "Wedge Strategy – see Dr. Braterman's article to follow) were to make the United States into a theocracy in which God (evangelical Christian, radical Muslim, and extremely conservative Jewish sects) should be the prime focus of the nation. Also, the nation should become a Christian theocracy to (paraphrasing): we are a science-based organization just questioning the validity of the findings of science – including global warming, cloning, the origin of life, and so on.

So, how have these people fared across the United States? In general, not very well. But they have made inroads. Particularly in Louisiana where a similar law was passed, there has been some success (see next page excerpts for the currently proposed New Mexico law). Unfortunately, when the Louisiana statute says teach evidence against evolution, science teachers cannot find anything that is valid. The only thing they can do is look to creationist or intelligent design textbooks (not accepted by mainstream science), and the teachers who actually understand science are stuck asking "what can teach that is acceptable to real science?"

So, why all this lead-in and hoopla about this coming session of the legislature and the bills that we believe are coming? The short version is that we believe people should be informed about anti-science activities that are controlled by our public officials. The longer version is that after comparing the bill from 2011 and the purported bill for 2013 (it may be different – these people can and do change tracks on a moment's notice), there appears to be essentially no change but to the formatting on the web. But if this bill should be passed, it opens the door to a significant violation of the First Amendment's Establishment Clause. Furthermore, it allows the creationists to get a theological foothold into what is being taught in New Mexico schools. If the 20 year goals of the Wedge Strategy begin to take affect, our children will be taught theologically based materials in a science classroom. And I suspect that our Founding Fathers will begin turning over in their

graves, if they are not already doing so..

The 2011 bill, and apparently the 2013 bill, discuss several things. You may see a copy that is labeled 2013 at the top and 2011 at the bottom at http://originseducation.org/index.php?option=com_content&view=article&id=26&Itemid=4. Note the name at the beginning: "Originseducation." The creationists have never seemed to understand that the origins of life is not the same as the evolution of life. Yet they attack "Origins" (how was life started)– except in this bill, though the bill would open the door. Instead, they concentrate on protecting students and teachers from teaching "scientific" information that applies to controversial topics, such as global warming, evolution, and cloning. What does cloning have to do with scientific topics that are controversial? Cloning is something that has been accomplished already. It is more like a genetic engineering topic, not a science topic that is controversial in any sort of scientific sense. In an ethical sense, yes, but it has already been done. Why would they include that here instead of in a talk about the impact of science on society, which is in the current science standards? To me, this is a peek into the non sequitur type thinking that apparently occurs in the minds of these anti-science people. The ethics of cloning will probably come up as an ethics controversy, not a science controversy.

There is more in the bill, as currently stated, but the biggest point I see is the definition of what scientific material is. The definition lacks a few very key components. In fact, it essentially allows anyone who dresses in a lab coat and pours two chemicals together to be classified as a "scientist" and to provide scientific information. But in reality, scientific material is only classified as such if it has been reviewed and accepted by experts in the area of science being given attention. For material to be scientific, it must be predictive and falsifiable. Can just anyone have a valid scientific viewpoint? Well, sometimes. But that person must be well trained and knowledgeable in the area of science they are concerned with. They must accept peer review by the mainstream of scientists who specialize in the area of concern. They must understand and accept that whatever their opinion is, it is subject to examination. The results of their opinion must be predictive (that word again!) and it must accept a way or ways to disprove it if it is incorrect. Yet none of these core requirements are listed in the bill. In short, the definition of science is so incomplete as to allow junk science, or pseudo-science into the schools' science classrooms. The bill also states that no teachers or students can

be punished for teaching or believing in a particular “controversial” scientific viewpoint. Students and teachers can believe in whatever they wish. But a teacher must teach to the state science standards; deviations to religious based material, no matter how well disguised, are simply not a protected area, as many court cases have demonstrated. This bill is an attempt to very cleverly get around the First Amendment, and if it comes passes, it automatically puts the state into a terrible position, as a laughing stock for the rest of the nation, as a subject to expensive and drawn out law suits, and worst of all, as a purveyor of religious based beliefs in the guise of science to students who need very much to have a decent foundation understanding in terms of what is science, and what are the basics of science that are shaping the world today.

So, as we gird our loins, to borrow a phrase, for another onslaught of pseudo-science, they start with a fundamental tenet of the creationists in which they continually assert that the scientific studies concerning the origin of life on earth are, simply put, wrong but that they are taught as such in science (biology) classes. Dr. Paul Braterman takes on this topic in the following excellent article, and properly discusses the fact that creationism is, in reality, a conspiracy theory. (Again, origins of life is NOT the same as evolution of life, yet the creationists never seem to get this straight. But they keep pounding on it, and miss the point of early and later experiments regarding the creation of organic material from scratch, so to speak.) Dr. Braterman has been kind enough to release this copyrighted article and allow the public to use it for, non-commercial consumption. And how befitting it is, dealing with the beginning propaganda that is sure to surface if this bill is passed into law. The Beacon and CESE thank him for all his contributions, and in particular for what follows.

Kim Johnson, Ed.



An earlier (2003) cartoon by David E. Thomas expressing the attempt by the anti-science creationist (using “intelligent design” as a guise to have the New Mexico science standards modified to include a religious based idea into the science standards. Now, they are trying to get to the same place (substitute “science class” for “science standards”) through legislation. This cartoon also shows the many steps that real scientists must go through to be called accepted scientific material. Add predictive for scientific theories and falsifiable, and this forms a very good graphic showing what real science requires to be considered as such. This is very different than what is proposed in the creationists’ bill.

Creationism as Conspiracy Theory, and the Teaching of Their Urey-Miller Experiment

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Some time, you may want to start a conspiracy theory. If you want to learn how to do this, you cannot do better than study the antics of the creationists, and especially their Discovery Institute (DI) think tank.

Creationists absolutely need to have a conspiracy theory. That is because it contradicts everything that scientists have been telling us for the past 200 years, or even, in its Young Earth version, the past 300 years. If creationism is true, the entire intellectual establishment has been lying to you.

All conspiracy theories work the same way. Like the most unpleasant kinds of religion, they divide humanity into two groups, the illuminated and the benighted, and offer membership of the illuminated, if you will only accept their central doctrine. To qualify as a conspiracy theory, that doctrine has to pour scorn on the most obvious or scientifically validated explanations of the facts, and replace them with the belief that these explanations, or indeed these facts, are fabricated by a close-knit group of wicked people (in this case, the Wicked Evolutionists, or WE), cynically manipulating the evidence for their own disreputable reasons. Once this belief is in place, it is self-sustaining, since all evidence to the contrary is tainted, coming as it does from the Unscrupulous Scientists (US).

The next step in setting up your conspiracy theory is to find a group of people who already want to believe you. Most of us, after all, spent most of our thinking time on looking for evidence in favour of what we want to believe. So find a group of people who already have reasons to want your claims to be true. They might, for example, wish to believe that the Government is hiding evidence of UFOs, or that NASA is a giant scam, or Barack Obama should not be President of the United States, or that Government should not interfere with the operations of industry.

Then give them an excuse, however flimsy, for believing. Believing that aliens landed at Roswell, or that the Moon Landings were faked, or that Obama was born in Kenya, or that there is no such thing as man-made global warming. Or, at least, for believing that the topic is controversial. If all else fails, your own voice raised in denial of reality can be used as evidence that the controversy is real.

You've now got US in a cleft stick. If WE ignore you, you can continue unchallenged. If WE reply to you, that proves that there really is a controversy. And if WE try to explain that there is nothing worthy of a reply, you can claim, as William Lane Craig claimed when Richard Dawkins refused to debate with him, that WE are scared of you.

Finally, you have to convince your target audience that it matters. Here the creationists have it easy. For most people, at least for most people outside parts of Western Europe, religion matters. If the Bible is literally true, as a lot of people would like to believe, then evolution is wrong and WE are spreading false doctrine. Moreover, since WE are smart people (no self-respecting conspiracy theory would claim that Nobel Prize winners as a group are stupid), WE must be spreading that false doctrine for non-scientific reasons. And what might that reason be? Obviously, naturalism is a form of materialism which is a form of atheism. It is, therefore, the scientific, as well as the religious and moral, duty of creationists to refute what WE are saying. Hence the DI's notorious Wedge Strategy¹. Refute evolution, and the way is open, as the wedge Document says, to refute "*scientific materialism*" [emphasis in original] and reinstate "theistic understanding."

Time to illustrate by example. And a good example it is; the DI members are really very good at what they do. This one comes from the cover letter that the Discovery Institute recently sent out with its pamphlet for parents, *A Parent's Guide to Intelligent Design*. My excuses for publicizing here are that it is going to reach its target audience without any help from me, and that this particular example is in fact rather instructive. I take a perverse pleasure in showing ways that we can learn, from creationist materials, what the creationists themselves refuse to learn.

Continued from page 5

So here it is, reproduced solely for purposes of discussion and review. [Emphasis in the original.]

“Dear [first name]:

Textbooks and teachers stop teaching myths about evolution when the mainstream media admit textbooks are wrong ... don't they?

Not if the data challenges Darwinian evolution.

... Retelling outdated myths about the Miller-Urey experiment and the origin of life and wrongly telling students the experiment correctly simulated gases present on the early earth ...

The evidence challenging evolution is beginning to outweigh the evidence that supports it. But will your kids learn about that in their science classes? Unfortunately, probably not.

To help parents understand all the aspects of the debate over Darwinian evolution and intelligent design we created a free 28 page e-booklet **A Parent's Guide to Intelligent Design: Resources to help you and your children understand the debate between Darwinian evolution and intelligent design.**”

The free booklet comes with a request to donate, but whether the Discovery Institute really needs that money, or whether it is just another device to generate commitment, we can only speculate.

Let's look first at the overall structure, and then at the specific claim, (which is actually one of four; but life is short).

Starting off with the initial rhetorical question, and its proposed answer. Here the purpose is clear, while the language, quite deliberately, is not. Note the reference to the mainstream media, suggesting that it is the biology teachers and textbook writers who are the fringe group. The nudge nudge, wink wink, dot dot dot layout establishes intimacy; reader and writer bonded together by a common understanding. Finally, the question and answer format introduces an element of deniability that you will find throughout the creationist literature.

“We don't say evolution is wrong, we just draw attention to all the question marks about it.”

Now to the substance of the claim I'm examining, that the textbooks are “Retelling outdated myths about the Miller-Urey experiment and the origin of life and wrongly telling students the experiment correctly simulated gases present on the early earth.” 30 years ago, this claim might have had some validity, but not now. No matter. Once a claim enters the creationist literature, it takes on a life of its own. For example, Darwin's lament about the incompleteness of the fossil record in 1859 is repeated as if it described the situation today, despite the existence of tons (literally) of evidence unearthed (literally) to the contrary. So let's look at what actually happens in the Urey-Miller experiment, what it does or does not tell us, and how it is treated in 21st-century textbooks.

The original report of the Urey-Miller experiment² relates it to Harold Urey's cold accretion theory, which maintained that the planets formed so slowly that the gravitational energy of their formation was dissipated as heat³. On this theory, the metal from iron-nickel meteorites would have been lying around on the Earth's surface giving rise to a strongly reducing (i.e. hydrogen-rich) atmosphere. This theory did not survive the moon landings, and the discovery that most of the moon's surface consisted of molten basalt. Nor does the experiment address the origin of biological polymers, or of organization. Nonetheless, the experiment was, and remains, liberating. It destroyed the assumption that the building blocks of life are difficult to come by.

Changes in thinking since then have all been in the direction of making the production of these molecules seem easier. As Stanley Miller himself showed in one of his late (2002) papers⁴, we don't need a strongly reducing atmosphere. We certainly don't need ammonia, the least plausible of his original ingredients because it is so readily destroyed by UV light, as long as we have nitrogen, N₂, (which we certainly would have) and some source of energy powerful enough to split it into separate atoms (and we would certainly have had that, in the form of the Sun's unfiltered UV light,

back before the formation of atmospheric oxygen and ozone, as well as lightning). We don't need large amounts of methane. Very small amounts, which could readily arise from geochemical processes (as seems to be happening on Mars), would do the trick, as would carbon monoxide, a component of volcanic gas; it was carbon monoxide that was used in Miller's 2002 work. Organics could also have arisen by completely different pathways, including reactions at hydrothermal vents, or on sulphide mineral surfaces, and large amounts of organics would in any case have been brought to earth by comets. Comets, after all, are dirty snowballs. The snow is thought to have made a major contribution to the Earth's oceans, and the dirt is a mixture of organic compounds. Simple organic molecules are a precondition for life as we know it. We do not know the relative contribution of the various possibilities to the inventory of such molecules on the early Earth, but we can feel confident that they were there – one way and/or another.

What about the textbooks? What do they say, what should they be saying, and how much justice, if any, is there in the Design Institute's accusations?

To quote Dr. Ken Miller⁵, who is, among other things, one of our most influential educators and textbook writers in biological science:

"It's absolutely true, of course, that the strongly reducing atmosphere Miller and Urey used for their first experiments is now not thought to be indicative of the primitive earth. Therefore, it would be a mistake to claim that these experiments "proved" anything about the actual biochemical pathways to life on earth.

However, these experiments were still absolutely essential in shaping our current views of prebiotic evolution."

Exactly. Urey-Miller de-mystified the production of the building blocks of life. For some decades, there was rancorous disagreement between those who paid high regard to the original experiment, and the geochemists to whom such an atmosphere seemed increasingly implausible. However, once it became clear that the highly reducing atmosphere

was no longer even necessary, the dispute faded into the background.

I have looked at half a dozen textbooks. One of them did in fact present the Urey-Miller atmosphere as realistic, which I regard as gross professional incompetence, rather than deliberate concealment as suggested by the creationists. However, even this text did mention reactions at mineral surfaces as an alternative. Every biology textbook that I have examined, with one exception, makes it clear that finding a possible source for the building blocks is not the same as explaining the origins of life. The exception is the 2012 text *Evolution - Making Sense of Life*, by Carl Zimmer and Douglas Emlen, which presents the isotopic and fossil evidence for Archaean life, but says nothing about its origin. And indeed, why should it? We don't demand that a chemistry textbook gives an account of the origin of the atoms, nor could it possibly have done so during the 150 years between when Dalton put forward the first version of the modern atomic theory, and when Fred Hoyle and co-workers gave the first good account of the origin of elements heavier than helium.

So rest assured that your children's textbooks will not retell "outdated myths about the Miller-Urey experiment and the origin of life", but will, on the contrary, carefully distinguish between the formation of prebiotic organic molecules, and the origin of life itself. And even the few texts that are still guilty of "wrongly telling students the experiment correctly simulated gases present on the early earth" are careful to make this distinction.

And the Discovery Institute is doing what they always do superbly. Distorting reality.

End Notes

1. Available at <http://www.antievolution.org/features/wedge.pdf>
2. S. Miller, *Science* 117, 528 (1953).
3. H. C. Urey, *PNAS* 38, 351 (1952).
4. S. Miyakawa et al., *PNAS* 99, 14628 (2002).
5. Private communication

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