BEFORE THE STATE BOARD OF EDUCATION

TEXAS EDUCATION AGENCY

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PUBLIC HEARING

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On the 10th day of September 2003 the following proceedings came on to be heard before the State Board of Education, Geraldine Miller, Chair presiding, held in Austin, Travis County, Texas:

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PROCEEDINGS

September 10, 2003

CHAIR MILLER: We have got a quorum and we will -- the meeting will begin.

I want to thank all of you for coming and participating in our public hearing today. Some of you maybe were here in July, some of you this might be your very first time to go through this process of a public hearing in front of the quorum of the State Board of Education, this elected body.

I call this democracy in action. It's -- we are here to hear what you have to say and your points of view. And we welcome them.

We do have 169 -- that was the last count -- that have signed up prior to the deadline. So as you know, we -- the testimony is to be allowed at three minutes. Because we have -- you can do the math, multiply that and realize how many hours that we are going to sit here and -- and listen to everyone's opinions and points of view and suggestions.

Our -- the ultimate goal in a public hearing on textbooks, this wonderful textbook process that we have in Texas, is to come up with the best books. Because, as many of us know, as

Texas goes, so goes the nation. And we have one of the finest, most comprehensive, multilayered evaluation of textbooks, I think, in the United States. I'm very proud of it. I'm very proud of all the people here at TEA that work very hard to bring it forward to us. And, also, to the wonderful teachers who gave their time this summer and, also, volunteers that took the time to read the books. It means a lot to us, believe me. So I just don't think I can thank you enough. And I welcome -- we all welcome you today.

The -- we have a little bit of housekeeping to do. And so let me begin with some issues that were brought forward to us and to our Commissioner, Scott, prior to this meeting. And so member -- we've had -- out of the 169, we had a few people from out of state. And so let me address this: Members, some of you have requested that the out-of-state speakers be allowed to address the Board as part of the textbook hearing process. We have a textbook rule that only allows Texas residents to address the Board or submit written comments as part of the textbook review process.

Because that rule is an administrative regulation adopted in the Texas Register, we cannot suspend it

like we normally can do our operating rules.

I have spoken with Robert Scott, our Commissioner, and he is willing to use the Commissioner's authority to waive a State Board rule if that is by the request of this Board.

I will also commit to bring this issue back later in -- possibly in the spring that we can review the textbook rules again and make any appropriate revisions in 2004 for the 2004 adoption in the next cycle.

So with that, I will open it for any comments or a motion or however the Board -- the pleasure of the Board.

Dr. McLeroy.

DR. McLEROY: Go ahead, Mavis.

CHAIR MILLER: Ms. Knight.

MS. KNIGHT: Point of inquiry: Is it possible for us to receive the written testimony of the out-of-state individuals, as opposed to hearing the verbal testimony?

CHAIR MILLER: Certainly. We can hear written and -- yeah.

MR. MONTGOMERY: Madam Chair, I believe that --

CHAIR MILLER: I'm -- let me -- who

else had their hand up next?

Dr. McLeroy. And then, I believe, Mr. Craig, didn't you have your hand up?

MR. CRAIG: No, ma'am.

CHAIR MILLER: No. All right. Then Mr. Montgomery and then Ms. Leo.

DR. McLEROY: I would just like to speak to the Board. I think -- I would like to -- we don't have that many out-of-state testifiers. I think there's around 11 or something.

CHAIR MILLER: Seven.

DR. McLEROY: There's seven?

CHAIR MILLER: Uh-huh.

DR. McLEROY: I don't think it will extend our time that much time. I think it would be very valuable. I would like to hear it. And so I would like for the Commissioner to overturn our rule.

CHAIR MILLER: All right. I believe Mr. Montgomery.

MR. MONTGOMERY: Yeah. Point of clarification: Doesn't this rule also apply to written testimony, as well as oral testimony; is that correct?

CHAIR MILLER: I just read that, yes,

sir.

MR. MONTGOMERY: It does.

CHAIR MILLER: Any other -- Ms. Leo.

MS. LEO: Well, I just think that this Board is charged with the duty to adopt quality textbooks and -- that meet our TEKS. And how can we do that if we critically don't have all the information from some of the science --

CHAIR MILLER: Turn your mic on.

MS. LEO: Can you hear me?

CHAIR MILLER: Yeah.

MS. LEO: Okay. And -- I mean, some of these scientists have been -- their work has been criticized in the books, Dr. Behe especially. This is a book that will go out nationwide. We're not just thinking about Texas residents here. What we do in Texas on textbooks really has national significance. When Ken Miller's work was criticized, the last biology textbook adoption cycle, he was allowed to come and defend his position before the Board.

Same thing with Dr. Leos. We have received so much information in the mail from, you know, smearing his personal character and his work. I think it's only fair that we allow them to speak.

It is 21 minutes. Our issue is not Texas specific. And especially when other groups, the National Center for Science Education, has even sent a letter to the Board in which they said that they have been making suggestions directly to the publishers, out of the spotlight, so to speak. So if they are allowed from California to work with our publishers and influence them and possibly criticize some of these scientist's work, I do believe that they deserve their -- a fair hearing. They deserve their three minutes.

And I don't ever recall a time before when a person signed up to testify and they were asked what their residency was. I just think that science is not a sacred cow. There is a history of ideas out there that don't go along with the consensus. And for us to be fair, I think we need to hear -- it's not going to require that much of the Board's time, especially when the work is criticized in the textbooks. And they have spent the time and money to come here and defend themselves.

CHAIR MILLER: Thank you, Ms. Leo.

Mr. Scott, would you like to make a comment?

MR. SCOTT: Ms. Allen has --

CHAIR MILLER: Oh, Ms. Allen, excuse me.

MS. ALLEN: Did we --

CHAIR MILLER: Welcome.

MS. ALLEN: Thank you. Did we take a vote, a telephone poll?

CHAIR MILLER: We just started the meeting. Oh, I'm sorry.

MS. ALLEN: Did we take a telephone poll? I know I received a call asking me my -- whether I would approve it or not.

CHAIR MILLER: Do you want to speak to that, Mr. Scott?

COMMISSIONER SCOTT: I was approached by several Board members about this issue initially. I think about a third of the Board had contacted me. So rather than make a decision on whether or not the Commissioner grant a waiver based on a third of the Board, I asked staff to contact the remainder of the Board members and get their preference. So that's the process we went through.

MS. ALLEN: And the results of that was?

COMMISSIONER SCOTT: Well, obviously,

it's not a binding vote. But the consensus, the sense of the Board members was that there was a majority that favored adhering to the current State rule.

MS. ALLEN: Okay. And then we're doing it again?

COMMISSIONER SCOTT: That was nonbinding. The issue today is, I am willing to adhere to the will of the Board on this matter. If the Board would like, by majority vote, to request a waiver, I am willing to grant it. I do not believe it's appropriate for me to act on a Board rule, because I respect the rules of the Board, without clear direction and public direction from the Board.

MS. ALLEN: Okay.

COMMISSIONER SCOTT: That being said, I am also a believer that -- you know, that we should listen to all sides of this debate. And I am willing to stay after the Board meeting to meet with any representatives from out of state who wish to relay any concerns or provide any additional information to the agency itself. Any of the Board members who want to stay after are welcome to stay. However, we cannot violate the Open Meetings Act and

cannot have a quorum, without a waiver of such. So I'm willing to stay as late as it takes.

MS. ALLEN: I just wanted to see how that poll came out, because I know I was called. But in defense of it, I also wanted to say that these are books selected for the State of Texas for the -- and they are put together according to our proclamation, the guidelines. And we operate under Texas rules, Texas regulations, Texas proclamation. I think it ought to be a Texas decision. While I am willing to listen to input in writing or read the input, I think that we ought to use our time wisely. And we don't have enough time today to listen to all of the things that the Texans have to say. If we have 168 people today, you can multiply that without even -- with -- times three without making a comment, without somebody asking a question and you can see the hours will run into 10:00, 11:00, 12:00 tonight. So I think that we ought to hear from Texans. And if somebody wants to stay until midnight and hear from out of town, but I think that this is a Texas focus, under Texas proclamation, the books are for Texas children.

COMMISSIONER SCOTT: Thank you.

CHAIR MILLER: Yes. Mr. Scott.

COMMISSIONER SCOTT: Your point is well taken on the time constraints here. I would also say to the public that -- to respect the time limits of the Board. But, also, if you feel like your testimony will be repetitive, we can certainly make available note pads or -- so you can provide written testimony. We'll make that available to the Board members and to the media who want them as well.

However, this is -- you know, I think there are seven folks from out of state. So I'm willing to lay stay later afterwards. And the effect of that would be that the Texas residents would be able to go first and then we could hear folks from out of state afterwards.

CHAIR MILLER: All right. Ms. Bauer.

MS. BAUER: When I was apprised of the rule, I spent days calling all the superintendents and the principals in my area. And 100 percent of them said to abide by the rule. And I feel that that's really important that we also listen to those who are teaching the children and have that authority.

CHAIR MILLER: Thank you, Ms. Bauer.

Mr. Craig.

MR. CRAIG: May I make a motion?

Madam Chairman, I would move that we allow only Texas residents to speak, but that we would receive from non-Texas residents any written materials that they might have to review.

MR. BERNAL: Could you add to that that the Commissioner and some of us would wait until the end and stay and listen, even if it's after we adjourn?

MR. CRAIG: That would be fine.

MR. MONTGOMERY: Second.

CHAIR MILLER: Any further discussion? Everybody understand the motion?

Okay. Then we will have a record vote.

(Vote.)

CHAIR MILLER: Now, everybody voted, I hope.

All right. The motion passes.

MR. MONTGOMERY: A question, though, about this, about the written comments. Does it still take a waiver from the Commissioner to allow written comments that have already been submitted to us to be -- to stay in the record? Mr. Anderson, do you --

MR. ANDERSON: You can consider those as comments submitted to the Agency, in which case the answer is, no. I think the sense of the motion, though, was to ask the Commissioner to take whatever action is necessary to incorporate only written comments from non-Texas residents into the textbook hearing record.

DR. BERNAL: Madam Chair.

CHAIR MILLER: Yes.

DR. BERNAL: Another issue. I wanted to express my appreciation to you and to the Commissioner -- acting Commissioner -- for your attitude concerning a request that had been made by some good Texan constituents asking that some consideration for two people, Liz Carpenter, who may show up in a wheelchair -- and we don't know that she's here, but that she wanted to testify. She used to be the Press Secretary -- for some of you that are not as old as I am, she used to be the Press Secretary for Lyndon Johnson. Anyway, she's in a wheelchair. And the consideration to be given to her is that we would have her come up when she would arrive.

The other one is a Nobel Laurette from the University of Texas, Steve Weinberger. But

he has since made a change in his schedule and he's willing to come during the time that he was scheduled. So he's -- that consideration would be out.

CHAIR MILLER: Oh, so he's okay with --

DR. BERNAL: But I appreciate you-all listening to me on those requests and agreeing to bring it up before the Board.

CHAIR MILLER: Certainly. We, always in the past, try to accommodate unique and unusual situations.

I'd like to let you all know that Gene Rios and Diane Salazar will call the names of our testifiers. And so if you could -- since we do have so many, when your names are called, they'll be calling the next person, if you could sort of walk into -- get as close as you can to be in line for the next person to testify, it would help us as we move through this efficiently.

Terry Taylor will keep time right over here.

Raise your hand, Terry.

And just remember that you have three minutes. A two-minute -- right? You will ring for

two minutes?

That means you have one minute left. So we're also going to ask you, though, if you get to the point you've got just a few words left in a sentence, you may finish it, but not a paragraph, please.

The -- and I'm also going to ask our Board would be -- to be sensitive in your question and answer period to how many people we have signed up and the time. Because we want everybody to have their opportunity to speak before this Board. So with that, begin.

MR. RIOS: Mark S. Ramsey, followed by Stephen Schafersman.

MR. RAMSEY: Madam Chairwoman and members of the Board.

My name is Mark Ramsey with Texans for Better Science Education. I am registered in the State of Texas as a professional engineer. As we start this historic meeting, this packed room demonstrates the controversy that continues over the de facto monopoly power a relative handful of individuals exert over the teaching of chemical and biologic evolution. With apologies to Winston Churchill, never have so many been so intimidated by

so few.

As an honors graduate from Texas Tech, I once believed in evolution. I was surprised when a friend told me there were inconsistencies with the theory. I was indoctrinated -- some would say brainwashed -- to believe that evolution was as proven as is gravity.

Today, over two decades later, many of us now know better. As the years since the voyage of the HMS Beagle have passed, we are no closer to answering profound problems with the theory that even Darwin recognized. New problems with several theories relating to the origin of the genetic code and the very information contained in that code appear to be insurmountable.

You will hear today from many, although not as many, credentialed and world-recognized scientists, each discussing one or more profound scientific weaknesses of evolutionary theories. To be clear in the beginning, TBSE is not attempting to insert the Bible, creation science or even intelligent design into the textbooks. We are a very diverse group and we do not agree on some issues. TBSE submitted multiple reviews to you on most of the books. In those reviews, we have become

unified, however, in asking that publishers be made to abide by existing Texas law passed by a bipartisan majority of this very Board and supported by a breathtaking 82 percent of Texans. Literally thousands of Texans agree with us enough to sign a simple online statement supporting the enforcement of current law.

We actually wish more evolutionary theory was being taught, not less. Strengths and weaknesses. At the end of this historic day, I urge you to take the bold step of simply recognizing the most enduring controversy of mankind, that of origins. And that profound and seemingly intractable scientific difficulties with the various theories of evolution, in some cases mutually exclusive theories of evolution, do indeed exist and should not be covered up or otherwise censored.

As a fifth generation Texan, I say we should lead in teaching both sides of the controversy and let the fittest survive. Please stop scientific censorship.

Thank you.

CHAIR MILLER: Thank you.

MR. RIOS: Stephen Schafersman, followed by --

DR. McLEROY: Question: I just want to know, did you do a -- which review -- how many books did you actually review yourself and send it to us?

MR. RAMSEY: I personally scanned every book that was submitted. I only really did a detailed review on four of those books. And I think I actually submitted two of those to the TEA. But the broader group, TBSE, covered, I think it was about eight or nine of -- of at least the larger books, if you will.

DR. McLEROY: So not only have you read the books, you've read them and read them in detail?

MR. RAMSEY: Absolutely. And not just this year's books, but prior year's books, as well, to compare with.

DR. McLEROY: I just want to tell you, thank you very much for all that work. That's what I like to see in people that testify, that they've actually read the books and have given us concrete testimony. And that's what you -- the written testimony that we received earlier in the week had your review. So thank you very much.

MR. RAMSEY: Thank you.

MS. LEO: Madam Chair?

CHAIR MILLER: Ms. Leo.

MS. LEO: I just wanted to ask you: I know that all of your written comments were turned into the Board, all the Board members got that through the mail. But when I looked over that, I didn't see one of your reviews in the comments in the changes in the science that you were talking about in there that mentioned your personal belief, your religion, creationism, intelligent design, didn't even mention age of the earth issues as some have alleged. And I would just encourage -- and I want to thank you as well for taking the time to write that. But I'd like to encourage the Board members to look at those written reviews. I think a lot of people will not be able to point to specifics, but they'll have a generalization. You have provided for the Board specifics. And I really do appreciate that.

And what does your petition say that you have on your sheet?

MR. RAMSEY: You know, I don't actually have a copy of it, sorry. So this was not a planned thing. The petition online essentially says that whoever signs the petition agrees that

teaching both strengths and weaknesses, as required by TEKS 3A, should be followed. It says nothing of creation science, of intelligent design or anything of that sort. It's simply teaching both sides of the controversy, strengths and weaknesses.

MS. LEO: And I know that's been up for three weeks, because I looked at it. How many people have signed that petition?

MR. RAMSEY: It's a little hard to say, because the server has been apparently swamped or something. But the last accurate count was over about 2400. And they're actually escalating pretty rapidly here with all the publicity.

MS. LEO: I thank you for doing that web-site. It's an awesome web-site. I encourage the Board members to go to it. The reviews will be on there.

MR. RAMSEY: Thank you very much.

CHAIR MILLER: Thank you.

MR. MONTGOMERY: Madam Chair.

Mr. Ramsey, I appreciate the time that you've taken to review some of these books. I'm looking at a book review that you made of Biology: The Dynamics of Life by Glencoe Science. It's a quite extensive review and I appreciate any

citizen taking the time to do that.

As you know, State Board members are not scientists. We must listen to both sides of the issue and we have so-called scientific experts on both sides of every case, as you might well know. And so we must determine, you know, which is correct and so forth. And I think that -- I can't speak for all of my colleagues, but we all certainly, I think, want the TEKS 3A to be adhered to, which includes both strengths and weaknesses.

But having said that, you have reviewed these books very extensively. What is your background in the biological sciences?

MR. RAMSEY: Background in the biological sciences?

MR. MONTGOMERY: Yes, sir.

MR. RAMSEY: Some college work. I'm not a Ph.D. biologist.

MR. MONTGOMERY: Your background is what field?

MR. RAMSEY: Mechanical engineering. I spent about half my career in research and the other half as a consulting engineer in the oil and gas business.

MR. MONTGOMERY: Are you associated

in any way in any other organization that might have an interest in this whole issue as far as evolution, creation or intelligent design? Do you belong or head any other organizations?

MR. RAMSEY: I don't quite understand your question.

MR. MONTGOMERY: Well, I mean, do you belong to any other active organization, such as an evolution group, a creationist group or an intelligent design?

DR. McLEROY: Point of order. That has nothing to do with what we're -- Dan, let's get on with this.

MR. MONTGOMERY: I'm asking the questions. You've had your --

DR. McLEROY: This has nothing to do with these textbooks.

MR. MONTGOMERY: Well, I just -- I don't know why anybody would not want to answer that question.

MR. RAMSEY: Are you --

DR. McLEROY: We'll be here all night long.

MR. MONTGOMERY: I just asked you the question: Do you?

MR. RAMSEY: Do I what? I don't under the question.

MR. MONTGOMERY: Well, I'm going to have to repeat it again.

MR. RAMSEY: Do I have interest --

MR. MONTGOMERY: Do you belong to or --

DR. McLEROY: Madam Chair.

MR. MONTGOMERY: -- are you active in any organization --

MR. McLEROY: Point of order.

MR. MONTGOMERY: -- that might be historically associated with this issue, such as an evolutionist group, a creationist group or an intelligent design group? The three issues here.

MR. RAMSEY: What I am associated with is a group of scientists that looks at the science of this very issue.

MR. MONTGOMERY: So you don't belong to any creationist organization?

MR. RAMSEY: You'll have to define "creationist organization." That is not what -- that is not the subject of this day's --

MR. McLEROY: Madam Chair, point of order.

MR. MONTGOMERY: That's my question. And I don't care to be interrupted by a colleague.

DR. McLEROY: Madam Chair.

MR. MONTGOMERY: I'm trying to find out the correct vote. And I am not a scientist. And I think that in order to look at these reviews and determine whether or not there are biases, whether or not someone has reviewed a book who's qualified to review them, that's what we have to look at. And that's why I'm asking the question, sir.

And also, I understand that you built the web-site, right?

MR. RAMSEY: That is actually correct. That's a matter of public record, yes.

MR. MONTGOMERY: Are the web-sites have links to Discovery Institute?

MR. RAMSEY: I believe there's a couple of links. Is that a problem?

DR. McLEROY: Madam Chair, can I ask a parliamentarian question?

MR. MONTGOMERY: I'm through. Thank you, sir. Thank you for taking the time to do this.

CHAIR MILLER: Mr. Montgomery.

Dr. McLeroy.

DR. McLEROY: Can I get a ruling from the parliamentarian when we start demanding answers that have nothing to these textbooks it's just -- we'll be here forever. What's the actual --

CHAIR MILLER: This is public testimony and it's public discourse at this point. And I think it's the will -- it should be the will of this Board of how we want to proceed forward on this.

DR. McLEROY: Well, I just thought, Mr. Montgomery, that was a very poor line of reasoning for what we're trying to accomplish.

MR. MONTGOMERY: Well, we'll wait and see what your reasoning is.

CHAIR MILLER: Let's just -- I'm going to ask -- I'm going to ask that this Board, respectfully respect each other. And if you want to speak, please raise your hand and I will recognize you. But we, also, have a very long day. And I've asked that you all be very sensitive in your questions and your Q and A's to the people who have given -- taken their time and effort to come down here.

So thank you very much, sir.

MR. RAMSEY: May I add one thing?

CHAIR MILLER: Quickly.

MR. RAMSEY: Quickly. I am appalled by the fact that the very people that would vote to not hear world class, credentialed scientists on this issue, would then think that other people were not qualified by virtue of the fact that they had something else on their plate unrelated to this issue or maybe related. This country is about freedom. It is not about a litmus test that I can't have faith or outside activities in order to also contribute to the democratic process.

And I thank you for your time.

(Applause.)

MR. RIOS: Stephen Schafersman, followed by Walt Esquivel.

DR. BERNAL: Is somebody timing this? Madam Chairman, how much time did we expend on this speaker, No. 1 speaker?

CHAIR MILLER: I -- we didn't -- I know now if we --what?

DR. BERNAL: Eleven minutes?

CHAIR MILLER: Eleven minutes total.

DR. BERNAL: I think your comments were very appropriate. And I think we need to be judicious about the three minutes.

CHAIR MILLER: Yes, we do. Thank you, Dr. Bernal, for reminding us.

Okay. Begin.

DR. SCHAFERSMAN: Good afternoon, my name is Stephen Schafersman, president of Texas Citizens for Science, an organization dedicated to maintaining the professionalism and integrity of science education in Texas. I am also a professional scientist and science educator and writer.

Here are some recent Texas newspaper headlines: "While SAT Scores Rise in U.S., Texas Still Near Bottom." "Texas SAT Scores Below National Average." "Textbook Fund at Issue in Vote," which mentions that the Texas Permanent School Fund has lost $6 billion in four years, about a quarter of its value.

What's the point of this, you ask? I try to protect biology books from being censured and damaged by creationists of two types, those who testify and try to manipulate the system using specious arguments and marketing tactics, and those individual State Board of Education members who put a higher priority on debilitating the evolution content in biology textbooks, rather than doing

their job to ensure that our children actually receive a good education and have access to modern textbooks that the State can afford to buy.

This inattention to serious concerns is an example of fiddling while Texas' education burns. In July, two members of the Board publicly threatened to place biology books whose publishers refused to make scientifically inaccurate changes on the nonconforming textbook list, thereby making them less purchasable. This is a very dangerous game they are playing, because you -- they -- are asking the quality of our children's vital science education and because the financial -- the public financial intimidation of publishers can have serious consequences.

The biology textbooks being considered for adoption have been vetted by your own science staff, your own science textbook review panel to ensure compliance with the TEKS, your own contractor to check for factual errors and by dozens of scientists and science educators who testified on their behalf in July.

You would be wise and responsible to listen to these experts to judge the scientific content of the biology texts, not to individuals who

are notorious for promoting unscientific and supernatural explanations of natural process.

In my written testimony, I explain in great detail why the so-called weaknesses have no place in the biology books. The weaknesses identified by the Discovery Institute are bogus. True weaknesses of Darwin's original theory, the missing knowledge of genetics, are discussed by all the books. And legitimate problems or controversies of evolutionary theory are too advanced to study in high school.

The Discovery Institute representatives are not scientists, but pseudoscientists. They claim to want evolution taught in our schools, but their claim is not sincere, since they promote intelligent design creationism exclusively, not evolution. The Discovery Institute representatives travel from state to state using political and marketing techniques to convince State Boards of Education to modify their science curriculum in ways favorable to creationism and unfavorable to evolution. They did this in Kansas and Ohio. And ultimately their goal to diminish science education was rejected by both states. Now, they are here in Texas, in this very

room. You know what to do.

In conclusion, please don't give in to creationist pressure and censor the biology textbooks. Don't try to force the publishers --

CHAIR MILLER: Sir.

DR. SCHAFERSMAN: -- to make scientifically inaccurate changes by inserting bogus weaknesses.

Thank you.

CHAIR MILLER: Thank you very much.

(Applause.)

CHAIR MILLER: All right. All right. Ms. Leo.

MS. LEO: Dr. Schafersman, in your written testimony that you submitted before the Board in July, you say that all biology texts are factually accurate and free of errors. And you go on to say, "Nor do they omit scientific information critical of evolution, because there isn't any such information, contrary to what you have led to believe." Then in your oral testimony, you said that there is no scientific controversy about the fact of evolution, no weaknesses concerning its occurrence. There are no weaknesses in the theory of evolution at the level it is presented in these

textbooks. You qualify that. Then you go on your web version and you take out, in your web version, that part of your testimony. You say, "There is no scientific controversy about the fact of evolution. And thus no scientific weaknesses concerning its occurrence. There are also no weaknesses about Theory of Evolution at the level of which it is presented." Then you say, "Disagreements and controversies" -- you added this in there, which was not in our written testimony. "Disagreements and controversy, the weaknesses concerning evolutionary theory are found at the frontiers of research and graduate education and not appropriate for that level in the biology books." Then you said on your web page, again, in your -- for your hearing in September 10, that there are many disagreements among scientists, but they're not appropriate for undergraduate.

So -- I mean, we're trying not to dumb down the curriculum. We believe do that children can understand the strengths. Why can't they understand the weaknesses?

DR. SCHAFERSMAN: You have quoted me correctly, and everything I have said and written is accurate. I distinguish, as do other scientists,

between the process of evolution, of which there are no weaknesses. All scientists accept the process of evolution. The Theory of Evolution, however, there are controversies and problems that advanced researchers, university professors do investigate. Here you might call these weaknesses at that level. They are appropriately studied.

But in high school books, as I pointed out in detail in my written testimony, evolution is treated as reliable knowledge. After hypotheses are tested and go through scientific peer-review and testing and examination, they become reliable knowledge. And that's what gets put in an introductory high school science textbook.

At that level --

MS. LEO: Part of your written testimony here seems to suggest that if we put the weaknesses in here -- and this is from Page 8 on your written testimony -- that it would lead -- that, you know, somehow talks about the -- in Texas the controlling political party, which would be the Republicans, seem hell bent on repeating historical tragedies. And you relate it to Nazism, eugenics. You say that -- let me get this quoted right. Communist, pseudo-sciences and substitution of

scientific anthropology in Germany where the murderous Nazi pseudoscientists of eugenic Aryanism.

Then you go on, basically to say that that's what would happen if we put those in. And by the way, eugenics started with Darwin. And in Germany, I don't know, since you brought that in, that's what Hitler said to Einstein. He said he was a pseudoscience, that he couldn't have an opinion because of his religion on science. I just think that -- I mean, I take great offense to your language here and what you're talking with the Board members relating that as if we would be hell bent on repeating those historical tragedies.

And then you go on and you say that, on your web-site, "Supernaturalistic religion and naturalistic science are and will remain in eternal conflict." And that evolution is blind, mechanistic, purposeless, goal-less and planned. And if you want to indict people for their faith, then maybe we need to indict you for having -- I mean, you've created web-sites. I have them right here. One is from Fagus. It says nonbeliever, secular humanists, agnostics, atheists, free thinkers, rationalists, homophobics. I mean, you go

on and on. This is a -- and they give you credit for designing this web-site. So if you're going to impugn people for their individual faith and say they can't have a say in science, we would have to, by the same token, say, what is your motivation here?

(Applause.)

DR. SCHAFERSMAN: Okay. I will try to answer this more briefly.

CHAIR MILLER: Let me ask -- just a moment. I'm going to ask the audience to be respectfully. I know you might feel like clapping, but in respect to all the testimony, both sides, I think it would be appropriate to refrain from the clapping, if you please.

All right, sir.

DR. SCHAFERSMAN: Thank you, Ms. Chairman.

I will try to answer that more briefly than it was stated. But thank you for repeating all this of my written testimony, which I don't have time to give in my three minutes.

I -- in my examples of -- that you read, I criticized the political intrusion of state -- of public officials into the scientific

content of textbooks or the -- or the science curriculum. That's what I object to. And I do take great offense that people, for whatever ideological reasons they have, are trying to inject their own -- their own beliefs into science. That's what happened in Russia and Germany, as I mentioned.

I don't say that the same things will happen here. But what would happen here, if you did succeed, was that our textbooks would be diminished in their scientific content and our Texas school children would learn less about science and about the important topic of evolution. And, thus, they would receive a second and third-rate education and suffer on the education market. That's what I do claim.

So I take offense at the injection of political biases into science textbook curriculum in textbooks.

CHAIR MILLER: Okay. Mr. Schafersman -- we're going to have to move on, Ms. Leo.

DR. SCHAFERSMAN: That's fine. I answered the question.

CHAIR MILLER: We need the next person, please. Thank you.

DR. SHAFERSMAN: Thank you.

MR. RIOS: Liz Carpenter, followed by Mr. Esquivel.

MS. CARPENTER: Well, thank you.

CHAIR MILLER: Ms. Carpenter, we are just delighted to have you here. We have a rule of three minutes. But, you know, if you have a -- want to have a little extra time. Do you --

MS. CARPENTER: I've got my watch. I don't want to be like Senator Hubert Humphrey who couldn't sneeze in less than five minutes, he said. One time when he was speaking, he went on and on and on. And finally, somebody in the back of the room stood up and said, "Senator, if your watch has stopped, there is a calendar behind you."

(Laughter.)

MS. CARPENTER: I'll try to stick to the --

CHAIR MILLER: All right. Thank you.

MS. CARPENTER: Friends, really no one knows the whole truth about life on this planet. That story is still unfolding. So we cannot limit its theories and the right to speak and the right to think whatever we want to. And that is what America has given us, freedom. We -- there are

lots of explanations. And I come here really as a sixth generation Texan, a descendant of pioneer colonists who carried their books across the Red River and established libraries and schools as soon as they could.

There is even a stranger's bedroom at the house I was born in. The front of my great-grandparents' house in Salado, Texas, so that a horseman could unsaddle his horse and spend the night. And no one asked him what he had read or believed. They shared meals with him because they wanted to know what he knew. They were curious.

Texans, with our wide spaces and blue skies, believe in freedom, I think, and resent, more than anyone, being throttled. And my own roots go back to a 17-year-old boy who died at the Alamo and three ancestors who stood with Sam Houston at the Battle of San Jacinto. I was really shaped by Texas roots, by Christianity, the Methodist Church and the democratic party. And I don't want to be confined by extremists who want to curtail knowledge of any kind.

I'm not a scientist. I have no scientific training. My specialty is Texas and making sure that the children in this State, indeed

everyone, live in a free and open Texas where the flow of knowledge is not hampered by the opinions of the few who, whether they realize it or mean it or not, are -- they -- whether they mean to have this effect are short changing students and making Texas appear narrow when we're wide enough for all ideas.

We cannot cut our children off from the breadth of knowledge available to them. We can teach them to make good choices and values. But we need to let them think. Never be afraid to -- of a library or a school board. Be afraid of a child without all of tools to succeed, for those are the children that are left behind. We have heard that phrase before. We don't want to leave any of them that way.

But when it comes to religion, one size does not fit all. School libraries and computers have a ready supply of books about religions of all sort. No one is trying to burn them. Texas students also deserve a world class science education and access to the best scientific information. So let's not water down the strength of the science curriculum. Let's not box Texas children in. Let's try to give them room to think.

And I thank you for your willingness

to hear me brag on my kinfolks.

(Applause.)

CHAIR MILLER: Thank you, Ms. Carpenter. We appreciate your remarks.

Are there any questions, any comments from the Board?

Okay.

MS. CARPENTER: Thank you very much.

CHAIR MILLER: You're welcome. Next.

MR. RIOS: Walt Esquivel, followed by Dr. Walter L. Bradley.

MR. RIOS: Walter L. Bradley.

William Dembski, followed by Franklin W. Mayo.

DR. DEMBSKI: My name is William Dembski. I'm an Associate Research Professor in the Conceptual Foundations of Science at Baylor University. I hold a Ph.D. in mathematics from the University of Chicago. One of the things I do for a living is study the problistic underpinnings of the neo-Darwinism evolution.

In his testimony to you on July 9th, UT biology professor, Davis Hillis, claimed, "There is no debate about the existence of evolution in scientific circles." That may be, depending on how

you define evolution. But there is considerable debate in scientific circles about the mechanism of evolution. Namely, how it happens.

Cambridge paleontologist, Simon Conway Morris. Writing for the premier biology journal Cell, remarks, "When discussing organic evolution, the only point of agreement seems to be, it happened. Thereafter, there is little consensus."

Despite that, the illusion of scientific consensus is all we get in the textbooks. What's more, pro-Darwinian lobbyists like Eugenie Scott strive to maintain that illusion. In an interview with Salon, Scott tells us why. According to her, for textbooks to admit the lack of consensus over how evolution happened, will, "Confuse kids about the soundness of evolution as a science."

Whatever happened to science education nurturing the capacity of young minds for critical thought? Whatever happened to exposing students to as much information as required to form balanced scientific judgments. All the textbooks under consideration grossly exaggerate the evidence of neo-Darwinian evolution, pretending that its

mechanism of natural selection acting on random genetic change is a slam dunk. Not so.

As a probability theorists, I and many other mathematically trained scientists, regard claims for the creative power of natural selection as implausible in the extreme. To see why, MIT's Murray Eden asked us to imagine a library evolving from a single phrase. "Begin with a meaningful phrase. Retype it with a few mistakes. Make it longer by adding letters and rearrange subsequences of strings of letters, then examine the results to see if the new phrase is meaningful. Repeat until the library is complete."

From the standpoint of probability, neo-Darwinism is even more absurd. Mathematicians aren't the only ones criticizing neo-Darwinism. Consider Franklin Herald, a professor emeritus of cell biology at Colorado State University. In 2001, he published, The Way of the Cell with Oxford University Press. He remarks, "There are presently no detailed Darwinian accounts of the evolution of any biochemical or cellular system, only a variety of wishful speculations."

Last year, I debated Brown University biologist Kenneth Miller, the lead author for one of

the biology textbooks under consideration here. At that debate, I read Herald's criticism. Miller didn't dispute the truth of Herald's claim, but merely made the irrelevant observation that Harold had retired 15 years earlier.

Sadly, such failures to address meaningful criticism of neo-Darwinian theory also pervade Miller's textbook and the others under consideration.

In his July testimony, David Hillis implored you to, "Ignore the push to take science out of our school science textbooks." Hillis missed the point entirely. The point is to put more science into our textbooks by including not only the strengths but also the weaknesses of neo-Darwinian evolutionary theory.

Leave it there.

CHAIR MILLER: Thank you, sir.

Any questions?

MS. THORNTON: Yes.

CHAIR MILLER: Dr. McLeroy.

DR. McLEROY: No. Go ahead, Cynthia.

MS. THORNTON: Thank you for coming very much.

DR. DEMBSKI: Thank you.

MS. THORNTON: I want to ask you a question. I believe through your testimony that you were saying that there are weaknesses. So I'd like to ask you this question: Would you agree that one of the examples of the weaknesses of Darwin's original theory would be the new information presently found in the textbooks on DNA and things like bacteria flagella motors. Excuse my pronunciation. Would you agree or disagree with that statement?

DR. DEMBSKI: Yeah. Well, Darwin had no conception of what was going on at the biochemical level in the cell. I mean, for Darwin, the cell was basically a little blob of jello enclosed in a membrane. And in Darwin's day, the conception was that something like that could just spontaneously arise.

Now, the Origin of Life problem, how you get that initial cell, is the most difficult problem. I mean, scientists don't really have a clue about that. The Miller-Urey experiments which are treated in the high school textbooks are basically forming building blocks. It's like, okay. If you can get the bricks for the house, can we then get the house? You know. And the simplest

cell, microplasma bacteria, there is more complexity there involved than -- name your favorite human artifact. Hubble Space Telescope, the General Motors assembly plant. There's more going on in an individual cell than in any of these human artifacts. And this is all supposed to come about by some sort of spontaneous, blind, natural process. It's absurd. And yet, that is what's pushed because the only alternative is, you know -- dare I say it? -- something like design.

MS. THORNTON: Well, but answer my question, please, sir.

DR. DEMBSKI: He -- the question was: Are there new results which counter Darwinian theory? And yes. Yes, there's plenty of --

MS. THORNTON: And these are examples that I shared with you?

DR. DEMBSKI: These are examples. But I think, you know, my point was not even so much -- I mean, we're here concerned with the accuracy of the textbooks. You know, points of, you know, is, let's say, the peppered moth, is the evidence that's presented there, is it accurate? I'm trying to frame this, you know, in terms of, you know, what are the broader problems with it? And

what you're getting at with, you know, Darwin's theory and this mechanism, there are -- you know, the very framework with which evolutionary biology proceeds in the textbooks is flawed, fundamentally. And that's what's responsible for all these other errors which keep coming up. Everything has to be shoehorned into this framework.

MS. THORNTON: Darwin did not speak about these two items I've mentioned to you.

DR. DEMBSKI: He didn't know about them.

MS. THORNTON: So this was a weakness in his theory and which we know today. And these are found in the textbooks for the students.

DR. DEMBSKI: Yeah. I mean, I think there's this conception of science that, you know, it's always the frontiers of knowledge are being pushed back. And in fact, the more we learn, the more we understand, the less -- the less we actually know about these systems.

MS. THORNTON: Thank you for coming.

CHAIR MILLER: Thank you.

Dr. McLeroy.

DR. McLEROY: Are those things that she talked about identified as weaknesses to

evolution? I know they're in the book, but are they identified as weaknesses to evolution in the book? And the answer to that, I'd say, is no. I'm glad those things are in the book. And Cynthia is very right to realize. These things are very, very complex. And -- but they are not identified as weaknesses, they're just in the book.

I just have another question. I've read a lot of books since our last meeting. And one of them I've been reading about is the -- is how people try to extrapolate micro to macroevolution. And since you are an expert and this is what you write books on this subject. Tell me one of the foremost spokesman that I've read is this guy, Dr. Richard Dawkins, I guess, in England. And he tries to talk about how -- he takes a tree or something and computer generates these things. Can you respond to what kind of results -- are those promising results for the evolutionist's position for natural selection?

DR. DEMBSKI: Yeah. What you're referring to is some computer simulations. I mean, it's trying to get a handle on what is the power of this Darwinian mechanism of natural selection and random variation. And you can represent that

computationally. And so somebody like Richard Dawkins is going to write computer program which are going to -- it's going to try to represent how you can get all this -- you know, all this biological complexity. Let's see if we can do in a computational setting. And he gets some nice pictures out of it.

But the fact is, when you actually do the mathematical analysis, you find that all the information is being put in there already. I mean, you've got already the computer hardware. But then also in the programming.

And the idea is -- I mean, what's driving evolutionary theory is that you want to get -- explain complexity in terms of simplicity. You want to have -- you want to get more out at the end than you start with. And what we're finding within information theory in mathematics is that you don't get something for nothing. That, in fact, whatever you get out, you've already put all the design in there to start off with.

And so his -- what he's done, I think, has been thoroughly repudiated. There have been some newer studies done. There's a recent article by Lenski and Pennock, et al, which --

in Nature, which is trying to ramp that up. But basically, what I find always is that it's sort of moving the shells under some glasses and the information problem doesn't go away. You dig one -- you fill one hole by digging another. And that's the problem. And there are strong theoretical results in information theory which show that the Darwinian mechanism, it is not getting you the complexity that the biological community claims that it can get.

CHAIR MILLER: Thank you very much. Okay. I appreciate --

DR. McLEROY: Mavis had a question.

CHAIR MILLER: Oh, Ms. Knight.

MS. KNIGHT: Madam Chairman, this is not a question for the speaker. This is a process question that my colleagues made me think of. It goes to the issue of strength and weaknesses. Are we suggesting that our students are not smart enough to realize a strength or a weakness, unless it is labeled in the book strength or weakness? I just don't understand that our students and our teachers are not intelligent enough to have to have a label strength or weakness for an issue to be in the textbook.

CHAIR MILLER: Thank you. All right.

MR. RIOS: Franklin W. Mayo, followed by Michele Ramsey.

MR. MAYO: My name is Frank Mayo, and I'm with the Texans for Better Science Education, TBSE. I have written a review on three of the textbooks, Prentice Hall and Holt and Lavelle. And I've looked carefully at -- and thoroughly at Glencoe. These reviews are already available to you, giving page number and quotation, comments about each of the science issues that need to be corrected.

There's been much erroneous publicity that TBSE wants to put creationism or religion into the textbooks. This publicity is without foundation. What the TBSE wants to put into the textbooks is the weaknesses of evolution, which is required by TEKS 3A.

The strengths of evolution are already well represented. But the well-known weaknesses are almost wholly missing from all of these books that I have looked at. And we at TBSE have developed a list of essential scientific weaknesses that should be presented in the biology

textbooks.

I want you to take notice that these are scientific issues and have nothing to do with religion. And I have listed these out below. And let me just mention a few to you. The extreme improbability of obtaining any specific amino acid sequence, the high probability of breakdown of amino acid change by hydrolysis, the difficulty of achieving 100 percent left-handed amino acids in proteins. Whether disassociation of water vapor has been a source of oxygen since the earth formed. The Cambrian explosion quickly produced all the basically different body structures. This is very different from the evolutionary tree of life.

Many life forms exist over large expanses of geologic time, essentially unchanged. Most major proposed transitional forms are problematic and controversial.

As you can see, these are important scientific issues. TEKS 3A demands that they be in the textbook.

CHAIR MILLER: Thank you.

MR. MONTGOMERY: Madam Chair, I'm going to ask the same question to anybody who did a review of the books, only the ones that did the

review. And I won't take much up anymore time, because this is what I'm looking at. You, Mr. Mayo, did do a pretty extensive review of some of the books. And I appreciate that. But I would like to know what your background is in doing this as far as the biological sciences are concerned.

MR. MAYO: Professionally, I am an electrical engineer, semi-retired now. I've had the usually college training. But over the last 20 years or so, I've read -- I can count more than 60 books on my bookshelf related to these kinds of issues, because I got interested and I just wanted to know from starting out from the usual evolutionary viewpoint we're all trained with, there were natural questions that I wanted to pursue and understand. And so that wide reading is my primary background.

MR. MONTGOMERY: You don't have any degree in biological sciences?

MR. MAYO: No, sir, I do not.

MR. MONTGOMERY: And one more question: You mentioned the Cambrian explosion.

MR. MAYO: Uh-huh.

MR. MONTGOMERY: When did that -- how many years ago do scientists believe that that

Cambrian period occurred?

MR. MAYO: The Cambrian period started about 550 million years ago.

MR. MONTGOMERY: Okay. That's what I wanted to know, because, you know, I can't imagine that anybody who is a young life creationist, which a lot of us are, would then associate themselves with a -- a movement that would admit to the -- to the existence of life 500 or 600 million years ago. So I do not think that there is relationship here between your group and creationism. Thank you.

MR. MAYO: My group, TBSE, has got nothing to do with young earth creationism or anything like that.

MR. MONTGOMERY: Right.

MR. MAYO: And many of us can sit back and think from any number of different viewpoints and like to understand all of those viewpoints.

CHAIR MILLER: Thank you. Next?

MR. RIOS: Michele Ramsey, followed by Patrick R. Elliott, Sr.

MS. RAMSEY: Evolution has been taught undisputed for years now. Starting in kindergarten, kids, right along with colors and

numbers, are already introduced to evolution. By the time high school is reached, many youth have been indoctrinated with it, not once learning the weaknesses of this theory. Should not high school, of all times, be a place of learning how to think, not what to think, especially where there's undeniable scientific controversy?

But no, as it stands now, all continues as before. Our textbooks treat evolution as a fact, not providing adequate weaknesses to the highly disputed theory. And yet you're surprised when we make decisions, sound ones really, based upon what we're falsely led to believe is absolute truth. You don't understand the widespread depression in teens, the overwhelming suicide rate. You convince them that it's scientifically proven they're animals, victims of chance with no purpose other than the pleasures they can get out of this earthly life.

You can't believe the increase in teen violence, yet you ignore the evidence that supports that teens are merely acting consistently on what they've been taught since grade school. From the Journal of Eric Harris, one of Columbine's killers, "Me and you will get revenge and kick

natural selection up a few notches. And also, all the fat, ugly, retarded, crippled, stupid in the world would die and, oh, well, if a few of the good guys die, too."

If evolution is true, what a sad world we live in. However, if there's any evidence against it, any doubt at all in its authenticity, why you would hold it back from us? Don't label us as simple, stupid children, unable to deal with opposition. I am deeply offended that Ms. Eugenie Scott suggests, "The role of the high school teacher is not to be on the cutting edge of research. And it's not doing the students any service to confuse them about some of the esoteric elements of scientific discipline."

Are you saying that you can piece things together more easily than my peers and I can? That evolution is easy enough to understand, but to bring up possible errors in it would confuse us? Confuse us so much that you would rather lead us to believe it is infallible and consequently leave us in despair? Do not underestimate our comprehension. We are seeking desperately for the truth. Trying to piece everything together. Yet, you deliberately leave out vital information. We're

capable of understanding calculus, computer programming and Hamlet, yet we can't handle all the facts about evolution?

Stop hiding inconsistencies to make things simpler. How can you expect our generation to come closer to the truth if you hide that which they have found? Do you wish us to wastefully start again at a clean slate? If evolution is too great, please give us a good start in perfecting what we know of it. If my generation concludes it's not, then we'll look for alternatives. All that we are asking of you is to be given the whole truth. Don't sensor anything from us because it might complicate the issue. Please include both strengths and weaknesses of the Theory of Evolution in what's taught. Let us know when old evidences are obsolete. Do not shelter us from the truth.

Thank you.

CHAIR MILLER: Michelle, are you in school?

MS. RAMSEY: Yes, I am.

CHAIR MILLER: Would you tell us what grade?

MS. RAMSEY: I'm a junior.

CHAIR MILLER: A junior. Okay. What

part of Texas?

MS. RAMSEY: In Tomball, Texas, by Houston.

CHAIR MILLER: All right. We -- is this your first time to come before our Board?

MS. RAMSEY: Yes.

CHAIR MILLER: Well, I hope it's been a good experience for you. It certainly -- it makes us proud to see a young person like you come before us and express your views. Thank you so much for coming. And our very best to you in your education career.

MS. RAMSEY: Thank you.

MS. LEO: Madam Chairman.

CHAIR MILLER: Ms. Leo.

MS. LEO: Dr. Schafersman said that introductory science textbooks are written to be introductory science students who do not have the technological and conceptual background to understand complex issues, nor do most of them probably want to. And I know that Origin of Life is an extremely interesting and fun way to study. And that link opens the door for you. It -- I wanted to get your comments on this particular statement. At the K-12 level there is little or no educational

value for the requirement to analyze, review and critique scientific explanations, including hypothesis and theories, as to the strengths and weaknesses. And I want you to answer that.

But I also want to tell you how courageous you have been. Your home address was put up on a web-site. And I think that took a lot of courage for you to come and testify before this Board -- before our Board.

And can you comment on that? Do you think that there is any educational value? The Board wrote that in the TEKS that you could -- you know, that you need information to review, analyze and critique. Is that an important education?

MS. RAMSEY: I think that's very important. Like, I know that as students a lot of times we don't want to learn. You know, like we might not want to study Hamlet or whatever we're being taught. But I think it's very important that the school board has a rule like that in effect so that the students are learning, because it's the adult's job to teach us or we wouldn't be learning on our own.

And, also, like if we can't understand the strengths of evolution, then I think

we should also be able to look at the weaknesses and be able to see just all the sides of the issue. Because when there is controversy over something, that's when we're going to get interested. That's when we're actually going to learn the information. Whereas, if you just tell us one side, we might not even, like, learn it, because it's just so easy to -- just things go over your head or whatever.

CHAIR MILLER: Thank you. Appreciate you coming, Michelle.

MR. RIOS: Patrick R. Elliott, Sr., followed by Cynthia Klentzman.

Cynthia Klentzman, followed by Mark Cadwallader.

MS. KLENTZMAN: You can't see it, can you?

I'm a scientist trained in the field of mechanical engineer. Having used that training as a biomedical engineer.

CHAIR MILLER: Could you speak into the mic a little bit?

MS. KLENTZMAN: I am a scientist trained in the field of mechanical engineering. Having used that training as a biomedical engineer, being involved in the early research presented

exclusively to Dr. DeBakey for the application of prosthetic and cadaver heart valves, including may observations of transplants using the experimental heart units and bypass machines. As a manufacturing engineer in the field of oil exploration and as a science educator.

I am one of eleven members of the appointed science textbook review panel. It was my impression that the TEA was to follow the instructions of this State Board. I am here specifically to report on how the TEA and its science staff directed us to perform our job as review panel members. Prior to my arrival, I was given a question/answer document for publishers to utilize in seeking conforming evaluations. This was meant to guide my personal evaluation when determining if publishers followed TEA's directions.

This notebook directed us that if publishers miss one breakout of a student expectation, the overall expectation fails and the text is not comforming. Reviewers of all subjects were gathered in one room and shown a Power Point on how the TEKS instrument was to be used.

The breakout that is in question is

TEKS 3A. Legally, all that was needed to meet TEA's criteria was one and only one theory and hypothesis that introduces strengths and weaknesses. That means only one situation with weaknesses, such as the Tobacco Mosaic hypothesis, which is insignificant in supporting the theories of evolution, therefore giving of the publisher a passing grade.

Unfortunately, the State review panel has certified the book as conforming if just one theory and hypothesis had weaknesses and strengths given. This is not the correct interpretation. TEKS 3A is required of each and every theory and hypothesis. And each of those must have strengths and weaknesses covered.

When I presented the scientific evidence and information that I was aware of, I was confronted with requirements to document my information with peer-review material. I was not aware that I was to bring my personal library, for no one else was required to.

With my vote always overridden by the two committee members, the publishers were given a free pass. This free pass concerned me and I sought out a way to address it. My TEA staff member left

the room and returned, advising me to write a minority errors report. That is what I did entirely the last day of the panel. If there had been more time and their assistance in another direction, I would have written a minority TEKS report. I signed my panel's report because I was a member of that panel, even though my vote did not change the results of the panel's report.

TEA's introductory Power Point took the liberty to paraphrase TEKS 3A and left out the words "hypothesis" and "theories." TEA dropped the TEKS language identifying only explanations. This is inexcusably ambiguous. It interested me that the wording was changed.

Our philosophical differences in the origin of species is not the issue here. It's pseudoscience -- pseudosciences don't ask, don't tell policy.

CHAIR MILLER: Any questions? Yeah.

MS. LOWE: Yes, ma'am. I have a few questions, if I may, about the process that was used. You mentioned that if one element of the breakout was not covered, then that should have disqualified the entire breakout; is that correct?

MS. KLENTZMAN: Correct.

MS. LOWE: That's also the material that I've been given that says that. So you're testifying that that was not true of TEKS 3A that governs strengths and weaknesses?

MS. KLENTZMAN: For strengths and weaknesses, that is plural strengths and plural weaknesses of plural theories and plural hypothesis. And when TEA told the publishers that legally the only thing that was needed was just one theory or hypothesis -- well, I guess you'd say and hypothesis -- that that would have met the TEKS. There were many hypotheses and many theories in the textbooks that did not address the strengths and weaknesses that the State Board desired to have done.

MS. LOWE: You mentioned specifically the Tobacco Mosaic Virus. And I recall that one, because I looked it up in the book. As I recall, that was the only -- in that particular textbook, the only clear presentation of a theory with a strength and a weakness. Was it your understanding when that material was reviewed, that the strengths and weaknesses were to be hidden in the material and students had to esoterically pull them out or were the directions from TEA that the TEKS instruction

should be clear, that you would not have to search for it, but it should pop out to you?

MS. KLENTZMAN: It definitely did not pop out. The way it was presented, it was like a timeline. And they were describing the timeline, how we came to discover the existence of viruses.

MS. LOWE: Well, I have a TEA presentation that says TEKS should pop out at you. They should be obvious. And I would certainly agree that in the particular textbook to which you refer, the only obvious instruction is on the Tobacco Mosaic Virus and its strengths and weaknesses. And I would agree with you in arguing that that is an insignificant hypothesis for which students should need to know either strengths or weaknesses.

MS. KLENTZMAN: If I may, the weakness, you would say -- the scientific community had consensus on each level as you went down the timeline. But as far as weakness -- the weakness was, they didn't have the technology at that time that made it possible. They had just a light microscope to look at with the best that they had. They could do it. And then someone developed a filtering system with the best that they had at that time. That was their consensus. But then when they

were able to crystallize that individual that they were concerned with and then the electron microscope was developed, then they had conclusive evidence. So it was just a timeline of development. It was not really a strength and weakness lesson. And you couldn't really find any.

MS. LOWE: I agree. The weakness listed is that they didn't have a microscope and couldn't see those things under a microscope.

Would it be your consensus that in a lab experiment, where students are given a problem and students come up with their own hypothesis about the data and are then asked to review the strengths and weaknesses of that student's hypothesis, would that be your understanding of TEKS 3A to analyze, review and evaluate scientific theories and hypothesis with scientific strengths and weaknesses? Would that be your -- would a student hypothesis of a lab experiment be how you would expect that TEKS to be met in the classroom?

MS. KLENTZMAN: Absolutely. This is very confusing for the student, because they've been trained in the scientific method where you have results and those results are repeatable and -- and you have the opportunity for peer-review. And so

they are expecting the information that they receive in their book is something that is repeatable and that it's observable. And then when you present something as being a factual truth when it's not observable and it's not repeatable, it's very confusing.

MS. LOWE: Thank you.

CHAIR MILLER: Yes, Ms. Knight.

MS. KNIGHT: This may not be the appropriate forum, but I would hope that Staff would have some opportunity to address the instructions that they gave.

CHAIR MILLER: Okay. Thank you. Any other questions?

Ms. Leo.

MS. LEO: I just wanted to know: When you look for the weaknesses as well as the strengths, are you looking just in the student text or what if you find a weakness -- one weakness to the whole Theory of Evolution in the teacher's edition, does that count?

And, also, address the Power Point that the Texas Education Agency gave you in which they omitted the hypothesis and theory part. They said that students were able to analyze, critique

and review scientific explanations, but they left off the word "hypothesis" and "theories" as to their strengths and weaknesses. So that weakens what you guys are looking for. You're not specifically told in that Power Point to look for the strengths and weaknesses of theories and hypothesis.

And I have a question that, why not just list the TEKS as required on the Power Point overhead? Why leave -- why omit that? What's the purpose? Why didn't the Agency just write TEKS 3A how it was. Did that develop any confusion in your part as to what you were looking for?

MS. KLENTZMAN: Yes. TEA gave us multiple explanations to how to meet TEKS. We were told to find three examples of each of the breakouts. And then they tell us that legally only one was necessary. And then when they give us the Power Point, this is a copy of the Power Point that they gave us. I don't know if it can be determined. But right here is when they just talk about explanations (indicating). And they do not even discuss hypothesis or theories.

And another point that they brought out on our Power Point is telling us what an error is. An error of fact or omission of information and

it's also overgeneralization. For example, using "always."

And what concerned me -- let me read -- I don't think things would be verily -- wouldn't be valid, plus they wouldn't be motivated to show any weaknesses to the many theories of evolution when they start off in the first chapter of this book saying, "Biology showcases life in the scientific context of evolution, the one thing that continues to hold all of our biology together no matter how big and complex the subject becomes."

There were definitely, by the -- how it's described in our Power Point of overgeneralization, this was an error in this book.

MS. LEO: If you -- but if you found a weakness in the teacher's edition, but didn't find any errors in the student edition, would that count as a weakness?

MS. KLENTZMAN: Oh, yes. I was very disappointed. I wanted a student to have a book where everything they needed was in their book and they can get that information on their own. But we were directed that if the information was presented in the teacher's edition as a possibility to be presented to the student, that that would qualify as

meeting the TEKS. So if the teacher chose not -- if the teacher chose to overlook and was pressed for time and didn't present it that day when it was in that chapter, then that TEKS would not have been met in that classroom because the teacher chose not to present it. If it had been in the textbook, the child would have had an opportunity to read that TEKS.

MS. LEO: Well, I saw in your factual error sheet, too, one more thing that I wanted to address, because I looked at yours specifically, since I knew you were testifying. In that book and as well as some others, they have talked about the Theory of Gravity or the Theory of Thermodynamics. When I studied those things in physics, it was the Law of Gravity, the Law of Thermodynamics. I think that's an error to rename something to put maybe evolution on the same level as gravity and thermodynamics. Do you address why --

MS. KLENTZMAN: As a mechanical engineer, this definitely troubled me and it also troubles me when someone comes here to testify and they're asked: Is their field of expertise in biology? We are all scientists and we are highly trained in the field of -- and use scientific

method. And we recognize when scientific method is and is not being used in biology.

And so being trained as a mechanical engineer, when I see something about the gravity, let me do a quote here. Says, "Debates about evolutionary theory are like arguments over competing theories about gravity. We know that objects keep right on falling while we debate the cause."

I -- since I've read this, I've talked with other scientists and I asked them, I was not aware of any debate about the Universal Law of Gravity. And I was wondering if they heard of any debates going on about Newton's Universal Law of Gravity. And there's no such thing.

MS. LEO: Those are laws and evolution is still a theory, because the law you can observe. You can observe gravity.

MS. KLENTZMAN: Absolutely. Absolutely. That is the scientific method. Yes, ma'am.

MS. KNIGHT: I'm sorry. Would you clarify for me, I think you said at the beginning that when you heard the explanation from TEA, you followed the process and, therefore, in following

that process that was explained to you at that time, the books were able to be put on the conforming list; is that correct?

MS. KLENTZMAN: I followed TEA's process.

MS. KNIGHT: That's what I'm say -- my question is.

MS. KLENTZMAN: But TEA did not follow your process.

MS. KNIGHT: I asked you about the process that you were told at the time that you were given your instructions. So based on the instructions that you were given at that time and you followed that process, you were able to put the books on the conforming list, based upon the instruction that you had been given by TEA; is that correct?

MS. KLENTZMAN: TEA paraphrased.

MS. KNIGHT: I didn't ask you what they paraphrased. I just want a simple yes or no. For the process that they gave you at that particular point in time --

MS. KLENTZMAN: Okay. Uh-huh.

MS. KNIGHT: -- were you able to put the books on the conforming list?

MS. KLENTZMAN: On TEA's, yes. TEA's list, we did.

MS. KNIGHT: All right. That's all I needed to know right now. You were able to put the books on the process -- on the conforming list based on the process that TEA gave at that particular point in time?

MS. KLENTZMAN: Yes, ma'am.

MS. KNIGHT: So the issue for me becomes: Is the flaw in the process, as opposed to in the textbooks if the publishers follow the process that they have been taught to follow.

MS. KLENTZMAN: The publishers follow the process that TEA lined out for them. And TEA did not follow the State Board's direction.

MS. KNIGHT: I am very much aware of what you're saying that the TEA did not do as it relates to the State Board. I have that clearly.

I'm just trying to identify what was done in terms of your experience with the explanation for TEA and what it appears that the publishers may have been told, based upon their instruction from TEA. What TEA did with -- what the Boards intent was is a totally different matter. Thank you for answering my question.

MS. KLENTZMAN: I have a direct quote what the TEA told the publishers. It says -- let me see if I can find where the starting quotation was.

"Technically and legally coverage of the TEKS need only take place once. Must be in agreement and comfortable" -- let's see -- "but panel members must be in agreement and comfortable with an one instance of coverage. All panel members agree that the one lesson or paragraph or reference in the TEKS sufficiently covers it."

MS. KNIGHT: You have answered my question. Thank you very much.

CHAIR MILLER: Thank you so much.

MR. RIOS: Mark Cadwallader, followed by Raymond Bohlin.

MR. CADWALLADER: Thank you. My name is Mark Cadwallader. I have worked as a career scientist for 23 years, first as a research chemist for Witco Chemical Company. For 10 years I was director of research and development at Gundle Environmental Systems in Houston, Texas. And for the last eight years, I have run my own consulting practice in Conroe, Texas, consulting in polymer science applied to pollution control. I work in failure analysis, forensics, product development and

technical standards development. I have published over six dozen technical papers for industry journals and conferences. I'm hired as a scientific expert in my field and have given expert testimony to the U.S. House of Representatives Subcommittee on Hazardous Waste on two different occasions.

In my work, I am asked to analyze failed plastic liners and pipes and provide expert opinion as to why they have failed. I must consider all the evidence, all the factors, all the variables and everything that the evidence might infer.

Over the years, I have read widely in science and have observed that all the evidence is not brought to bear on the teaching of evolution in public schools. I have also reviewed a couple of public high school biology textbooks for this hearing. Public school texts ignore many weaknesses of the evolution hypothesis. For example, the myriad transmission fossils predicted by Darwinism do not exist after 150 years of searching for them and the accumulation of a very comprehensive fossil collection worldwide. The fossils show natural selection within species groups, but they do not support natural selection as a driver for change between groups. There should be explanation of this

distinction between natural selection within a species group versus change between species groups.

For example, the textbooks claim, Page 430, Glencoe McGraw-Hill, and Page 59 to 61 of Kendall Hunt Publishing, that the adaptation of bacteria to penicillin and the adaptation of insects to insecticides are examples of evolution, when they are nothing more than natural selection within a species group. This is not evolution. The textbook presentation is not the whole story. Cyclic variation and natural selection within a species group is well-known as a result of inherent genetic potential of the group.

The example for evolution is thus grossly misrepresented. Students must be taught this explanation, otherwise they do not have the whole story. To learn true science, students must be taught to consider all the evidence, all the factors, all the variables and all the inferences. They must be taught the strengths and weaknesses of evolution, otherwise they will not learn to think critically and to do what a practicing scientist must do to practice science.

CHAIR MILLER: Thank you.

MR. MONTGOMERY: Madam Chair.

Which book did you review, sir?

MR. CADWALLADER: Glencoe McGraw-Hill and Kendall Hunt Publishing.

MR. MONTGOMERY: Okay. And I'm sorry, I might have missed it. What is your background in biological sciences?

MR. CADWALLADER: I'm a chemist, chemical engineer and a practicing scientist for 23 years in the polymer material science area.

MR. MONTGOMERY: But no biological experience, right?

MR. CADWALLADER: I do not use biology in my practice, but I apply the scientific method. And I know in my practice how scientists need to look at all the information. And as I said, I read widely and I can understand science better than the average person. Certainly, as well as a high school student can. And I think that there's not enough of the full science being taught to the high school kids to understand the full field.

MR. MONTGOMERY: Well, I appreciate your taking the time to do this. I'm just trying to sort this out as far as, you know, the experience level of the people who are --

MR. CADWALLADER: Yes, I am applied

scientist.

MR. MONTGOMERY: -- who have actually looked at the books. And I appreciate you looking at the books. Thank you.

MR. CADWALLADER: Thank you.

CHAIR MILLER: Thank you.

MR. RIOS: Raymond Bohlin, followed by Barbara Cargill.

MR. BOHLIN: My name is Ray Bohlin. And in the late '70s, I spent two and a half years at the University of North Texas as a graduate student in the Department of Ecology and Evolution. My research project involved the study of races of pocket gophers in North Texas, Oklahoma and Louisiana. My research specifically concerned the process of what is now known as microevolution.

Microevolution involves real life studies of the processes of natural selection. The process of speciation is often documented, as in my research, in populations that so little morphological difference between the parent and offspring species.

But if evolution is true, the concept that all living creatures are descended from a common ancestor, there must be processes that

explain the origin of major morphological changes. How did we such widely diverging creatures such as earth worms, fruit flies, pocket gophers and scientific observers?

Evolution above the species level is referred -- usually referred to as macroevolution. There is a longstanding controversy in evolutionary biology as to whether the well-documented processes of microevolution are the same as those leading to macroevolution. Andrew Simons, in 2002, wrote, "A persistent debate in evolutionary biology is one over the continuity of micro or macroevolution, whether macroevolutionary trends are governed by the principles of microevolution."

The reason for this longstanding discussion is that differences between major taxonomic groups require changes in what is called the body plan. Sea anemones and horses are not built on the same body plans. But if they have a distant common ancestor, then there must be a way to change from one body plan to another. Wallace Arthur put it this way in his '97 book: "Those genes that control early developmental processes are involved in the establishment of the basic body plan. Mutations in these genes will usually be

extremely disadvantageous and it is conceivable they are always so."

It seems that most genes involved in microevolutionary events occur late in development. Arthur states further, In a developmentally explicit approach, it is clear that many late changes cannot accumulate to give an early one. Thus, if taxonomically distant organisms differ right back to their early embryo genesis, as is often the case, the mutations involved in their evolutionary divergence did not involve the same genes as those involved in the typical speciation event.

Eight of the 11 textbooks up for adoption either do not even mention micro or macroevolution or if they mention them do not define the terms. If they define them, they do not acknowledge a controversy. Of the remaining three, Raven and Johnson's biology simply falls back on the usual explanation that micro will explain macro. Campbell and Reece's biology acknowledges only that the developmental mutations are necessary, but does not discuss the myriad problems with these mutations. Pervis only suggests that infrequent, slow and unobservable events might be the culprit.

All of the texts ultimately leave the

impression that there is simply no problem. This is misleading and false and needs to be corrected in order for students to adequately understand the strengths and weaknesses of evolution.

CHAIR MILLER: Thank you.

Questions? Dr. McLeroy.

DR. McLEROY: Dr. Bohlin, what -- how did -- what's the best -- since you've studied this, what's the best explanation for the net increase in genetic complexity from a cell to a higher order of creature like us?

MR. BOHLIN: What's the best explanation? That's an awfully big question. And I think that's one that's of major dispute today among scientists.

DR. McLEROY: Scientifically, they're just stating it's only the natural selection operating on a genetic variation has accomplished this; is that what you're saying?

MR. BOHLIN: That's what the textbooks leave the impression of. And that is simply not the case, even among discussion of scientists in the peer-review literature. We don't know what the connection is between these microevolutionary processes and macroevolutionary

processes.

MR. MONTGOMERY: Madam Chair, one question. Oh, I'm sorry.

CHAIR MILLER: Ms. Leo.

MS. LEO: Yes. Dr. Schafersman, in his written testimony, says that, "No individual representing Discovery Institute is a legitimate scientist." And you're one of their fellows. So I have a few questions to ask of you. A number of other supporters of Darwinian theory has also claimed that your experts are aren't credible. So you can respond to that?

MR. BOHLIN: Well, that's really just a matter of their own definition. What they basically say is if you are a critic of Darwin, you are no longer a scientist. It's also been questioned extensively that these controversies do not occur in the peer-review literature. And when we do cite from the peer-review literature that we misquote, we misunderstand or we take out of context.

And what I'd like to present to the Board is from the Discovery Institute. What we've done is we've taken the freedom to -- and I'd like to present it to the Board, all of the quotations

involved particularly in Jonathan Wells' Icons of Evolution, which is roasted quite frequently. What we have for you are photocopies of the actual articles themselves, the quotes that were used, so you can see for yourselves and judge for yourselves whether they were taken out of context or not.

MR. MONTGOMERY: Madam Chair, could I ask him just one quick question?

MS. LEO: I still have the floor.

MR. MONTGOMERY: Oh, I'm sorry.

MS. LEO: None of us on this Board are scientific experts. We're just citizen board members from all different walks of life. And we've been told by some people who testified or sent in comments that, you know, we should just trust the experts, those who write the textbooks. Why shouldn't we do what they say?

MR. BOHLIN: Well, we'd like to consider ourselves experts as well. And we're giving conflicting testimony and conflicting ideas. And that's why we brought these specific peer-review articles. We're not expecting you to go look them all up for yourselves. And we understand your time is limited and your exposure and background in biological sciences is not the same, so we're trying

to shorten the process a little bit and provide you your own process to look up these articles themselves. Look at the quotes. Are they out of context or aren't they?

MS. LEO: Okay. And are those peer-reviewed articles that you're giving us?

MR. BOHLIN: Yes, these are all peer-reviewed articles here, yes.

MS. LEO: Okay. Thank you.

MR. MONTGOMERY: Madam Chair?

CHAIR MILLER: Thank you very -- yes, Mr. Montgomery.

MR. MONTGOMERY: Sir, one of the things I noticed that -- I know that you talk about a lot is the situation regarding Haeckel's drawings, Haeckel's embryos.

MR. BOHLIN: That's correct.

MR. MONTGOMERY: I know that that is peer-reviewed literature. I know that there are weaknesses in that particular thing. Do any of the books that you have reviewed, do any of them include actual Haeckel's drawings?

MR. BOHLIN: Two of the books of the 11 that are up for adoption do still include them.

MR. MONTGOMERY: Could you get us the

names of those books and the publishers?

MR. BOHLIN: I can get them to you, certainly.

MR. MONTGOMERY: I would really appreciate it.

MR. BOHLIN: Yeah, glad to do that.

CHAIR MILLER: Thank you. Next?

MR. RIOS: Barbara Cargill, followed by Anthony Comeaux.

MS. CARGILL: Hello. I'm Barbara Cargill. I graduated from Baylor University with a bachelor of science in education and from Texas Women's University with a masters of science in science education. I taught high school Biology 1 and Biology 2 honors. And during that time it was a great privilege to receive many teaching awards, such as the Thanks to Teachers National Excellence Award, the AJ Sales Scholarship Award and the National Audobon Society Award.

In 1995, I founded Wonders of the Woodlands Science Camp and I still serve as its director. We teach children the wonders of science through a hands-on approach. And this past summer, we had over 1100 children in the program. I work closely with teachers through in-services and

consulting. And I also do a variety of outreach programs in the schools, usually with my 50-plus critters in tow.

There is no doubt in my mind that both the strengths and weaknesses of evolution must be presented in science textbooks. My students and I relied heavily on the textbook, so the need for factual accuracy and thoroughness is vital. High school kids are smart and savvy and they want and need discussion about topics that reinforces critical thinking and decisionmaking.

In the TEKS, students must learn key process skills, such as analyzing, comparing, gathering information and drawing conclusions. Teachers are expected to teach these skills year after year. So students will expect to use them, especially when controversial topics are taught. No parents questioned me over what was discussed in class because I allowed each student to develop their own opinion. And my students were expected to respect what others thought, which is a wonderful life skill.

My students trusted me to do my best to prepare them for college and for future jobs, possibly in science. And science is full of mystery

and change. Think of recent headlines, cloning, the Human Genome Project, DNA testing. What a wonderful time to teach science and what a thrill to come to class just itching to hear what students think about current science events.

With that in mind, how can we ignore parts of science just because they are controversial? Ignoring those parts does not make the controversy go away. And not giving students the entire picture about evolution research is truly letting them down. And believe me, many high school kids will ask about the weaknesses of evolution anyway.

We want our teachers prepared. We want them to be able to reference legitimate answers in the textbooks. I teach science because I love the wonder that it brings the eyes of a child. What brought wonder to your eyes? Wasn't it something mysterious and probably unexplainable like this (indicating)? A child would look at this and would say: What is that? How is she doing that? Is that a trick? What's going on? Are they going to fall off? What is it? Because you see the power of a magnet is a great mystery of science. Let's not limit our teachers and our students from exploring

another great mystery of science called evolution.

Thank you.

CHAIR MILLER: Thank you. Any questions?

I appreciate it.

MS. CARGILL: Thank you.

MR. RIOS: Anthony Comeaux, followed by Jonathan Wells.

CHAIR MILLER: While he's coming to the mic. For those of you, we'll have a break at 3:00.

MR. COMEAUX: My name is Tony Comeaux and I'm from Galveston County, League City, Texas. I'm representing my three grandkids, Kendall, Taylor and Cara in order of birth. And I'm going to talk about spontaneous generation, a problem in the textbooks.

Spontaneous generation is a hypothesis that living creatures can come from nonliving materials. This was an accepted theory of living reproduction from at least Aristotle's time through the end of the 17th century. Then experimental method began to be seriously applied to biology and tools such as the microscope became available to study the various forms and hay

infusions. There was a controversy on how protozoa got into these hay infusions or how maggots got into the meat -- rotten meat that raged for over 200 years. Finally, Pasteur came along and experimented with a special gooseneck flask -- which I have in these pictures up here, if you didn't know what they were like -- in the presence of the Commission of French Academy on June 24th, 1864.

This dramatically and emphatically demonstrated in their presence of the Commission's witnesses that all examples of spontaneous generation were previously contaminated with spores, air laden spores. And if these were filtered out, then nothing living appeared in this flask. Two of these flasks are still sterile in a French museum that still testify today that no living creatures can come from dead materials. The biology textbooks that cover this experiment of Pasteur, the Glencoe's Biology: The Dynamics of Life on Page 381, and then in close proximity to the report, that life had to come from nonlife after the earth became habitable. This seems to contradict Pasteur's work and it borders on being illogical.

In another textbooks, La Bel's Biology, Page 163 through 167, in the

section entitled "Experimenting with Spontaneous Generation," it develops a hypothesis that some organic polymers will spontaneously assemble from simple organic molecules. It then further develops that spontaneous simple cellular structures can develop, but leaves the reader hanging on their faith that the first living cell just had to happen for life to be here now.

We have more recently discovered many reasons why spontaneous generation of life does not occur, such as extreme probability of getting the right amino acid sequences for the 1,000-cell proteins or certainly of hydrolysis breakdown of amino acid changes of water. Also, there's still a scientific mystery of how all the precise information encoded within DNA molecules get there.

These are clear weaknesses of any naturalistic Origin of Life hypothesis. And these should be presented clearly in textbooks. TEKS 3A requires such presentation of weaknesses as a realistic scientific presentation of the evolutionary theory of life origins.

That's it.

CHAIR MILLER: Thank you. Any questions?

Dr. Lowe.

MS. LOWE: I'm sorry, I'll be brief.

Did you examine each of the textbooks for its coverage of spontaneous generation.

MR. COMEAUX: I only looked at two. This one right here (indicating). This is the Labelle. And the Dynamics of Life. I scanned a number of others, just for the pictures because I'm amazed, actually.

MS. LOWE: If the textbook had that concept missing and the disproof of spontaneous generation, would that seem significant to you?

MR. COMEAUX: Yes, it would. Except the Pasteur's thing was such a nice development of the experimental method. And it showed that they could actually, you know, use good science, good logical reasoning to develop that you cannot get life from nonlife.

MS. LOWE: But that is an important concept that you would expect to be covered in an adequate textbook?

MR. COMEAUX: Yes. Right. But then --

MS. LOWE: Thank you.

MR. COMEAUX: Okay. Go ahead.

CHAIR MILLER: All right. Any other questions?

Thank you very much.

MR. RIOS: Jonathan Wells, followed by Eddy Parker.

MR. MONTGOMERY: Point of order, Madam Chair. Point of order.

CHAIR MILLER: What?

MR. MONTGOMERY: This gentleman is not a resident of Texas, I do not believe.

DR. WELLS: That's quite true. I came here from Seattle. Would you like me to deliver my remarks orally or shall I just submit my written testimony?

CHAIR MILLER: I believe we -- in our motion, we said we would -- if you could submit them in writing. If you are willing to stay afterwards, Dr. Wells, we are going to listen. I don't know if you heard that, but we will listen to all of the out-of-state people, which I think, came to a total of only seven, if you feel like you can stay that long.

DR. WELLS: Thank you.

CHAIR MILLER: All right.

MR. RIOS: Eddy Parker, followed by

Mac Deaver.

MR. PARKER: I am Eddy Parker. And it gives me no comfort to come before you as a Board and tell you in the Fort Worth public schools, I learned that all of you are less than human. Now, I was taught maybe we come from a monkey. Now, I don't know what generation it was. It seems to change all the time. But I had a good mother that didn't believe that and she taught me the truth about it.

Now, these well-educated, well-intending people that come before you and try to intimidate people like myself, I have a hard time with that, because they cannot prove you either came from creation or evolution. Everything in this room is either human or nonhuman.

Now, if it was so simple, why hasn't it been put to bed over all these many years? They haven't proved their case. I stand before you begging you, before you put anything in any textbooks to teach these young minds, let it be the truth or let it be as a theory. And there are other theories besides the Theory of Evolution that is as much evidence on them as they have for theirs.

Now, they come before you and say,

"Oh, I'm a scientist. Look at me. Believe me." But I'll guarantee you, I have some dear friends that's got as high a credentials as they've got that would debate them on the issue.

Now, I'm not a scientist, but I have seen Dr. Thomas Warren debate two men on this. And when they have to put their credentials and what they believe on the line, they can't do it.

Is that the --

CHAIR MILLER: No, that's just the two minutes.

MR. PARKER: And they were both well-learned men. I have the books. I'll be happy to give you one of them, if you'll read it.

If it was proved, why are they still looking for the missing link? Have you ever noticed on TV, oh, we found the missing link?

All I'm asking this Board to do is don't allow people to tamper with the children's minds that they found the missing link and we are something less than human. All of you in here are human. And we're cut above roaches and rats and all such life as that. Because they come before you and say, "I'm a scientist." If they want to try to teach their ungodly evolution as a scientist -- is

that the end?

CHAIR MILLER: That's the three-minute bell.

MR. PARKER: Okay.

CHAIR MILLER: Thank you so much for coming. Appreciate it.

MS. HARDY: Thank you for your honesty.

MR. RIOS: Mac Deaver, followed by Dr. Ide Trotter.

MR. DEAVER: My name is Mac Deaver. I'm from Sheffield, Texas. I'm a gospel preacher and a Texan. I appreciate so much the opportunity to stand before the Board and letting you know what I think about this. My training is in the field of Christian apologetics, which entails the study of philosophy and the Bible and reasoning about these things.

And I appreciate the remarks that Mr. Parker just made with regard to the Warren-Flew debate that took place on a Texas campus in 1976 in North Texas State University.

The question of origins is not a matter of science, it's a matter of philosophy and theology. And there, two philosophers came together

and debated it. A world rewound atheist, Anthony Flew and a philosopher-theist, Thomas B. Warren.

What evolutionists need to do is to prove their case by a logical demonstration. And that's never been done. And that's why it goes on. They write book after book after book and give paragraph and paragraph of analyses of chemicals and collection of all kinds of empirical data, but they've never come up with a logical argument that ties it all together that this and this and this absolutely proves evolutionary theory.

Now, it is inaccurate, because as was just suggested, there are no missing links and there are no shades of species shading off into other species. There's nothing like that out there. So the theory is advocated and maintained and pushed on the basis of really great human imagination, not empirical fact. Not at all.

It is inadmissible as a scientific theory because it's really a philosophical theory about science. It's not something you get from empirical analysis and the use of the scientific method as such, but it is a leap that you make in your own mind with regard to origins, which as I

just stated, is a philosophical theory or a matter for theological study.

So they get outside the domain of evolution in order to try to bolster the view. It is a not a scientific theory. And most Texas high school biology teachers have not been trained in philosophy of science. But that's where you have to go for the discussion of that point.

It's an impossible view, because it entails, as Dr. Warren pointed out with Dr. Flew, your view means that we have the eternality of matter, which is not scientifically discoverable. You have to posit the eternality of matter, which is ultimately, as a cause, non-explanatory. You get life from nonlife. You get mind from matter. You get consciousness from unconsciousness. You get the human conscience from that which is not even mental. It makes all of these moves. It does not show how it's done. It just assumes that somewhere in the blackness of an almost unending past it was done.

These are the kinds of things that children need to hear and know about before the theory is opposed as a true one. It is logically unworkable because the scientific method itself is a

logical form that is illogical. And it's impractical because, as the teenager was suggesting a little while ago, there is some sort of a contribution that the constant promulgation of the theory has an ethical deterioration in our country.

CHAIR MILLER: Sir, I -- sir, we just had the three-minute bell ring. I just had to clarify that. So I thank you very much.

MS. BERLANGER: Ms. Miller, I have one question and I want a real short answer, because we have so many speakers. But you mentioned in your second page that there is a correlation between the acceptance of evolutionary theory and the degeneration of morals in our society. Just very briefly tell me what that correlation is.

MR. DEAVER: Because unintentionally, when you teach evolution as fact and you don't show weaknesses, you are teaching children there is no ultimate accountability. There is no ultimate accountability for action. We've got kids shooting each other in public schools and on interstates shooting at cars.

MS. BERLANGER: But that's because of the Theory of Evolution?

MR. DEAVER: It is partially because

they are -- they are being taught they are not really responsible as agents, they are simply the product of inorganic evolution. Yes, ma'am.

CHAIR MILLER: Okay. Thank you.

Ms. Knight.

MS. KNIGHT: Madam Chairman, if I may make a comment to my colleague. I appreciate the question, because I respected the student's first time in coming, I did not ask her that question, but I would like to ask you. What is the role of parents in the teaching of values in the community if people are just animalistic then why do we have people who do behave responsibly? I don't get the connection between coming from an animal and being animalistic in our actions.

MR. DEAVER: Because there's a difference between a fact -- an unlogical fact of your nature and what you are doctrinally exposed to in school as a theory. There's a difference between being a person having the nature of humanity, which you have, and then being taught a counter-theory which goes against your very nature, saying your conscience came from dirt. You still have a conscience, whether it came from dirt or not. And your mind tells you that you're more than dirt. But

then you're exposed to a constant theory that's at war with your own nature.

And if you adopt the theory, then you can act it out. And I'm just the product of inorganic evolution. There is no ultimate individual responsibility for who and what I am. Evolution made me what I am. How can I help that?

MS. KNIGHT: I guess I'm the usual aberration. I studied evolution in school. I think I'm responsible and I do not subscribe to that concept. Thank you.

MR. DEAVER: I didn't say that everybody does, but I'm saying that it can be done that way.

CHAIR MILLER: Thank you.

MR. RIOS: Dr. Ide P. Trotter, followed by Paul Jordan.

CHAIR MILLER: I believe after Mr. -- Dr. Trotter, I think after your testimony, we will have a five, six-minute break.

DR. TROTTER: I'm Ide Trotter, BS Texas A&M, Ph.D. chemical engineer Princeton, resident of Duncanville. I have four grandchildren in Texas public schools and a family of 10 Texas teachers, spread over three generations. I am here

as a spokesman for Texans for Better Science Education, concerned citizens from across the State, approaching 3,000 have signed our petition supporting you in seeing our children's textbooks are free of factual errors and clearly present strengths and weaknesses of theories. I'm also here to make evident certain scientific weaknesses in the Theory of Evolution, which are not presented as TEKS requires.

First, I confess bias. I was trained in the disciplines of physical science, math, physics, chemistry. I have great admiration for researchers pushing back the challenging frontiers of life science, as we see ever deeper into the extraordinarily complex machinery of the cell.

However, to a practical engineer, evolution seems merely a descriptive correlating concept. It offers no informative theory as known in physical science. The search for one is clearly a work in progress. It is amazing to me that anyone, to say nothing of the National Academy of Science, could discuss a fact of evolution in any sense except microevolution and the primary and often misused dictionary definition of change over time.

Rhetoric aside, let's focus on scientific weakness that TEKS requires be covered. And I take for my authority the Darwin Day 2002 lecture of Dr. Schafersman. Much of it could be used. His hypothetical fossil chart correctly shows organisms unchanged over time and separated by gaps in time. His text on this chart makes clear the difficulty this poses for evolutionary theoreticians. He begins: Three models of evolution as applied to a hypothetical set of fossils. He describes three separate theories of evolution that he names.

This was easy to understand in his public lecture and should not be censored from textbooks. I ask: Couldn't evolutionists agree on one model if any were free of weakness? Just exactly what are the weaknesses Schafersman reveals? First, there is no underlying predictive mechanism as known in physical science. Instead, new data produces new theories. In physical science, theories predict data yet to be observed.

Second, there is not even agreement on the path for which a mechanism should be developed.

TEKS requires that these weaknesses

be presented and discussed, not censored. TBSE supports you in seeing that this is done.

Thank you.

CHAIR MILLER: Thank you, Dr. Trotter.

Any questions?

MR. MONTGOMERY: Ma'am.

Mr. Trotter.

DR. TROTTER: Yes.

MR. MONTGOMERY: Dr. Trotter, you did review the books, didn't you? You've reviewed several?

DR. TROTTER: I have only worked on this book right here (indicating).

MR. MONTGOMERY: I appreciate your time in doing that. And I want to ask you, also: What is your experience or educational background in biological sciences?

DR. TROTTER: Sir, with all due respect, I am really glad you asked that question.

MR. MONTGOMERY: I am, too.

DR. TROTTER: My training in chemical engineering, in my opinion, better qualifies me to analyze the proposed processes up to the moment of biogenesis than the training of any biologist.

MR. MONTGOMERY: And that --

DR. TROTTER: That is chemical process. And with all due respect to Dr. Schafersman who told you, to my great amazement, that all scientists accept the process of evolution, I would like to paraphrase a very well-known Texas politician, Lloyd Bentsen. Mr. Schafersman, I know process. Evolution has no process.

MR. MONTGOMERY: And I want to ask you one other question. I read in the Austin paper yesterday, Dr. Trotter. And I don't always -- I know that press doesn't always get us right when they quote us. But it says, "Trotter, a chemical engineer disagrees with Schafersman," I assume. "What is the educational problem today? It is to excite the interest of the student. This is a Jerry Springer world. Controversy is exciting."

Are you suggesting that we ought to include these kind of Jerry Springer controversies in our classroom, whether or not they have any scientific basis?

DR. TROTTER: Mr. Montgomery, I would like for everybody here to know that I haven't set you up to ask these questions.

MR. MONTGOMERY: Well, you and I have

talked before.

DR. TROTTER: Yes, sir. I was engaged in a debate on this subject in Houston on Sunday night. And our opponent was a 10-year track assistant professor of biology at the University of Houston. And interestingly enough, before I got to make the point, he said, "We have a problem. A problem in Texas. Forty percent of my graduate students are from other nations."

Why is that? Because we are not exciting our students about biology. A good controversy would be a help.

MR. MONTGOMERY: Regardless of truth. Regardless of scientific background.

DR. TROTTER: No, no, it's a matter of scientific controversy. You know, the thing that boggles my --

MR. MONTGOMERY: Well, Jerry Springer controversy would be considered scientific controversy.

DR. TROTTER: I don't think that's what you're trying to get me to say. What we see in the world today, is we've got a very short attention span. We are geared to sound bytes. The press people have collected their sound bytes and they've

left, a lot of them. We have -- if we're going to interest our students in proceeding in a scientific career, we've got to get them interested.

When I was teaching in the classroom, the most difficult job I had to do was to get the student interested. If controversy is interesting, and I think everybody agrees that it is, students will respond. The controversy needs to be an honest, open, well-defined scientific controversy. Dr. Schafersman spends 40 percent of his Darwin Day 2002 lecture, public lecture, dealing with the controversy. It was a heck of a good lecture. I saw it on the web. I didn't get to hear it, but you know, he was preaching from my Bible.

CHAIR MILLER: Ms. Leo.

MS. LEO: Dr. Trotter, one thing I did want to ask you about. I agree with you that, you know, especially now with all the advances in biology, microbiology, DNA, I think this is a really exciting time to be teaching kids in those subject areas. One thing when I looked at the books, and I wanted to see what you thought of this, is one thing that Darwin even had concerns about was the Cambrian explosion. And he had hoped that future generations would find that fossil record to shore up that there

was a -- this gradual change, instead of finding all of these fossils, fully formed creatures in one layer in the Cambrian. And I saw that either the books did not address this at all, which I think this is a major part of the weakness of evolution. They either maybe -- some of them dedicated like one sentence to it. And Darwin himself said, you know, this has to be resolved.

DR. TROTTER: I think you're absolutely right about that. It was amazing to me to look at this Prentice Hall biology text and see how they treated the Cambrian explosion. They sort of relegate it to a minor little place. They talked about other things, namely Lynn Margulis and some of the things that she had done to push down and obscure hypothetical path or certain evolutionary progress, but failed to mention that the Cambrian explosion caused Stephen Jay Gould to come forward with a whole new evolutionary concept, punctuated equilibrium.

Punctuated equilibrium is mentioned, but it is clearly not integrated into the development of thinking about evolution as students need to understand.

MS. LEO: And to me, that opened --

DR. TROTTER: It is not well treated.

MS. LEO: And that opens the door for some high school student to say, "Hey, that's still unknown. I can figure that out. And maybe I'll pursue a career in that direction." There's so many unknowns. And I think that some of those unknowns, like the Cambrian explosion, need to be addressed. Those are sincere weaknesses in the Theory of Evolution.

DR. TROTTER: There are Nobel Prizes yet to be won in this area.

MS. LEO: Right. Thank you.

CHAIR MILLER: Thank you, Dr. Trotter.

We will now have a five to six-minute break.

(Brief recess.)

CHAIR MILLER: Hello, everybody. We'll resume our public testimony. And I think we're at Paul Jordan, correct?

MR. RIOS: Correct.

MS. SALAZAR: Paul Jordan, followed by Allison Jackson.

CHAIR MILLER: Welcome.

MR. JORDAN: Thank you. I thank the

State Board of Education. My name is Paul Jordan, previously a pre-vet major at Texas A&M, now I have a baccalaureate and master's degree from UTMB. I'm a board certified nurse practitioner at Herman Hospital in Houston. I work very closely with the University of Texas Medical School in Houston.

I am here before you today as someone who uses biology every working minute. If I fail to accurately know or apply biology, the gravest of possible consequences -- I'm sorry, the gravest of consequences are probable.

I extensively reviewed the Miller Lavine text. As I read, a strong editorial nonscientific bias emerged. Incomplete data, faulty data, gross logical fallacies, equivocation of terms, contradictory statements and thought processes contradictory to the scientific process were rampant. The general specifics of which I have -- the general and specifics of which I have on this -- the attached sheets and is on the document cam.

We would not allow two plus two equals five in math. I seen the dog in English. We must not allow, and I quote, "So is evolution a fact or a theory? It is both." It is not both. It is a

theory. The direct quote -- this is a direct quote directly from the -- and contrary to scientific process and confusing to the students.

Texas law states that the strengths and weaknesses of evolutionary theory must be taught. Nowhere in this text does it even attempt to comply with that law. Then it does state itself, "It is useful to review, analyze and critique the strengths and weaknesses of evolutionary theory." I ask that the Board require the author to do as he says what is useful and is the Texas law.

Further, there is no better example of the proper application of the scientific process than this controversy. There is so much, both for and against this theory, and much more needs to be done and resolved. There are big problems and questions that need to be answered if the theory is to survive and move it to the category of the law.

Let's open up this debate. It is the law. If the theory is itself the fittest, it can stand the simple test of the debate. In the interest of science, involve these kids, develop scientific discovery skills and critical thinking skills that will last a lifetime. If they do not hear the logic of the controversy, they cannot be

involved in the resolution of it. That's science, let's involve them. Isn't what that what education is about, teaching those that follow us to reevaluate critically the proposition before them? Real education is what has put this nation on top. This book does not achieve that, nor does it comply with the Texas law.

Please do not endorse it without requiring the correction of the -- that is required by law.

It is editorial opinion in a pretty box. It is not science or scientific. I ask the Board require changes to the factual errors or reject this text.

Thank you.

CHAIR MILLER: Thank you.

DR. McLEROY: Madam Chair.

CHAIR MILLER: Any questions? Doctor.

DR. McLEROY: Thank you for your testimony. It's very good. I also would like to inform you that this textbook has been changed and the offending it's a theory and fact -- or the statement it is both has been taken out of the book.

MR. JORDAN: Good.

DR. McLEROY: So this process is good. We're getting things to be better. And I just want to make sure that we all have factual books.

Thank you.

MR. JORDAN: Thank you, sir. That's a start. There's several others.

CHAIR MILLER: Anyone else? All right. Linda. Ms. Bauer.

MS. BAUER: I wanted to thank you because I really appreciate the fact that you actually read a book and made the comments. I think that in this -- in general, this process needs to be addressed. As a writer and an author, I think it's important that the procedures are convoluted right now. And if people would address specific pages, paragraphs and sentences and make comments accordingly, how they react to the TEKS, it would be far more beneficial for all of us.

I recommend that the instruction committee get together and get some suggestions from public, publishers, panelists, board members, TEA and qualified outside experts in the future to better understand and streamline this process for the future of our children.

Thank you.

CHAIR MILLER: Ms. Leo.

MS. LEO: I wanted to -- sorry. Please forgive me. I just want to ask you a question: When -- you said that you use biology every day in your field of work. And when you teach evolution dogmatically, you only present the strengths of that argument. Are you, in essence, then, by not listing any weaknesses, teaching it as more than a theory? Because as a scientist, when you present a theory, you should present both the strengths and the weaknesses. Only in this particular case, in the case of evolution, you're only presenting one side. Then wouldn't that be, in essence, saying that it's a fact?

MR. JORDAN: Yes, ma'am. But the bigger picture is that you don't show how the scientific process works. That here is a controversy. Should the controversy be proven, then the theory needs to be resolved -- revised. I'm sorry. I am a little nervous.

MS. LEO: Me, too.

MR. JORDAN: And if we -- if the testing that goes on resolves the fact, then the theory stands and it ingrains -- gains greater

weight. And that's what needs to happen. We need to -- you know, and stop this, you know, going back and forth. Let's get in there. Let's teach the kids. Let's show them how to do this. Let's show them the scientific process. And it's a perfect example, that's what I'm saying. That's what this is about is education.

MS. LEO: Thank you.

CHAIR MILLER: Thank you so much. Appreciate your --

MR. RIOS: Allison Jackson, followed by Jim Jenkins.

MS. JACKSON: Hello. Thank you for the opportunity to speak on behalf of Texas students and teachers. My name is Allison Jackson and my background includes a bachelor of science degree in biology with a chemistry minor, which I used as a high school biology teacher.

When I tried to teach strengths and weaknesses of evolutionary theory in the classroom, I was asked by several members of the administration to avoid digging deeper and to discontinue teaching the topic altogether for fear of offending any other parents. The great frustration that I had stemmed from the book not adequately explaining the modern

Theory of Evolution, also called neo-Darwinism. For example, the textbook -- and many teachers tend to use the rather innocuous phrase, change over time to characterize evolution. Nobody debates that organisms and populations change over time, but that is somewhat misleading, because that phrase doesn't necessarily explain the more weighty philosophical commitment of the modern theory of evolution that's been discussed here today.

Nobody in science doubts that microevolution occurs. It's observable. It's repeatable. But evidence for the mechanisms of macroevolution are broadly debated. Therefore, students of biology should be exposed to that debate so that they can evaluate the subject in its entirety.

Because the textbook didn't adequately explain neo-Darwinism, I used a wide variety of supplemental materials, including numerous high school and college textbooks, books by authors from a broad spectrum of backgrounds, information gleaned from the Internet and even a guest speaker. The students engaged the topic wholeheartedly, intrigued by the controversy surrounding evolution and intellectually stimulated

by the bold claims of neo-Darwinism.

Because we discussed and debated strengths and weaknesses before our guest speaker came, the students were well equipped to participate intelligently during the Q and A time. They asked thoughtful questions and clearly benefited from the speaker. When we revisited the text, it was evident to the students that, at best, the textbook offered an incomplete definition of neo-Darwinism.

Although my students clearly benefited using high order thinking skills and enjoying the learning experience, one parent objected. He feared that my use of supplemental materials, rather than the exclusive use of the text, opened the door to the interjection of personal or nonscientific opinions. On the contrary, my goal was and is to allow students access to accurate information on the subject so that they can draw their own conclusions.

In spite of my efforts, I was immediately asked, as I said, by the administration to discontinue the use of outside materials and guest speakers and stick to the text. And better yet, not even address evolution at all.

That's why it's critical that the

State of Texas adopt biology textbooks that clearly explain modern evolutionary theory, including both its strengths and its weaknesses. If students are given accurate information, I trust that they can draw their own conclusions based on the scientific evidence.

Thank you for your time.

CHAIR MILLER: Thank you.

Ms. Knight.

MS. KNIGHT: Could you give me a definition of what you thought your administration meant by "digging deeper" and what were some of the kinds of supplemental materials that you used?

MS. JACKSON: In the context, "digging deeper" meant using anything other than the textbook on the particular topic of evolution. I was encouraged to dig deeper on any other subject, but on that particular subject, since it was controversial, that I should only use what the textbook used.

MS. KNIGHT: And what kinds of supplemental material did you use?

MS. JACKSON: When I did the research for my lectures, I used things that I mentioned. Other textbooks, some of the -- it was a biology

adoption the year before I started teaching, so I had access to lots of the books that were put out by publishers and college textbooks from my college experience and ones that I had purchased. And then also books that commented by scientists from a broad -- from several people who are represented here today on both sides of the issue. So that I had a clear, big picture argument to present to the children. I also used some handouts that included excerpts from some of those books and the guest speaker that I mentioned.

MS. KNIGHT: Okay. Could you tell me who the guest speaker was?

MS. JACKSON: His name is Ray Bohlin.

MS. KNIGHT: Thank you.

MS. JACKSON: Thank you.

MS. LOWE: If a publisher were to produce a supplemental document that addressed strengths and weaknesses of evolutionary theory, would that supplement be of value to you, apart from your textbook? Rather than to address strengths and weaknesses in a textbook, what value would be there be to you as a biology teacher to have it in a separate supplement? Would that be useful or not useful? Would that have helped in this situation or

not helped?

MS. JACKSON: I think it would have helped. But what would be better is to have it in the text. The critical issue for my department chair and my principal and for the local board member that asked me not to talk about it anymore was that the textbook was the State mandated piece of material that I was allowed to use as a teacher and encouraged to use. Anything else was subject to debate and, therefore, not appropriate to use.

MS. LOWE: Thank you.

CHAIR MILLER: Ms. Hardy.

MS. HARDY: Yeah. I -- is my mic on?

I would like to ask you what your -- are you teaching now?

MS. JACKSON: I'm teaching potty training to a two-year-old and table manners to a four-year-old.

MS. HARDY: Good. I hope they're not too animalistic to learn those. But what I was wondering is: Did you participate in the book reviews? Actual -- which ones did you review?

MS. JACKSON: I did not this round. In -- 10 years ago or so I had that privilege of

being on several subcommittees. So I appreciate --

MS. HARDY: Did you do any reviewing of the ones that -- I mean, not officially, but on your own?

MS. JACKSON: No, ma'am.

MS. HARDY: Not on this. Because I was wondering kind of what Ms. Lowe said about the fact that if I were a student, a 10th or 11th grade student taking biology and were given the assignment, make a T chart, pros and cons, strengths and weaknesses of the Theory of Evolution, I was just wondering if this textbook would provide -- and since you haven't done the textbooks, I guess you can't tell me. But that seems to me like we probably could find some high school kids to give that assignment to and let them come back to us with: Did the textbooks do that?

MS. JACKSON: There have been some changes since I reviewed the textbooks that I reviewed. But on the whole, they're much the same. And I taught honors students exclusively. I had the supposedly smart kids and the supposedly more motivated kids, which they were, generally. And an astute student, who was highly motivated, could probably make that kind of T list -- T chart. The

average student wouldn't be interested in doing that and would have a hard time doing so, because the text is so weighted towards the strengths of evolution and doesn't explicitly state what the weaknesses are.

MS. HARDY: Seems like they have an awful lot of material in here. I've -- you know, in the book. It's just an incredible amount. And it seems to me like someone could glean from all that what they need to for a T chart.

CHAIR MILLER: Thank you very much.

MS. JACKSON: Thank you.

MR. RIOS: Jim Jenkins, followed by David Smith.

MR. JENKINS: Thank you for this opportunity to speak. I'm Jim Jenkins, a Texas resident of 49 years. I have a master of science degree in electrical engineering from Rice University. I am the president of Worldwide Microsystems and an inventor, developer and producer of three microprocessor-based national products. I have never before publicly addressed any Board or Commission concerning school textbooks. I am now addressing you as a very concerned observer of the negative trend in our national science education

programs, in particular biology.

As a parent, I tutored my three children in biology, chemistry, in physics. And so I became familiar with their science textbooks. I have observed that whereas the chemistry and physics textbooks tended toward teaching science, the biology textbooks tended toward teaching philosophy.

One particular textbook, Biology: The Dynamics of Life, uses the first 157 pages to discuss sociology, ecology, environmentalism, population growth, water and air pollution, conservation, preservation, global warming and recycling. When I was using the book, I thought I'd never get to the science of biology. And I would bet that this type of indoctrination turns many kids away from biology.

However, it's the gross factual errors which cause me the most concern. Here are just three examples in Biology: The Dynamics of Life. On Page 382, the textbook includes a drawing of the Miller-Urey apparatus with a misleading caption claiming that the experiment stimulated conditions on the early Earth. No mention is made of the scientific evidence supporting the presence

of oxygen and almost no hydrogen in the early atmosphere, a condition which shuts down the production of amino acids and renders this experiment useless.

On Page 377 the textbook fails to point out how the fossil evidence of the Cambrian explosion, the biological big bang, does not support the Darwinian belief in a universal common ancestry. Even Darwin recognized the fossil evidence as a serious scientific problem, which he said, and I quote, "May be truly urged as a valid argument against the views here entertained."

On Page 402, the textbook copies of the discredited Haeckel drawings which evolutionist Stephen Gould called fraudulent and even the New York Times called, and I quote, "More fiction than fact," grossly exaggerating some early similarities in vertebrae embryos as evidence for Darwinian evolution. There is no discussion of the extensive dissimilarity of earlier embryotic stages well-known to biologists for over a century.

There is absolutely no excuse for these scientific factual errors. Science, at its best, pursues the truth. And I hope that this Board will do the same.

Thank you.

CHAIR MILLER: Questions?

MS. KNIGHT: Not specifically about his testimony, but I notice we didn't get a written copy. And I wondered if that would be possible.

MR. JENKINS: Sure would. Yeah, I'll get you a copy.

CHAIR MILLER: Thank you.

MR. JENKINS: Thank you.

MR. RIOS: David Smith, followed by Pete Moore.

MR. SMITH: My name is David Smith. And I appear before you today much appreciative of the opportunity to speak to this Board. I know your work is difficult. And as a retired public school teacher, administrator for 39 years serving the children of Texas, I know how difficult it is when you're dealing with their lives. And I speak to you today on behalf of the children and youth of Texas.

While a student in our public schools in Texas, I remember seeing pictures in one of our textbooks of the Piltdown man and an artist's conception of the stair-step evolutionary process that gradually transformed a little apelike creature into a human man. Most of the leading scientists of

the day lauded the discovery of the Piltdown man as the missing link. He turned out to be an elaborate hoax.

And incidentally, this is not the only time. Most of our noted scientists have been hoodwinked. Evolutionists are still searching for the missing link. Many, many links should be evident in the fossil record. They're just not there.

All I'm asking is that when textbooks are adopted, that the children of Texas get a fair shake. When theories are presented, I believe textbooks should give both the strengths and weaknesses of said theories. This, I think, would be in keeping with the Board's own operating rules, the Santorum Amendment and TEKS high school biology requirement.

Not all leading scientists today are evolutionists. Might be hard for some to believe, but that is a fact. Many are now pointing out glaring weaknesses in the Theory of Evolution. Our children deserve to hear the rest of the story.

Thank you.

CHAIR MILLER: Thank you.

Any questions?

Next?

MR. RIOS: Pete Moore, followed by Forest M. Mims.

MR. CRAIG: Mavis.

CHAIR MILLER: Oh, I'm sorry.

MS. KNIGHT: Madam Chairman, I do have a question. And it probably is for David. And he may not be able to answer it now. But I would like to find out about the Santorum Amendment. It was my understanding that was more a clarifying amendment to legislation, but it does not have the weight of legislation. Could you clarify that for us, please?

MR. ANDERSON: I'd like to go check and report back. What I've heard is that it was an amendment that was adopted in one house of Congress and did not actually pass and become part of No Child Left Behind. But I'd like to go back and do some digging and report back on that.

MS. KNIGHT: Please. And I would like that to come from our attorney.

MS. LEO: Madam Chairman, I did look into that. And Congress didn't reject Santorum, it just decided to put the language in the report language, rather than the statutory language. But

by the way, the report language is voted on and approved by both houses. I know there was some debate on that at the last Board meeting when somebody said it had been rejected. It has not. It was voted on both houses of Congress. It's just like statutory language. Congress expects report language to be followed. For example, in No Child Left Behind, it tells the districts -- and this is in the report language -- how to calculate graduation rates. We do follow that.

So the Santorum language does represent the official view of Congress. It was voted in by 91 ayes and eight nays. And it says, "Where topics are taught that might generate controversy, such as biological evolution, the curriculum should help students to understand the full range of scientific views that exists, why such topics may generate controversy and how scientific discoveries can profoundly affect society. Contrary to some reports, nowhere does this language mention intelligent design or creationism. Instead, it simply states the idea that children should understand that there is a diversity of opinions."

So it was not rejected. It was put into -- it was passed by both the House and Senate

and put into the report language, which that doesn't carry -- that does carry the -- I mean, the Congress does wish that to be implemented or followed through with, just like when they put the graduation rates in the report.

CHAIR MILLER: Ms. Knight?

MS. KNIGHT: Madam Chairman, I appreciate my colleague's response, but I think my request was that we get our attorney to provide that answer. And I still would like for that to be done.

Thank you.

CHAIR MILLER: Dr. McLeroy.

DR. McLEROY: Madam Chair, we're passing around a letter. This is from Mr. Chapman, who wasn't allowed to testify because he's from out of state. But this is a letter that he would like to share with us that deals with this. There's so much controversy, people asking the very same good question that you asked, Ms. Knight. And so this is a response from -- as you can see, it's fairly recent, September 8, 2003. This is an answer from the people that wrote the law, that wrote the Santorum Amendment to clarify. And I think this would be very helpful. And I would pass this

information on to all the Board members and, also, to Mr. Anderson.

MS. KNIGHT: Madam Chairman, my request still stands.

Thank you.

CHAIR MILLER: Thank you.

Next?

MR. RIOS: Pete Moore, followed by Forest M. Mims, III.

Forest M. Mims, III, followed by J. Budziszeski.

MR. MIMS: Good afternoon. My name is Forest Mims. I live in Seguin, Texas. I was born in Houston. I graduated from Texas A&M. While preparing for this hearing, I read an organization that's here today believes there is no problem with the books before you and has no serious -- and that there is no serious scientific doubt about evolution.

Well, I do serious science and I have doubts about evolution and the books. I have written many books about science and technology, invented instruments and conducted biological research in Brasil, Hawaii and Texas for NASA and the University of San Palo. My papers have been

published in leading scientific journals, including Nature. I've been a member of many professional societies, including the National Science Teacher's Association and the Texas Academy of Science.

The books and lab kits that I developed for Radio Shack, a Texas corporation, have sold seven million copies. They're used in many schools, not only in Texas, but around the world. We carefully review errors -- for errors before publication. Folks, it's a strict policy. It's a Texas policy. We fix errors.

The publishers of the some of the books before have you a different standard. The descriptions of the Miller-Urey experiment in some of these books fail to state the experiment does not work as described. Several books feature staged photographs of the peppered moth. One book doesn't even mention the Cambrian explosion. Well, this Cambrian Aerolites I have here was there. It knows that life appeared in a geological blink of an eye. And our students deserve to know the same. Errors and omissions like these fail to meet the standards of a high school science report, much less the error-free mandate of the Texas Education Code.

I experienced a publisher's reaction to the evolution lobby when Scientific American magazine terminated my column assignment after the editor learned I no longer accepted Darwinian evolution. He said he was worried about the public relations nightmare that would occur if my doubts became public. His dream came true in the form of an international media event that led to a unanimous letter of support from the 16-member Committee on Scientific Freedom of the American Association for the Advancement of Science.

Since 1992, I've told this story to science students from more than 20 countries at the University of the Nations in Hawaii and Switzerland. I'll be teaching there again at Lason in October. I've learned that students around the world are perfectly capable of making analytical judgments about evolution. Why not Texas students?

Folks, Texas students deserve biology books without errors and omissions. My three children have excelled in science. Our youngest daughter, Sarah, won first place at the Texas Junior Academy of Science last year and again this year. She won $20,000 in scholarships at science fairs last year. Sarah is only 16, yet she knows how to

write accurate science reports. And by the way, she's writing her first scientific paper about a major scientific discovery she made on her own. The discovery of living fungus spores in smoke from Yucatan arriving in Texas.

It's time for Texas to insist that publishers provide biology books having the same accuracy we expect in our children's science projects.

Thank you.

CHAIR MILLER: Thank you.

Any questions? Ms. Leo.

MS. LEO: This is from -- this is from your onetime employer, the Scientific American in March 2003. And I'd like you to comment on it. "Since the origin of feathers is a specific instance of much more general question or the origin of evolutionary novelties. Structures that have no clear antecedents in ancestral animals and make no clear related structures in contemporary relatives. Although the evolutionary theory provides a robust explanation for the appearance of minor variations in the size and shape of creatures and their component parts, it does not yet give us as much guidance for understanding the emergence of entirely

new structures, including digits, limbs, eyes and feathers."

So are they kind of changing their viewpoint there? I mean, that was in the one that criticized you. That's the Scientific American.

MR. MIMS: Yes. Well, there are people within Scientific American who don't share all those views. What you just said, though, is a very interesting summary of the situation. I study mosquitos, for example, Culex pipiens. I measure the specter response of their eyes. And every time I study these animals -- and they are animals. They're insects -- I marvel over their ability to fly. They have a complete guidance system, have an inertial navigation system and have TV cameras on their head. It's an incredible thing to see that. I also study pigmented bacteria in Brasil and how they're reduced in population -- or actually, increased in population by smoke from biomass burning, how that alters the ultraviolet environment. These animal reactions to ecology are incredible. They're difficult to understand. They're inexplicable from strictly an evolutionary perspective.

MS. LEO: Thank you.

MR. MIMS: Thank you.

CHAIR MILLER: Any questions?

Okay. Thank you.

MR. RIOS: Jay Budziszeski, followed by John Koonz.

MR. BUDZISZESKI: Honorable members of the State Board of Education, my name is Jay Budziszeski. I'm a full professor in both the departments of government and philosophy at the University of Texas at Austin. In my 22 years as a scholar of political philosophy, I've written six books. I'm a nationally-recognized authority in my field of specialization.

The subjects that I teach most often are the tradition of natural rights and natural law, the problem of toleration, the constitutional thought of the American founders and the influence of religion on law and politics.

Now, although my teaching has included the philosophy of science, I'm obviously not a natural scientist myself. Why then am I here? I speak today in support of the principle that young people should be educated not propagandized. And I know something of what that means.

One of the most important differences between education and propaganda is how the two deal with great controversies. In education, the students are taught about the controversies. In propaganda, they are shielded from them. In education, students are taught both sides of the important debates. In propaganda, they're taught only one. In education, students are taught both the strengths and the weaknesses of the officially favored theory. In propaganda, they're ought only its strengths.

In short, education is the training of minds, while propaganda is the training of prejudices. In a democratic republic, the public school should not propagandize, but educate.

Now, the mandatory curriculum guidelines for Texas, the Texas Essential Knowledge and Skills, TEKS, agree with me. As we find in the science section of these guidelines -- this is well known to you -- students must learn to, "Analyze, review and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information."

Now, if the TEKS guidelines agree

with me, then what is the issue? The issue is that some advocates defend making an exception to the TEKS guidelines in the case of the neo-Darwinist orthodoxy. The view is urged upon you, the Board, that although the students should be taught about theoretical controversy in other scientific fields, they should not hear about the controversy about biological origins. That although they should be told about both sides of the other scientific debates, they should be told only one side of the origins debate. That although they should learn to weigh both the strengths and the weaknesses of other controversial theories, they must be shielded from the weaknesses of neo-Darwinist theory or they must somehow figure them out for themselves.

Against this special pleading, I urge that biology should be taught like the other sciences and that within biology, the neo-Darwinist theory should be taught like other controversial theories, with honesty about both sides.

Honorable members of the Board, when biology textbooks are biased, you are the check and balance. I urge you to require biology textbooks to let fresh air into the discussion of neo-Darwinist orthodoxy. And I urge you to require that the

important scientific controversy about origins be taught, not suppressed. To do so would be not only good training in science, but good education in citizenship.

Thank you.

DR. McLEROY: Madam Chair.

CHAIR MILLER: Dr. McLeroy.

DR. McLEROY: This is good testimony. I got a real quick question. The National Academy of Sciences says there are no weaknesses to evolution in their teaching about evolution in The Nature of Science back in 1998. They said there are no weaknesses to evolution. And you're advocating for us to take a stand, you know, the Good Honorable Board. How do you propose -- on what basis do we make our stand against the National Academy of Science and all these other supposedly experts? I mean, the strongest appeal for their argument is the fact that they have so much authority on their side.

MR. BUDZISZESKI: Yes, sir, that's a very good --

DR. McLEROY: So just give me -- this Board would have to be encouraged to stand up to incredible powerful forces. So what encouragement

would you give us to be able to do that.

MR. BUDZISZESKI: Well, I think that's a very good question. And I would say this: You know, we're all familiar with terms like political correctness. We know that there are such things as political prejudice, political propaganda and so forth. What's less well known is that in all intellectual fields, as well, these kinds of dogmas, theories which harden into orthodoxy tend to develop. Scholars and scientists have the reputation in the popular mind of being people who are nonconformists and independent thinkers. The fact is that although they tend to be indifferent to the views of their fellow citizens who are not members of their own fields, they're hypersensitive to the views of other members of their own fields, so that a kind of a group think can very easily develop. I see this in my own field. I see it in other fields when I read the literature. I have to cross lines many times in my work. And it operates, as we hear from scientist after scientist who has tried to present a contrasting view and as we see in the history of science, it operates in science, too.

So the mere fact that some particular

organization of scientists -- and remember there are many organizations of scientists, many different prestigious scientists on both sides. But when a single particular organization of scientists says, oh, there are no problems here, what you're listening to is group think. There are problems in every theory that I've ever encountered. And I'm including my own theories in my own field. You're never going to find one that never has problems, that there's nothing left to discuss. Whenever you hear that, you're listening to propaganda, you're not listening to scientific reasoning.

DR. McLEROY: Thank you, sir.

CHAIR MILLER: Any other questions?

Mr. Montgomery.

MR. MONTGOMERY: Sir, I hear us talking a lot about nobody or some people do not want to include both strengths and weaknesses to the -- what we -- to the hypothesis. And I wish somebody would talk about some other science concept except for just evolution, but I do realize that that is a controversy. But we've got to use a standard here. I doubt that any members of this Board are opposed to including weaknesses. So that's not really the issue.

The issue here is: Are they already sufficiently covered by the books; and if not, what are these -- are these purported weaknesses supported by science -- empirical scientific research? And what standard should we, as a Board, not being scientists, use to make that decision? Would it be peer-reviewed scientific literature? Is that the standard you would use?

MR. BUDZISZESKI: I beg to differ with your characterization, sir. I think the question is whether the strengths and weaknesses are to be covered. I don't agree that that's not really a matter of controversy, although -- although it's a -- the desire to shut out opposing views is the opinion that dare not speak its name here in these hearings.

You have heard from a high school student who says she -- she seemed like a bright person to me, is not able to learn about these things from her high school textbooks. You heard from a very intelligent high school teacher that in attempting to follow the law, the legal requirements, she had inadequate materials to do that in the textbooks.

Now, I am not a biologist. I've

stressed that from the beginning. And I have not done a survey of the biology textbooks. But I'll tell you what I have surveyed and what I have reviewed is the products of the Texas public schools in science. These controversies come up in my classes, too, because they involve issues of law, public policy, the intersection between religion and politics and all these sorts of things. And what I've found among my students who have been exposed to these textbooks in science is that they aren't even able to give me a good argument for the neo-Darwinist view, although they have been indoctrinated to believe that it is true.

MR. MONTGOMERY: So let me just --

MR. BUDZISZESKI: And they are in no way prepared to talk about its weaknesses. I have to -- I'm forced to say, I can -- that as an amateur, I can give you a supplemental list of readings on both sides and encourage you to go off and read on your own to try to fill in some of the gaps left over by inadequate science textbooks when you were in high school.

MR. MONTGOMERY: So you can't suggest a standard?

MR. BUDZISZESKI: Pardon?

MR. MONTGOMERY: You can't suggest a standard of particular --

MR. BUDZISZESKI: What do you mean by "a standard"? I think the standard is this: If what you find is that scientists are, in fact, disputing these things, then that controversy should be discussed. These things have -- you mentioned peer-review journals. This controversy has appeared in peer-review journals. I have myself been at scientific and philosophical conferences --

MR. MONTGOMERY: You've answered my question.

MR. BUDZISZESKI: -- at which it has come up. And I've read -- and I've read publications by scholarly publishing houses which contained these things. I mean, that seems like a pretty good standard to me.

MR. MONTGOMERY: Sir, you answered my question. We need to move on.

MR. BUDZISZESKI: Thank you. Thank you very much.

MR. RIOS: John Koonz, followed by Rob Koons.

MR. KOONZ: Hello, my name is John Koonz. I graduated from Sam Houston State

University in 1984 with a degree in bachelor of arts in teaching. Although I see the error of my ways, I originally started out at Texas A&M in engineering. Apparently, had I finished that degree, I could also have obviously been a biology expert today.

I taught science in public school for 16 years and in private school for three years. Excuse me. I also own my own science education supply business. I've looked at the various web-sites and articles and such on both sides of this issue. And what I have to say is: Do not force a change in biology textbooks used in the public schools in the State of Texas. The Discovery Institute, as well as these various Intelligent Design authors have to resort to taking out of context quotes and using misleading information to promote their scientifically unsound ideas. Sometimes research does lead scientists in new and unexpected directions. Real scientific breakthroughs are thoroughly discussed in peer-review journals, which serve as a kind of free marketplace of ideas.

The Discovery Institute does not conduct research that has ever been published in these peer-review scientific journals. They are

guilty of a kind of intellectual socialism. They want their ideas to be propped up by the government and not subjected to any free marketplace of ideas discipline.

There are two groups of people who will directly suffer from any weakening of discussion of education -- of evolution in the textbooks. First group close to my heart, teachers. When it comes to evolution, teachers are barely supported by their administrators as it is. I know this from personal experience and from doing workshops around the State at the science teacher convention over the last 10 years. And this happens even when they're following the letter of the law and following the TEKS.

And since there's no scientific evidence refuting the basic ideas of evolution, dedicated, hard-working teachers would be left struggling to figure out what to teach. They will be vulnerable to attack from all sides of this argument. And you owe some loyalty to these people.

Students is the other main group to be affected if you water down the textbooks. Since teachers will be increasingly afraid to cover this critically important topic adequately -- I'm sorry,

is that two minutes? Thank you -- students' performance will suffer. If coverage of evolution is weakened, students attempting to pass the TAKS and AP tests will be at a disadvantage through no fault of their own.

Please do the right thing. Reject the propaganda being fed to you by out-of-state special interest groups, 150 years ago they would have been called carpetbaggers. Support strong science education for the sake of Texas students and teachers.

Thank you.

CHAIR MILLER: Any questions?

DR. McLEROY: I have a question: Could you please give me an example of any quote that's been out of context, out of the myriads of quotes that they have presented.

MR. KOONZ: I don't actually have them with me --

DR. McLEROY: Thank you.

MR. KOONZ: -- but I do know for a fact that they have been forwarded to you on my personal -- or written testimony by a number of people.

MS. LEO: But we haven't seen the

quotes.

MS. KNIGHT: I'd like a copy of his testimony, also, please.

CHAIR MILLER: Okay.

MS. LEO: But we still haven't seen the quotes. I mean, you keep saying that -- and many people keep saying they've been misquoted. I would like somebody to furnish the Board with --

MR. KOONZ: I don't have it with me right now. I know there's other people that probably do, but I would be happy to send what I have read on the web-sites of National Center for Science Education, for instance, thoroughly discusses out-of-context quotes by a number of these authors. I'd be happy to forward that to you, if that would help. I don't have it with me, though, no, I'm sorry.

MS. LEO: I've seen that as well. And David Hillis said that he was extensively misquoted. And I actually saw where he claims that. It was four sentences. He was not misquoted. The book that it was in was reviewed by the same author of David Hillis' book or the same editor. And it was not objected to by that editor. It was four sentences on one page and a paragraph.

And it was a direct quote.

MR. KOONZ: Here again, I'd be happy to forward the information I've come across before. I'm sorry I didn't bring it here today.

MS. LEO: Thank you.

CHAIR MILLER: Thank you very much. Let's go to the next --

MR. RIOS: Rob Koonz, followed by Dr. Ronnie Hastings.

MR. GLASSER: I had a quote for you, but sorry.

MS. KNIGHT: He said he had a quote. Could we hear that?

CHAIR MILLER: Ms. Knight has asked that this young man in the audience. You said you had a quote.

MR. GLASSER: Ms. Knight, you want --

MS. KNIGHT: I'd like to hear it.

CHAIR MILLER: She said she'd like to hear it.

MR. BERNAL: Yes, Madam Chairman, I would, too, because he was trying to rush over to the podium to get the gentleman to look into some of those quotes. And these quotes were being asked for by two members. And so I'd like to hear them.

MR. GLASSER: I'm sorry to interrupt. But on the back side of my talk, I have an extensive discussion --

COMMISSIONER SCOTT: Excuse me, are you from Texas?

MR. GLASSER: What?

COMMISSIONER SCOTT: Are you from Texas?

MR. GLASSER: Yes, I am. On the back side of my paper, I have an extensive discussion of Jonathan Wells' treatment of the peppered moth, where he relies on information from Michael Majerus. Jonathan Wells makes the claim that peppered moths don't rest on tree trunks, which falsifies the textbook treatment of the peppered moth. And Michael Majerus himself said, "This is just wrong. If Dr. Wells had read my book, which he claims to, he would have seen that Table 6.1 and 6.2 show that I, myself, have recorded 168 peppered moths on tree trunks."

CHAIR MILLER: Any questions? All right, Ms. Knight.

MS. KNIGHT: Oh, yes, that satisfied me. Thank you.

DR. McLEROY: Madam Chair, before

this is over, I will give a detailed response to all -- any claims of misquotes and in detail. I think that was presented by -- was it Dr. Bohlin that gave us those notebooks that had extensive documentation of every single quote that's been -- well, it was given to the Board. They couldn't make copies for all of us. It was those five notebooks. Where are those?

CHAIR MILLER: In the lounge.

DR. McLEROY: I'm just saying that we can research this and find out the bottom line on these quotes. And I do know the Discovery people have submitted notebooks about each one of the quotes, including the entire articles that they were referencing and things. So thank you.

CHAIR MILLER: All right. Now -- Mr. Koonz.

DR. BERNAL: Excuse me, Madam Chairman. Who was the gentleman that just spoke right now about the peppered moths? What was his name?

MR. GLASSER: Russell Glasser.

CHAIR MILLER: I'm sorry, what?

MR. GLASSER: Russell Glasser. I am No. 73 on the list.

CHAIR MILLER: He's 73 on the list.

DR. BERNAL: 73? Thank you.

CHAIR MILLER: Well, no.

MR. GLASSER: 63.

CHAIR MILLER: All right. Now, you're on.

MR. KOONS: Great. Madam Chairman and esteemed members: My name is Robert Koons. I'm a professor of philosophy at the University of Texas at Austin. My written testimony also includes a letter from two of my colleagues at University of Texas, including Martin Pony, who is a professor of biology and Professor Milner in biomedical engineering. So although I'm not a biologist, I do have a letter from one. And before you ask me about that, there are two distinguished biologists over here from out of state whom that you refused to listen to. And frankly, I'm embarrassed by that, because that seems to be a breach of the kind of Texas hospitality that I would think we would try to show, especially when Dr. Wells' work is being criticized here. So I'm a bit shocked about that, to be honest.

But I am here speaking today as a father of three children in the public schools here

in Texas. I believe the Texas students should be allowed to study the weaknesses of Darwin's theory, but I'm worried that they're not going to be able to because supporters of Darwin's theory have overreacted to this perceived threat of creationism, by proclaiming that Darwinian theory is already known to be true beyond all reasonable doubt. And so it can't be reasonably questioned.

I believe that given our current ignorance of how the genes regulate these processes. And so our ignorance of the probabilities of new systems arising initially by chance, the truth of Darwin's model simply cannot be a matter of settled fact. Of course, if evolution is defined broadly enough, there is no doubt that it has occurred. There has been a gradual unfolding of life, which is the original meaning of evolution.

This was well known before Darwin's work. Darwin's crucial contention was that he had discovered the underlying mechanism, a blind and purposeless process. However, except in the case of a few minor adjustments, such as bacterial resistance to antibiotics, evolutionary biologists have not yet met the burden of proof of demonstrating this mechanism is sufficient to

explain biological complexity.

The mere fact that it's conceivable that some day we may discover such scenarios, is not sufficient to prove that the mechanism is a physically and chemically possible explanation of life as we know it today. To meet this burden of proof, there are two gaps that would have to be filled. Darwin's sketchy schema of variation and selection would have to be filled in with sufficient detail in particular cases to enable us to verify that it could, in fact, be responsible for these adaptations. And then we'd have to test those particular hypotheses against the available evidence. The second task presupposes the first.

We're still waiting for Darwin's Newton. For a theorists who can take Darwin's proposal and produce even one hypothesis about the origin of one interesting biological mechanism. A hypothesis which specifies step-by-step the genetic changes that had to take place, the embryological alterations that those changes produce, and the quantifiable selective pressures that enable each new step to reach a significant proportion of the population.

The -- to take an example, in the

case of the Galapagus finches, we still don't know the genetic process that produces those variations. So even in that case, which I think a Darwinian explanation is probably available at some day, we don't, in fact, know the step-by-step process of mutations that could have produced those variations.

Thus, I'm not arguing that Darwinism is only a theory. In fact, it's not even a theory. It's a research program.

Is that it? All right. Thank you very much.

CHAIR MILLER: All right. Thank you. Are there any questions?

Ms. Knight.

MS. KNIGHT: Not so much about his testimony, but since we have been accused of being inhospitable, I'd like to know how widely distributed is our ruling about who can sign up to speak and that you have to be a Texas resident? I'm just wondering how people paid their way to come here to speak, not knowing that there were this kind of regulation. Did we invite them? Did they just show up? How did that happen?

COMMISSIONER SCOTT: This particular

rule, I understand, was adopted by the Board -- or readopted this year and I think it was originally a 1996 rule. So it's been published in the Texas Register and there's been notice to the public. Now, given the fact that the rules are lengthy, I mean, there's certainly an opportunity that people were not aware of that, which is why we felt like we wanted to give everybody an opportunity to be heard and hold a separate meeting after the formal textbook hearing.

MS. KNIGHT: So we have provided an opportunity for them to be heard. Thank you.

MR. MONTGOMERY: Ms. Miller -- Madam Chair, I'm sorry. I'm not ashamed at all, sir. And I'm amazed that you would be ashamed that a member -- that this Board voted to uphold a law that this own Board passed as a rule and has the effect of law. So I'm not the least bit ashamed about it. And I don't know why, as a Texas resident, that you would be ashamed.

I also want to ask you one question: Are you from the Discovery Institute?

MR. KOONZ: No, sir, I'm a professor at the University of Texas at Austin.

MR. MONTGOMERY: As you know, we get

voluminous information from this group quite a lot during this period of time. And I find all of the things that they do not support, they run from various different things. But I also want to ask you --

MR. KOONZ: I'm actually -- to be honest, sir, I am actually, I think, a fellow of the Institute, although that's an informal relationship. I should also mention that I'm a member of the Communist Party, as well, in case --

MR. MONTGOMERY: You are? Well -- okay. I won't ask you --

MR. KOONZ: Not really. I'm sorry, that was a joke, sir.

MR. MONTGOMERY: Well, I didn't get that. But anyway, I do want to ask you about this: They do say that they have a long track record of, among other things, supporting the separation of church and state.

MR. KOONZ: Yes, sir.

MR. MONTGOMERY: Now, what constitution did they get that one out of?

MR. KOONZ: Well, that's a good point. In fact, that phrase is not in the Constitution, as I'm sure you're aware. It's in

the -- a letter about by Dr. Jefferson.

MR. MONTGOMERY: Right.

MR. KOONZ: But the main point here, I think, that they're making is, that we're not talking about introducing any sort of biblical theory, creationism, intelligent design, anything like that. I certainly wouldn't support that. I think the only theory they should be studying is Darwin's theory, because that's the only one in which we have an existing, working research program.

However, they should be aware of the fact that this research program still consists largely of promissory notes. That is, it's a sketch of what sort of explanation we might some day be able to find for these changes. But to suggest -- to teach students that they've already been -- these things have already been discovered is --

MR. MONTGOMERY: Sir, I asked you about the support of separation of church and state. Okay. Is that true?

MR. KOONZ: Do I support the separation of church and state?

MR. MONTGOMERY: The Discovery Institute supports that.

MR. KOONZ: I can't speak for them. I certainly support the First Amendment of the United States.

MR. MONTGOMERY: Well, I was reading from a letter from a gentleman named John G. West.

MR. WEST: I hope you'll stay after the meeting. I'd be happy to address it.

MR. KOONZ: If you'd like to talk to the Discovery Institute, I'd suggest you add them to the program.

CHAIR MILLER: No, everybody, let's -- all right. Is there anymore questions? We need to move on.

Thank you very much.

MR. RIOS: Dr. Ronnie Hastings, followed by Don Brillhart.

DR. HASTINGS: I'm Dr. Ronnie Hastings. Could I ask a favor?

My understanding is down the list, No. 37 or so, is Roger Paynter from the First Baptist Church of Austin who has to be attending Services right away. Could I switch positions with him?

CHAIR MILLER: I have no problem with it. Does the Board -- how --

MR. CRAIG: Yes, switch.

DR. HASTINGS: Thank you.

CHAIR MILLER: All right. So Mr. Paynter, No. 35.

REV. PAYNTER: Thank you and I appreciate you changing places. I am here because for too long Christianity in this country has been seen as being on the wrong side of this debate. For too long Christianity has come across as espousing a literalistic view of the creation story as contained in Genesis. Indeed, learning that I had signed up to give testimony today brought several phone calls and e-mails from fellow Christians, including one Board member here, assuming that as the pastor of the First Baptist Church of Austin and as a Christian minister that I would be here to speak in favor of teaching scientific creationism or intelligent design as it is now being packaged.

I suspect that much of the desire to question the weakness of evolution is, in the light of day, a desire to invoke religious teachings masquerading as science. The assumption behind these phone calls and e-mails is that people of faith would find the teaching of evolution a theory that undermines the very tenets of their world view;

i.e., that God is creator and that the creation of the world happened exactly as it is spelled out in the early chapters of Genesis.

As I see it, there are a couple of problems with these assumptions. The first problem with these assumptions is that Christians can, in fact, actually respect the findings of science without science being a threat to their faith in God. Claiming that God is the creator of the universe is a faith statement, not a scientific statement. Science is not here to make faith statements to ask how and when questions -- but to ask how and when questions.

Asking science to reflect on theological issues is out of the realm of science and beyond the scope of what the scientific community needs to be doing. If a scientist is a person of faith, and many are, that scientist still has to teach and research from an objective scientific point of view to retain any credibility.

It is my deep conviction that creation flows from the hand of the creator, God, but that is a statement of faith and not something that I or anyone else can prove in a scientific experiment. It is not verifiable and repeatable.

To lead children to believe otherwise is a disservice to them, a disservice to science, and most of all, a diminishment of the grandeur of God. We should take biology as seriously as we take the Bible, knowing that whatever we learn is true is not a threat to God, nor by the way, is it news to him.

The second problem with these assumptions is that Genesis is a scientific statement. To read the scriptures in that manner is like reading Moby Dick as a handbook on whaling. The first chapters of Genesis are profound and beautiful theological statements about the nature of God, about why God created, about God's love for creation, about humanity's rebellion against God and about God's longing to restore our relationship.

To manipulate these text into something they are not nor were ever intended to be is to disrespect the Bible, no matter how loudly you proclaim it or how vigorously you wave it or how you disguise it as intelligent design. The first chapters of Genesis deal with who and why questions and not how or when questions. The who is God and the why is because God loves us. How God brings creation into being is left up to us to discover. And that is where good science comes into play.

Is that it or can I finish?

CHAIR MILLER: Thank you. Question?

MS. THORNTON: I would like to have a copy of your --

REV. PAYNTER: Right here. Okay. Part of which I got to get.

CHAIR MILLER: Any other questions?

Dr. McLeroy.

DR. McLEROY: Do you know of any instance or any person or any push for religion, Genesis, to be placed in these textbooks?

REV. PAYNTER: No. And I expected you to ask that question. But I think that to ask it is to pretend that the teaching of religion isn't somewhere behind the desire to weaken evolution as a theory. I don't think evolution has to be seen as a threat to faith. And I think that's really how that plays out in people's daily lives and how they begin to understand it and how it gets masqueraded.

DR. McLEROY: Thank you. I appreciate your point of view. And it's well -- there's lots of people that would hold it. And I just know that I don't know of an instance that is being pushed to put Genesis in the books.

REV. PAYNTER: I bet if you ask some

of the people around here from the Discovery Institute, you might discover that.

(Applause.)

CHAIR MILLER: I have -- I'm asking once again to the audience, let's be respectful of the people that come up here with different views. And so I would ask you to refrain from clapping.

Thank you.

MR. RIOS: Don Brillhart, followed by Dr. Ronny Hastings.

MR. BRILLHART: Yeah. I'm Don Brillhart, a chemical engineer, World War II vintage. The most obvious of physical phenomena is motion. And motion is by work. We can drop some nickels and observe the free fall.

Isaac Newton, about 300 years ago observed the falling apple. Now, we can observe falling nickels. Such fallings are spontaneous work involving a potential difference of gravity.

Now, I can give you the rest of the story. Newton's apple, partly smashed, lay there and rotted. These nickels will decompose a lot slower, but so, too. We in science observe two kinds of work, spontaneous work and -- as free falling and nonspontaneous work or mentally directed

work, as climbing up a ladder. You can climb and expend energy to get there.

Note clearly that spontaneous work can only proceed after -- after creative work. I'll start that over.

Note clearly that spontaneous work can only proceed after direct work has been done. Thus, we in science have ensnarled ourselves. Most notably ensnarled as to material origins and a supposed Darwinian evolution, which now appears as impossible. In the sciences, deceit is rampant. Something like some of the Texas businesses we've all taken a beaten from.

No -- so Honorable School Boards and publishers, the whole truth and a balanced presentation in textbooks seems primarily up to you. Peer-review commonly precludes an author's total honesty and/or any second opinions getting into our textbooks.

Let's face it, materialistic only teachings have run their course. Let us now publish the truth, the priorable prior, the almighty spirit God, who was, is now and shall be.

Our youth need powerful inspirations and whole truth of reality if they are to follow the

second great commandment to love your neighbors.

CHAIR MILLER: Thank you so much.

MR. BRILLHART: That it? Okay.

CHAIR MILLER: Any questions?

MR. CRAIG: Thank you.

MS. SALAZAR: Dr. Ronny Hastings, followed by Roger Sigler.

DR. HASTINGS: Good afternoon, ladies and gentlemen. I am Ronnie J. Hastings of Waxahachie, Texas. My doctorate is in physics from Texas A&M University. I am a retired science teacher in Texas public schools, teaching physics and advanced mathematics 28 years in the Waxahachie ISD and a year as a regional science advisor for the University Texas Extension Division. In addition, I have served on the Texas State Textbook Selection Committee, over a decade ago, for three consecutive years. One year as a chairman. On the Texas State Advisory Committee for secondary schools curriculum development for two consecutive years.

I'm here today speaking on the adoption of the secondary school's biology text as a concerned, retired science teacher, familiar not only with the selection of the science texts for our children, but also the efforts of all kinds of

antievolutionists to effect the content of our students life science texts.

It's my considered opinion that so-called weaknesses in the evolutionary theory is but another groundless straw man argument pushed by antievolutionists. It would be an unfortunate step backwards from the progress made in selecting quality science texts in Texas a decade ago to now have the sectarian influences of antievolutionists undermine the quality and accuracy of our state's biology texts by referring to nonexistent weaknesses.

I urge all involved in the State's selection of the textbooks paid for by taxpayers and voters to not heed these antievolution influences.

I have dealt with antievolutionist of all types for almost 25 years now. And they all have nonscientific motives; religious, political or both. They are not interested in finding out the nature of things, but rather finding in nature justification for their prior religious beliefs. They simply ignore the 140 year plus success story that is the Theory of Evolution. All these antievolutionists, therefore, do not have the best interest of science students in mind.

Just as hidden snakes I watched for growing up in rural Central Texas have certain telltale indications, so do antievolutionists. They simply do not understand that congresses, debates, institutes, misleading quote-mining from scientific articles do not scientific research make.

Watch out for these signs. I ask you to do right -- what is right for Texas. In other words, please do not embarrass our great state, as Kansas was for a brief time embarrassed, by modifying or qualifying our children's biology textbooks as these nonscientific sectarian interests would want.

Students in Texas public schools deserve no less than to know what science is, what scientists do and why they do what they do. Don't short change our students. Texas leads our nation in so many categories, let us lead our nation in quality education.

Thank you for your time and consideration.

CHAIR MILLER: Question?

Dr. McLeroy.

DR. McLEROY: Does a motive change the truth?

DR. HASTINGS: Sir, could you repeat that, please?

DR. McLEROY: Does someone's motive change what is true?

DR. HASTINGS: I do not think so.

DR. McLEROY: Thank you.

CHAIR MILLER: Ms. Leo.

MS. LEO: I would just like to correct something that you said about Kansas. And you can ask several of the publishers that are here. But Kansas State Board of Education did not remove evolution from either the textbooks or the curriculum.

DR. HASTINGS: I understand and I did not mean to imply that.

MS. LEO: And I have a letter here from Senator Brownback that describes that process and what that Board of Education decided to do was that since microevolution was something that we can all observe and all agree on, variation among species and we have lots to agree upon there. But that macroevolution, you know, those ideas of changing one species to another, DNA changing to another DNA, creating life from no life, that those questions were still yet unanswered and unsolved.

So that Board decided to take a -- the macroevolution question off the State assessment test.

I have a letter from Senator Brownback from Kansas describing actually how that took place. And it was misreported as antievolutionists trying to remove or put in creationism and intelligent design into their textbooks and into their curriculum. That is not what happened. And I'm sure the publishers are here for you to talk to and see if Kansas, in fact, did remove evolution from that.

And that's also been misreported that all of those conservatives that supported that lost their races. And we don't want the same thing to happen. I checked three seats by the conservatives were lost and they gained two. So, you know, and that's normal in any election cycle and it wasn't due to this issue.

DR. HASTINGS: I understand. I'm just saying to you that perceived in the scientific community there was an unfortunate embarrassment for the State of Kansas.

CHAIR MILLER: Any other questions? Thank you very much.

MS. SALAZAR: Roger Sigler, followed by Susan R. Wright.

MR. SIGLER: I am Roger Sigler. And I have a new appreciation for what you-all do here as a Board. And I'm kind of taken back at the hard work you've got to do and put up with all us speakers.

I'm a geologist. I have a masters degree in geology. About 18 years experience in various fields of oil and gas exploration, certigrify, groundwater. And now I'm employed in the geothermal business.

What I want to try to stress here, I'm not a biologist. And I'm not going to argue biology by any stretch of the imagination. But I'm going to address the fossil record, the preservation of fossils and catastrophism.

Basically, catastrophism has been on the rise in geology since about the '70s, because of the nature of the geologic record. And I'm going to give you some quotes about the fossil preservation first.

"Soft parts can only be preserved by a stroke of good luck in an unusual geological context." That's Stephen J. Gould, 1989. Another

guy basically says, man, you know, nothing is really getting fossilized now. But how is it that we have all of these marine fossils on the continents when there's virtually no fossilization going on right now. Okay.

And another guy talks about footprints. You know, all the dinosaur tracks up in Connecticut. What about here in Texas? Did you guys ever go see those dinosaur tracks. When I am on vacation with my family, that's where we go. Even if my wife sits in the car, my kids are out at road cuts on I-10 looking for fossils in the beds there in the Glenrose formation or whatever.

And what we find there is evidence of catastrophism. Okay. It's on the rise in geology. You've got footprints that -- it says here, you know, that, "Sandy mud soon hardens and becomes covered with more sediment that's favorable for preservation." So these footprints you find all along the continental divide in the western United States either has to hardened quickly or be buried rapidly to preserve these tracks. Okay.

Here's some quotes catastrophism, Derek Ager, nature of the fossil record, 1976, well-known Brittish professor of geology, hates

creationists. He says, "It must be significant that nearly all the evolutionary stories I learned as a student have now been debunct."

We all know that many apparent evolutionary bursts are nothing more than brainstorms on the part of particular paleontologist. The point emerges that if we examine the fossil record in detail with its level of orders or species, we find over and over again not gradual evolution, but the sudden explosion of one group at the expense of another.

Another well-respected geologist, Kenneth Hsu. He goes out on ships and everything examining this stuff. Catastrophism is enjoying a renaissance in geology for the last 180 years. Geologists have applied a consistently uniform unitarian approach to their studies that has stressed slow and gradual changes as defined by the marked Lyell and Darwin.

CHAIR MILLER: Thank you. Are there any questions?

MS. LOWE: I'll try to keep it brief, Madam Chairman.

Are you familiar with polystrate fossils?

MR. SIGLER: Yes, ma'am.

MS. LOWE: Is that a problem in evolutionary theory?

MR. SIGLER: Basically, a polystrate fossil is -- are you familiar with Mount St. Helens and the eruption that occurred there? What happens is, when a catastrophe happens and it knocks the trees down and they're floating in the water, many of them want to start floating upright because the root end is heavier. And then the sediments bury this tree in multiple layers, giving the impression that you have multiple forests.

So since that catastrophe happened at Mount St. Helens, they took down the sign -- oh, not there, but I mean, over in Yellowstone about how they used to say it, 27 different forests. But now they took down the sign and they're starting to rethink again more in catastrophic terms. So the more we learn about the Earth like that, we can start talking catastrophism.

MS. LOWE: Well, polystrate fossils are a problem with the geologic column argument that everything is laid down slowly and in layers. And any sort of polystrate fossil that through several stratus --

MR. SIGLER: That would be an evidence of catastrophism. There are slow processes that you can observe everyday in the normal course of what's going on. But when you come across things like soft body parts, like fern leaves, fish scales, things like that, these are all -- have to be buried quickly, away from scavengers so that they can become a fossil, have a chance of becoming a fossil.

So the sedimentary geologic record, a lot of it is very catastrophic. And so they're now talking about in the peer-review literature of astroid impacts to explain it. There's another quote from a guy about -- just out in the September issue of Geology about methane-driven oceanic eruptions and mass extinction. If you type in the word "mass extinction" on the Internet, you're going to get hundreds of articles of what's going on. Because now we're trying to explain what in the world are all these marine fossils doing on top of the continents. Okay. And there's mass extinctions all throughout the geologic record.

So the point is: There's -- fossil preservation under normal circumstances doesn't occur hardly at all. It takes an extraordinary geologic event to bring about fossilization.

CHAIR MILLER: Ms. Leo.

MS. LEO: I just want to say that I appreciate testimony like this that has actually read the book, includes the page numbers where they are cited omitted weaknesses. And that you've really done a great job. That's what I like to see is somebody that actually read the book with specific examples and page numbers. So thank you.

CHAIR MILLER: Thank you.

Ms. Knight.

MS. KNIGHT: I have a question for my colleague, as we were talking about Kansas and the effects earlier. Did the National Science Teachers Association, the National Research Council and the American Association for the Advancement of Science withdraw permission for some of their copyrighted materials to be used in Kansas as a result of this prior stance on evolution, the teaching of evolution?

MS. LEO: I'm not sure. Say -- did they withdraw --

MS. KNIGHT: Permission to use their copyrighted materials in their science curriculum? Could I just have a copy of the letter that you have?

MS. LEO: Yeah. Okay. Yeah.

MS. KNIGHT: Thank you.

MS. LEO: Actually, it's from -- it's Senator Brownback's testimony before the United States Congress. It's in the congressional record, but I do have a copy. It's part of what he talked about when he talked about the Santorum Amendment.

MS. KNIGHT: I'd like to see it. Thank you, Madam Chairman.

CHAIR MILLER: Any other questions?

Thank you so much.

MR. SIGLER: You're welcome.

MS. SALAZAR: Susan R. Wright, followed by Allen H. Magnuson.

MS. WRIGHT: I want to thank you for the opportunity to speak here. I'm Susan Wright. This is my oldest son, James. And I'm going to be talking about him today.

I'm a registered professional engineer in the State of Texas, but the reason I'm here is because I'm a mother with five children in the public schools in the State of Texas who range from grades -- thank you -- from grades one through eight. I volunteer in their elementary school science lab as a PTA rep and I'm also a substitute

teacher in their school.

Many things from the past that are currently known to be scientifically incorrect are still being taught to our students. Last year, while James was in his 7th Grade science class, his teacher asked the class: "What do all animals have in common?" Many students gave good responses. Then she said, "I know of a similarity that you probably never thought of." And she showed the class this sketch of a human embryo. And she stated, "When you were in this stage of development, you and other vertebrates had gill slits like those shown in this drawing."

This sketch is part of Ernst Haeckel's drawings published between 1866 and 1874. In 1874 Wilhelm His, Sr. found them to be inaccurate and fraudulent. You're seeing a comparison of Haeckel's sketches and actual photographs of embryos. Human, mammal, bird and reptile embryos do not have gill slits and do not go through a fish stage of development. You've never had the DNA instructions for gills nor the type of blood vessels designed to absorb oxygen from water.

When you were in the embryonic stage, you had wrinkles in your skin which became your

pharyngeal grooves and pouches. These then developed into essential parts of your body, like your lower jaw, your tongue, your thymus gland, parathyroids and middle ear canals.

Charles Darwin published the Origin of Species in 1859. He predicted that evidence would be found to support his theory. Ten years later, Ernst Haeckel began publishing fraudulent drawings of embryos to support Darwin's theory. In 1874, Haeckel was convicted of fraud by his colleagues.

The idea that humans had gill slits was proven wrong over 100 years ago. Exposure of Haeckel's fraud has been published many times over the last 100 years in peer-review literature. Unfortunately, during this same period, Haeckel's sketches have been published in many biology textbooks. The 6th Edition biology textbook by Raven and Johnson that you're considering has sketches of embryos in Figure 21.16 on Page 450 which reads, "Our embryos show our evolutionary history. The embryos of various groups of vertebrate animals show the features they all share early in development, such as gill slits and a tail."

Inaccurate sketches of embryos that are very similar to Haeckel's sketches are also found in Figure 60.18 on Page 1229, along with a discussion of embryology as proof of evolution.

Inaccurate, fraudulent information presented to our children as a fact is not good science education. I'm asking you to follow the law. Follow TEK 3A and remove the fallacies from my children's science textbooks, for the sake of the children of Texas and for those teachers who have to teach them.

CHAIR MILLER: Thank you. Any questions?

Appreciate you coming.

DR. McLEROY: Dan, I think this is what you were looking for.

MR. MONTGOMERY: Yeah, I do want to ask. You know, I'm sorry, I don't have one of those books here. You can go back. I do agree that we probably shouldn't have that kind of information in the book that has been peer-reviewed and it is definitely a weakness or forgery or whatever. But I haven't -- nobody has actually told me whether or not these are actual drawings of Haeckel's. Are they just similar drawings of Haeckel's or are they

actually labeled Haeckel's drawings?

MS. WRIGHT: In this book, they are not labeled as Haeckel's drawings. But if you compare them to Haeckel's drawings, they look very similar. And they are --

MR. MONTGOMERY: But they're not Haeckel's drawings; is that what you're saying?

MS. WRIGHT: No, but they're also very inaccurate. If you compare them to actual photographs of the embryos, you can see they're not correct.

MR. MONTGOMERY: I want all that information, if I could, because I've asked for it and nobody has produced it yet.

MS. WRIGHT: Okay. What I did is I gave it to you here. And you've got copies of the book and you have copies of the overheads that I showed here.

MR. MONTGOMERY: Thanks for your information.

MS. WRIGHT: So it's right here.

MS. THORNTON: I have --

CHAIR MILLER: Ms. Thornton.

MS. THORNTON: Thank you so much for documenting. I know what you're talking about.

Maybe I missed it. Are you saying that -- directing my question to you, young man, that you were taught this last year in biology about Haeckel?

MASTER JAMES WRIGHT: Yes.

MS. THORNTON: What grade?

MASTER JAMES WRIGHT: Seventh Grade.

MS. THORNTON: Mic, excuse me.

MS. HARDY: No. Use the mic.

MS. THORNTON: Young man, what is your name, please?

MASTER JAMES WRIGHT: James Wright.

MS. THORNTON: James, thank you for coming. My question is to you: You were taught this information last year in school?

MASTER JAMES WRIGHT: Yes.

MS. THORNTON: What grade?

MASTER JAMES WRIGHT: Seventh.

MS. THORNTON: Seventh grade. Do you have the textbook in front of you?

MASTER JAMES WRIGHT: I have it -- no, I don't.

MS. WRIGHT: We don't have the 7th Grade textbook with us. This was extra material that she brought in. But the teacher obviously had this information from what she had been taught.

MS. THORNTON: But it was not in the textbook?

MS. WRIGHT: I don't think it was in his 7th Grade textbook. It was extra information brought in. But the problem that we have in our schools is, our teachers have been taught this. It's been known as a fraud for 100 years and nothing has ever been done to correct it in our textbooks. You know, and that's really not fair to a teacher, because he came home and he says, "Mom, my teacher told me something I'm not so sure about." We were able to go on the Internet and find lots of information very easily, without even leaving our house to find out that what the teacher had told him wasn't true.

And what we're affecting is the credibility of our teachers. And these same teachers who are teaching biology to our children may be the ones who, in turn, get -- have the opportunity to talk to them about the affects of drugs or smoking. And they've lost credibility if they present fraudulent information to our children one day and the next day they're trying to explain things that can affect their very lives.

So I think we should support our

Texas teachers and make sure that what we give them is accurate information.

MS. THORNTON: Thank you. And thank you for coming, young man. I hope the publishers have listened to this. Thank you.

MS. WRIGHT: Thank you very much.

MS. SALAZAR: Allen H. Magnuson, followed by Bernard Kaye.

DR. MAGNUSON: Thank you. I consider it a great honor and privilege to be allowed to speak before the distinguished Board members and guests. I'd like to talk about Darwinian evolution, the Second Law of Thermodynamics and TEKS 3A.

I have a BS in engineering from the University of Michigan an MS from Penn State and a Ph.D. in engineering from the University of New Hampshire. I have extensive experience in industry and as an engineering faculty member. I have published 17 referee journal articles and numerous conference papers. I was listed in Who's Who Among America's Teachers. I have taught engineering thermodynamics at both Virginia Tech and Texas A&M.

I have reviewed the material on evolution and Darwin's theory in the Miller-Levine textbook. There are four major omissions where

material needs to be added. These are listed as follows: No. 1, there is no illustration or discussion of the Tree of Life. 2, there is no discussion of the process of modification through mutation. 3, there is no mention of the mechanism of the upward evolutionary process resulting in increased complexity. No. 4, there is no mention of the Second Law of Thermodynamics as it relates to evolution.

These are very serious omissions as these topics constitute the very heart of the Theory of Evolution. I strongly recommend that appropriate material in these four areas be added to the Miller-Levine text and to all other texts that have similar omissions. The addition of this material should greatly enhance the student's ability to analyze, review and critique evolutionary theory as to its scientific strengths and weaknesses as mandated by TEKS 3A.

Figure 1 is a diagram representing Darwin's descent through modification. Time and complexity of the organisms increase as we go upward as shown. Evolution is the process of going up this Tree of Life.

Figure 2 is a view of the step-wise

process of evolution following a single branch of the Tree of Life. Each vertical step represents one small random mutation. The upward steps in Figure 2 violate the Second Law of Thermodynamics. This is an extremely serious weakness of the Theory of Evolution because the Second Law of Thermodynamics is one of the basic laws of physics. In science, a law out ranks a theory, making Darwin's Theory of Evolution invalid.

The Second Law says that the entropy and disorder must increase when the system undergoes a change, like when an organism mutates. For a mutated organism to evolve, you must undergo an increase in organized complexity, which means the entropy must decrease. The entropy decrease can occur only if there is an external intelligent organizing influence driving the mutation process. This means that evolution is essentially supernatural so that each upward step in Figure 2 is, in effect, a small miracle.

DR. McLEROY: Question. Could you tell me: How do you answer the -- this is a commonly raised objection. This is commonly raised objection of evolution is that it violates the Second Law of Thermodynamics, the increase in

entropy -- the increase of disorder. It's usually answered by -- in the books that I've read by the evolutionists, they answer this as, "Well, you have an open system with the sun's energy coming in." Could you respond -- how would you respond to their argument?

DR. MAGNUSON: You mean, the closed system? They usually say a closed system. Well, at any rate --

DR. McLEROY: No, they usually say it's an open system and we have all this energy from the sun coming in and so that compensates for -- and the Second Law, it's just brushed aside real glibly. Quickly.

DR. MAGNUSON: Well, there's nothing wrong with an open system. Engineers, almost all the time, work with open systems, okay. And the Second Law of Thermodynamics does apply to an open system. The energy is the First Law of Thermodynamics. It's about energy balances. The Second Law is about entropy. So it doesn't have anything to do -- what you're saying doesn't have anything to do with the discussion.

DR. McLEROY: Thank you.

CHAIR MILLER: Any other questions?

Thank you.

MS. SALAZAR: Bernard Kaye, followed by Ken Evers-Hood.

CHAIR MILLER: I'm going to ask the court reporter when you need a break. Okay.

THE REPORTER: About 5:30.

CHAIR MILLER: About 5:30. Okay.

MR. KAYE: That's fine. Can I be heard?

CHAIR MILLER: Yes, sir.

MR. KAYE: All right. I'm an attorney and a certified public accountant, have a degree in economics from Columbia University reside in Frisco, Texas, have two grandsons in the Frisco Independent School District.

I have two papers that are stapled together, but I'm going to depart from the two of them, based upon a question that was asked by a member of the Board of Dr. Hastings. Does motive affect truth? You bet it does. Maybe not in science, but in law and in life and experience, it does. And I'm going to give you two examples. The first one occurred in Texas when the moment of mandatory silence or prayer was put in to the law, and that has to be followed by all students now in

public schools. The motive is not for anything but to start to introduce prayer in the schools. Motive does affect truth, because that's a half-truth. And you've got another one going here today. Not by the members of this Board, but by the people who want to put intelligent design or creation science or miracles. They are half-truth. It's the start to attack evolution. And that is what you're faced with.

I have great respect for you. And I have great feeling for you because you are under attack. Knowing you are charged with enormous responsibility to enhance education of Texas children by providing the best textbooks, whether readily available or tailored to meet TEKS requirements, that individuals and organizations not regulated by the Board may have succeeded in 2002 to influence content of history and social science textbooks in private meetings with publishers. I assure you that many others and I are in full support of your -- your efforts and offer assistance.

Several changes were made in 2002 and ex parte meetings between individuals of right wing organizations meeting with publishers and

browbeating the publishers to change things. The changes were significant in history and social science textbooks. And I don't want to see that happen here. And I know you don't either.

So I will tell you now that motive is extremely important. And you have heard a series of falsifications and lies and motive this morning and this afternoon -- well, not this morning, but this afternoon. The motive is to get creationism and intelligent design into the schools, into the textbooks and into the curriculum. And they are disguising this by finding fault with a very complex and very longstanding theory. One that really has its merits, but every theory has its possible faults.

There was another mistake made here today and that had to do with gravity. Newton's laws or theories of gravity stood for years, until a guy named Albert Einstein came along and started to take them apart. So nothing is that definite, nothing is fixed in stone, except that every 10 years or seven years, whatever it is, we're going to have these meetings as the ID people try to do whatever they can. Motive does affect truth.

CHAIR MILLER: Thank you, sir. Any

questions?

MS. LOWE: May I ask a question about his material? You say there is no scientific controversy to be presented by discussion, mention or referral by footnote. Could you explain what you mean?

MR. KAYE: Yes, I don't think that there should be footnotes. I don't think there should be discussion of an ID. I don't think there should be even reference to ID in footnotes of biology textbooks. The textbooks should be biology. ID is religion, it is faith. And you had a very good presentation by a minister from the First Baptist Church of Austin. There should be no discussion of or mention of or footnoting to ID or creation science or miracles in biology textbooks or any other science textbooks. Teach them in religion courses, comparative religion, teach them in history courses, teach them in social studies courses, but keep them out of science and certainly keep it out of biology.

CHAIR MILLER: Thank you.

MR. KAYE: You're welcome.

MS. SALAZAR: Ken Evers-Hood, followed by David Gavenda.

MR. EVERS-HOOD: Thank you. My name is Ken Evers-Hood. I am the Pastor of the Presbyterian Church of Lake Travis and I come with two concerns today.

First off, it is the arcane scientific minutia, that at least I have been hearing for the last several hours, pretending to the same status as the majority academy. I haven't heard anybody's been speaking from majority academies. I hear folks from institutes. When my child is looking to get into college, he's not going to be looking to get into the Discovery Institute. He's looking to get into UT.

Second, I come as a pastor and my congregation. We are people of good faith. We are worried about extreme religious views infiltrating the schools. And I've witnessed an amazing thing this afternoon with people saying, this isn't about religion. I dare us to step a foot out of this esteemed rarified building -- and my children who are in our Sunday school tell us the arguments that they hear in school. It's all about religion. They have no idea of these hifalutin concepts that we hear about if we weaken evolution, they hear creation in their schools. And we deceive

ourselves, I think, at our own peril.

So I think what I would like to articulate is along the lines of what Roger articulated a little bit earlier, that is that we get our questions straight.

Let me tell you what I'm good at. I went to the University of Texas and then Princeton Seminary. I'm good at helping my congregation discern questions of meaning, questions of purpose, questions of why are we here, who is it that gives me meaning. That's what I'm good at.

You know what I'm horrible at? You know what religion is horrible and we're terrible about? We get terrible training. We're bad at talking about how.

The other day our crib came for our boy's coming in December. And I spent several hours trying to put together these pieces of wood with instructions that were in every language, I think, but English. I sat there, my seminary training gave me no guidance as to how to put this together. My wife an engineer, a woman trained in talking about how, she came in and thankfully ended my Sisyphean efforts, got it done.

I think what this comes down to is a

matter of letting majority academia science teach our children, prepare them for colleges, which is where we all want them to get into. And let questions about ID, questions about, you know, who is it that might be behind all this, leave that to me, please. Leave that to our community religious leaders, our concerned parents. Please help me maintain the integrity of my profession and the integrity of our classrooms and not ask our teachers to become sort of quasi-religio, quasi-scientific experts, please. Help us.

Thank you.

CHAIR MILLER: Thank you. Any questions?

MS. LOWE: I have a brief observation. You mentioned your strengths and your weaknesses.

MR. EVERS-HOOD: Absolutely.

MS. LOWE: Does that make you any less a person or any -- does that make you not true to me that you mentioned strengths and weaknesses about yourself?

MR. EVERS-HOOD: No.

MS. LOWE: Would mentioning strengths and weaknesses about evolutionary theory weaken that

theory at all?

MR. EVERS-HOOD: What I think I'm hearing is a fascinating argument from the right. I love it that my right -- folks on the right -- brothers and sisters from the right are now talking about pluralism and inclusively. I love this. I celebrate this.

My question, though, is that: Are we really talking about equal plural voices? Are we talking about high -- two people from ac -- academies, rather, that we support and respect University of Texas versus University of Tennessee? No, we're talking about academies versus institutes. Where are they financed? I don't know. Do you know? Where are these minority views coming from?

MS. LOWE: I think I'm talking about the presentation of scientific strengths and weaknesses as required by TEKS 3A. And I don't believe presentation of strengths and weaknesses necessarily weakens the presentation of evolution --

MR. EVERS-HOOD: And I believe --

MS. LOWE: -- anymore than your presentation of your particular strengths and weaknesses has weakened your testimony.

MR. EVERS-HOOD: I believe our textbooks maintain the weaknesses as they are and I recommend that you approve them.

CHAIR MILLER: Thank you.

MR. EVERS-HOOD: Thank you.

CHAIR MILLER: Okay. Next?

MS. SALAZAR: David Gavenda, followed by Amanda Walker.

MR. GAVENDA: Four years ago, I retired from the University of Texas, after having spent 40 years teaching physics and conducting research on the properties of materials. In addition, I have devoted more than 50 years of my life to an another Austin institution, the University Baptist Church, which I first joined as an undergraduate student. I say this to emphasize that I have never found any conflict between my scientific and religious understandings of the world in which we live. I am not unique. Many of my colleagues in the physics department are also active participants in various faith communities.

When I led Bible study classes at UBC, I found it helpful to include a discussion of the kinds of questions science can and cannot answer. People who think seriously about life seek

answers to two very different questions. What am I and who am I?

Science has evolved as a powerful method for answering the first question. Its goal is to describe the material world, including human beings, as accurately and concisely as possible.

Religion provides answers to the second question by helping us to understand who we are in the infinite scheme of things. Conflict arises only when people try to use arguments based on science to answer faith questions such as, does God exist or when they try to use arguments based on religious faith to answer scientific questions. An example of the latter was the attempt of Christian church leaders to suppress Galileo's contention that the Earth revolves about the sun rather than the sun about the Earth.

Theories play a crucial role in the construction of a scientific description of the world. As Henri Poincare said, a science is constructed of facts, just as a house is constructed of stones. But a collection of facts is no more a science than a pile of stones is a house. It is a theory that provides the framework that turns a collection of facts into a science.

Of course, scientific theories must be viewed as tentative and subjected to repeated tests to see if they really do describe the world accurately. A lot of bright people try their very best to invalidate widely accepted theories, such as relativity, quantum theory and evolution.

But as long as the scientific community finds the challenge is lacking in credibility, we must continue to include these important theories in our curriculum.

As a scientists and as a person of faith concerned about the science education of our youth, I support the adoption of science standards that honestly reflect the understanding of the scientific community, which means stressing that evolutionary theory best describes the facts or observational data of biological science.

CHAIR MILLER: Thank you. Any questions?

Ms. Leo.

MS. LEO: Yes, I have one. We have one biology book up here that's the Science of Biology by Willian Purves. And I just want to read you a quote and get your opinion of that. The book discusses what it's called -- and I'm reading from

the book -- the Darwinian view of the world. And it says that, "Adopting this new world view means accepting not only the processes of evolution, but also the view that evolutionary change occurs without any goals, the idea that evolution is not directed toward a final goal and state -- or state and has been more difficult for many people to accept that as the process and in the process of evolution itself."

Do you agree with that? I mean, did God create the world -- I mean, as a theistic evolutionist -- purposefully, intelligently, compassionately? Because this book says that it's blind, purposeless. So --

MR. GAVENDA: I'm not a theistic evolutionist.

MS. LEO: Well, but you said that the two could be compatible. And this book is saying that it can't be. Did God just make it look like it was blind or undirected or uncaring? I guess what I'm saying: Do you think that this statement should be taken out of the book then?

MR. GAVENDA: I'm not a biology teacher, a biological science teacher. I would defer to the academy, as the previous speaker said.

Ask the professional biological scientists and the people who teach biological science if this is a proper reflection of the current state of evolution.

MS. LEO: But we have a book that's saying you can't hold both views. So would that be something that you would want removed from a book?

MR. GAVENDA: I don't understand what you mean by "both views," I'm sorry.

MS. LEO: Okay. Excuse me?

CHAIR MILLER: Ms. Knight.

MS. KNIGHT: Could you reread the passage, please?

MS. LEO: Yeah. It says: "Darwinian view of the world." And it says that, "Adopting this new view of the world means accepting not only the processes of evolution, but also the view that evolutionary change occurs without any goals. The idea that evolution is not directed toward a final goal or state has been more difficult for many people to accept than the processes of evolution itself." And that's on Page 3.

And so I guess I'm asking that -- that is -- you know, you're saying you can -- that both are compatible and the book is saying that it isn't.

MR. GAVENDA: I'm sorry. I thought that was just a statement of description of the world. I didn't think it was an interpretation of it.

MS. LEO: Okay. But that would be something that would be all right to have in a book?

MR. GAVENDA: Well, I'm not a teacher in that field --

MS. LEO: You would agree with that.

MR. GAVENDA: -- so I wouldn't make that judgment.

MS. LEO: Okay. Thank you.

MS. HARDY: Is that an AP book?

MS. LEO: I didn't put down what it was. It's the Willian Purves The Science of Biology.

UNIDENTIFIED SPEAKER: Purves is an AP book as well.

MS. LEO: You have that, Gail?

CHAIR MILLER: Okay. Thank you so much.

Next?

MS. SALAZAR: Amanda Walker, followed by Donna Howard.

MS. WALKER: Hi. I'm Amanda Walker, but Michelle Gadush must pick up her child. She's No. 48 on the list. Would it be all right if we switched?

CHAIR MILLER: Sure.

MS. WALKER: Thank you.

MS. GADUSH: My name is Michele Gadush. I have a bachelor's degree in biology from the University of Houston and a master's degree in plant science from the University of California.

I am currently employed by the University of Texas at Austin as a research associate in the protein microanalysis facility of the Institute for Cellular and Molecular Biology. I am also the mother of two children who attend public school in the Pflugerville School District.

I testified last year at the social studies textbook hearings and I was shocked, as I somewhat am now, that some of the Board members apparently choose to ignore both the recommendations of the committee of experts that was assigned the duty of reviewing the textbooks by the TEA and by experts who testified at the first hearing.

For example, if you read the

testimony of people who are experts in the field such as Dave Hillis were asked essentially no questions. People from other places would go on for pages and pages. It did seem to be leaning in a certain direction.

Also -- and by experts, I mean scientists who have published in peer-review journals, not those who use controversy and publicity to sell their non peer-reviewed books to the nonscientific public. Some members of the Board seem to think -- feel that they would rather promote their own personal understanding of a subject, even in areas in which they have no expertise, rather than let the review committee decide what our children should learn.

The Board was warned in 1995 by the State Attorney General to discontinue this practice. But apparently, still it continues.

The Board has heard, and I will reiterate, there is no controversy among the mainstream scientific community as to whether or not evolution is a fact. Evolution is most simply the change and the frequency of a gene in the population over time. This is an observable fact. The only debate revolves around the mechanisms involved in

causing this change.

A scientific discussion of that topic would be well beyond the scope of most secondary school textbooks. Whole classes at the university level are devoted to this subject. And also, discussions on the mechanism of how something occurs is not what I would consider a weakness.

School textbooks are supposed to cover the current status of scientific understanding. To introduce ideas that have not been peer-reviewed or given a chance for the mainstream scientific community to really view has no business in a textbook.

While I did not have a chance to study the textbooks in detail, I accept the decision of the scientific committee that reviewed the textbooks and of my educator friends who tell me that all of the books deserve to be adopted in the form that was approved by the review committee. From my experience at the social studies hearings, I understand that back-door negotiations with publishers may be occurring, even before the hearing process has concluded and the current texts may differ from the original.

I have also included some easily

accessible references on the reverse side of my testimony, should any board member wish to read them.

America is already falling behind the rest of the world in the sciences. We should not handicap our children further by turning their science education into a baseless discussion.

Thank you.

MS. KNIGHT: We don't have any copies of your testimony.

MS. GADUSH: Oh, okay. Well, I will pass them out.

CHAIR MILLER: Thank you.

MS. SALAZAR: Donna Howard, followed by Dr. Terry C. Maxwell.

MS. HOWARD: My name is Donna Howard. I am a parent, former school board member and public education advocate. I live in Mr. Montgomery's district, though Ms. Thornton was my representative prior to lines being redrawn and subsequently approved without notice or public input on September 12th, the morning after the 9-11 terrorist attack.

I'm here today to talk about another abuse of power by some members of the State Board of

Education. With the critical issues before us, finance, dropouts, meeting new academic standards, this so-called textbook review process is a waste of time, money and energy. SBOE members are in no position to be debating science. That debate belongs in the scientific community. It is not your job.

I happened to agree with Ms. Leo who stated in the last hearing, "If education is truly a vehicle to broaden horizons and enhance thinking, varying viewpoints should be welcomed as part of the school experience." That should absolutely be the case, especially when discussing social, cultural and literary concepts. However, scientific discussions should be based on observable data rather than beliefs.

I agree with Ms. Leo and others that a discussion of theoretical weaknesses should be included, but such discussions should be grounded in the use of the scientific method, not on beliefs. And for the record, scientists are not arguing about evolutionary theory because it's not an issue for scientists.

The textbook adoption process includes review by science teachers, as well as by

institutions of higher learning to ensure academic rigor. Though public review can and does reveal errors not caught by the review teams and universities, for the most part, we have a fairly thorough review process by people who wish to have quality textbooks that adequately prepare our students for qualifying exams and further academic study.

Meaningful oversight of this process is thwarted when SBOE members misuse the process to further personal agendas. Our children need the best books possible so that they can be successful in higher education as well as in the work force. It is unconscionable for you to offer anything less. And muddying up science textbooks with superfluous, unscientific beliefs is only going to hurt our students.

Some board members have stated that they believe the biology textbooks should be rejected because of specific wording in the TEKS in regard to theoretical strengths and weaknesses. They charge that this constitutes a "error of omission," since intelligent design is not included in the text.

In actuality, the SBOE has come up

with some pretty ingenuous concepts to circumvent legislative intent regarding textbook review authority. Some predicted several years ago that the three-year wrangling over development of the TEKS would result in some imbedding of words that could be used to continue the ideological takeover of our textbooks. In fact, the actions of the SBOE might provide an enlightening unit of study in government classes as an example of how our system of government works or doesn't, based on your personal perspective.

I realize that the testimony today will probably have little, if any, effect on your decision regarding adoption of the biology textbooks. However, I believe it is important to do all we can to educate the public regarding the workings of our State Board of Education, especially if it allows us to move toward a more reasonable system of public education oversight in the future.

Just as we have imposed higher standards on our students, we should require higher standards of our State Board of Education. In fact, we should be able to reject the actions of this Board due to factual errors or at least errors of omission, the omission of rationality and reason.

CHAIR MILLER: Ms. Howard.

MS. HOWARD: Thank you very much.

CHAIR MILLER: All right. Next?

MS. SALAZAR: Dr. Terry C. Maxwell, followed by Chelsea Selter-Weatherford.

DR. MAXWELL: Thank you. Ladies and gentlemen of the Board, I wish to address you regarding the analysis of the Discovery Institute, that graded biology textbooks claiming weaknesses of evolution. My comments I'm going to confine to the Cambrian explosion.

Oddly, the greatest concern of ID proponents is when the Cambrian explosion is not referred to in the textbooks. Grades of F are given textbooks that do not mention it. They regard it as a major challenge to the origin of diversity from a common ancestor and therefore impart it as a weakness. Apparently, they believe that the Cambrian explosion demonstrates that major taxonomic groups of animals appeared suddenly as quite distinct and in separate entities, which would be a refutation of macroevolution.

I refer you to three recent reviews of the subject, Benton and others in 2000, Conway Morris in 2000 and Noel and Carroll in 1999.

These works review scientific literature of the fossil record in the Cambrian and Precambrian and the taxonomic conclusions of those finds.

We are concerned here with the dimly distant past, more than 500 million years ago. And yet, recently, many fossils have been found from that ancient period that bear on the issue of the first appearance of the animal phylum as we recognize them today.

The Cambrian explosion, per se, is a series of fossil collections most famously from Greenland, China and Canada that cover a substantial period of minimally 15 to 20 million years in the late early Cambrian. Comparison of these fossil assemblages demonstrates increasing diversity within that 20-million-year period consistent with the prediction of evolution.

At the beginning of the Cambrian 10 million years earlier than the Cambrian explosion are found fossil collections with a low diversity of small shelly animal remains. Recent finds relate some of these shells to groups represented by organisms found later in the Cambrian explosion. Even earlier in the Precambrian, there are trace fossils and fossils of animals, some clearly related

to mollusks and sponges, dating back to 60 million years before the Cambrian. This leaves us approaching 90 million years of time available before the diversity we see at the Cambrian explosion, not exactly a sudden appearance.

More important, however, is a growing body of literature demonstrating organisms difficult to assign to a category intermediate between living phyla, a finding consistent with the prediction of evolution. The ID argument that the Cambrian explosion illustrates a top-down rather than a bottom-up history of phyla is erroneous. Sudden appearances of a higher taxonomic category is not sudden appearance of an entire body plan. It is the appearance of an organism we can recognize and assign to a phylum. Many of the major changes in the Cambrian were first minor ones that became highly significant later.

I would enjoy teaching more about the Cambrian evolution -- Cambrian explosion and I would like to see more of it in the textbooks, because it's omission in some texts is unfortunate. It's a powerful strength of evolution.

CHAIR MILLER: Thank you. Questions?

Doctor.

DR. McLEROY: How do you explain the Time Magazine article several years ago? You know, I have a copy of it. That shows, you know, evolution's Big Bang or Darwin's Big Bang. And it seemed to -- is that inaccurate, the way they displayed it?

DR. MAXWELL: You know, Dr. McLeroy, I did not read that Times (sic) article. The ones I read were by Conway Morris, Noel and Carroll and others from the Scientific Analysis. I do not know what that Times (sic) article said.

The information that I get on which to base this kind of information is stuff that I get from the peer-reviewed scientific literature. And I simply don't know what they said in that article.

DR. McLEROY: Well, I'll show it to you, if you want.

DR. MAXWELL: All right. I would appreciate it. Thank you.

CHAIR MILLER: All right. Are there any other comments? We're going to take a break a few minutes.

Now any questions?

Okay. We are going to take about a

five to six-minute break, then we'll come back. Then we're going to break at 6:00 for about 20 minutes for dinner and then we'll come back.

(Brief recess.)

CHAIR MILLER: Some people -- for those in the audience have asked if -- if we will stay as long as -- you know, tonight, how long will we stay tonight?

We will stay until the last person speaks, okay. No matter what time it is. That's the role of this Board. That's what our job is. And so I just want you all to know that. And if you want to plan on any -- your evening or the rest of your evening, we are going to be here.

We do need to take a break, though, for a brief -- about 20 minutes for a brief -- some dinner, some sandwiches. So you might want to take your own break at that time, too. And then we'll reconvene after that. So -- thank you.

All right. Now, next?

MS. SALAZAR: Chelsea Seiter-Weatherford, followed by Lisa Weatherford.

MS. SEITER-WEATHERFORD: Good after -- good afternoon. My name is Chelsea Seiter-Weatherford. And I am in sixth

grade. In my fifth grade science class last year, my teacher told us that science is true. I think that the science teachers and the real scientists know what to put in the science books. Politicians do not know what to put in science books and neither do people who want to make schools teach their religion.

When I get to high school, I want to learn real biology and not a bunch of stuff that people wish was true, but isn't. The people who make textbooks should do what they know is right because we kids deserve the best science information.

Thank you.

CHAIR MILLER: Thank you, Chelsea. Welcome. And what school do you go to?

MS. SEITER-WEATHERFORD: A private school.

CHAIR MILLER: Private school. Okay. All right. Well, we're delighted that you came and you -- came to testify in this democratic process.

Thank you.

MS. SALAZAR: Lisa Weatherford, followed by Bassett Maguire.

MS. LISA WEATHERFORD: Terri Leo, in an indignant response to a critical editorial in the Dallas Morning News states that the biology textbook controversy is simply a matter of conforming to the TEKS. She says, "If we censor scientific weaknesses to evolution, textbooks would not conform to the TEKS. And by presenting scientific controversy accurately, students will learn how to evaluate competing interpretations in light of evidence."

Well, yes, only if those weaknesses are legitimate, the controversies are genuine and the competing interpreters produce bona fide evidence. Her statements seem disingenuous given the enthusiasm some Board members have shown for the Discovery Institute. DI appears to be a confederacy of hacks whose dedication to accuracy in scientific scholarship is considerably less than its drive to contaminate science classes with snake oil.

I suggest we apply Ms. Leo's standards -- lofty standards of accuracy to the Discovery Institute and see what happens. DI claims that there are major weaknesses in the biology textbooks that cover evolution science. Actual evolutionary biologists overwhelmingly disagree. It

boils down to credibility. I accept the explanations of people who have spent their lives uncovering and documenting the overwhelming evidence that supports evolution and how it's taught. Real scientists easily deconstructed DI's so-called research and exposed it for what it is, a hoax.

An alarming number of highly-regarded scientists are outraged that DI has deliberately taken their scholarly work out of context and used it to deceive the victims of Discovery Institute's con game, school boards, parents and the gullible public. This sort of desperate underhanded dishonesty is intolerable. And those competing interpretations, how would we know? DI hasn't provided any scientific evidence at all.

Based on Ms. Leo's criteria, the Discovery Institute gets a big F. DI's broader agenda includes the aggressive marketing of what it calls intelligent design, a kissing cousin to the creationists. And creationism is no kin to science.

But DI isn't about science, it is about religion. On Page 5 of its evaluation of Texas textbooks, DI says that scientists should admit to students that the origin of life remains an

impenetrable mystery. A scientist doesn't think in terms of impenetrable mysteries. A theologian does.

There are no impenetrable mysteries in science. As far as I'm concerned, in time we will know the scientific origin of life. That's precisely what DI is afraid of.

An assault on legitimate scientific scholarship is an assault on the children of this state. Our kids deserve science in their classroom, not half-baked theology or an end-run on State educational standards.

Textbook publishers, please unite against those who care more about the radical agenda than about children. You have an ethical obligation to preserve the integrity of your products, like the State Board of Education here has an obligation to preserve the integrity of education in Texas. Is it too much to hope that either will honor its promise?

Thank you.

CHAIR MILLER: Any questions? Thank you.

MS. SALAZAR: Bassett Maguire, followed by Robert Sanchez.

DR. MAGNUSON: Madam Chairman, members of the committee. I am Bassett Maguire, Jr., professor emeritus of integrated biology and of marine science at the University of Texas at Austin. I've been on the faculty, taught and done biological research there since 1957. I am committed to helping to assure that the students of our State have the best possible textbooks for use in education. I have two grandchildren who are in high school in Central Texas.

I have examined the biology textbooks that have been submitted for adoption and paid particular attention to the sections about which people from Discovery Institute have made their strongest complaints. Within the context of my knowledge and experience as an active research biologist, it seems to me that submitted textbooks are all good texts and should be adopted.

You and I were really devoted scientists in our first early years of our lives. We gathered data about the many repeating events that we observed around us, developed and modified and then used hypotheses based on our observations, we learned not to fall down on the floor when we had done that before and it hurt. We used our own data

about the reality of gravity to construct the useful hypothesis that it was better not to fall.

Physicists have constructed a complex theory of gravity, much beyond Newton, I interpolate. As with all theories, the theory of gravity is incomplete. For example, consider the great amount of money and work that's so far gone into theory guided efforts to directly detect gravity waves. Success has not come yet, but many pursue the prize. For the first one to do this, will probably get a Nobel prize. It will be wrong to throw out the physics text because of this "weakness."

Many of the "weaknesses," which critics claim to be in the Theory of Evolution are of this kind. They represent things that we do not yet have data for, and in a sense, represent a great strength of the theory because they are indications of where more work needs to be done.

The neo-Darwinian Theory of Evolution rests on an immense amount of observational data which has been produced -- which has produced a strong group of interlocking and mutually supporting falsifiable hypotheses about how the living world has developed. One of the great strengths of this

theory is that parts of it come from -- parts of it come from biology and geology and chemistry and other fields and they all fit well together. They give major support to each other and to the entire theoretical structure of which they have become part.

This is still growing and changing as a scientific edifice that provides us with an awesome view of life on Earth and an explanation of how it got to be what it is today.

I'm running late so I'll quit now. There is a little bit more, as those of you who have this will realize. It's primarily about the Cambrian explosion. But this has been ably dealt with before, so I'm not leaving out a lot.

Please approve the textbooks which have been sent in to you. They're not the best that I would like to see, but then no teacher ever really finds the best book, even if he writes it.

CHAIR MILLER: Thank you.

DR. McLEROY: Thank you very much for your polite testimony.

CHAIR MILLER: Next?

MS. SALAZAR: Robert Sanchez, followed by Mary Porter.

MR. SANCHEZ: Ladies and gentlemen of the State Board of Education, my name is Robert Sanchez. I'm a science teacher at James Madison High School in San Antonio, Texas.

In the TEKS there is a clear expectation that the students understand the concept or Theory of Evolution as it is understood by the vast majority of working scientists. A reading of professional and popular journals and magazines clearly demonstrates that the scientific community supports the evolutionary process as a means of explaining and describing the natural world.

The position statements of the American Academy of Science and the National Science Teachers Association are very clear on this issue. No other approaches are scientific because they are outside the methods and practices of science. To suggest that there are other approaches weakens the student's understanding of science. Are we going to rewrite or amend the TEKS to include nonscientific alternatives?

It is fairly obvious that the proponents of intelligent design are taking another stab at introducing divine intervention into the flow of the natural world as a matter of science.

Speculation about what God did or may have done is a matter for theology. Miraculous healings and other miracles may be real enough, but do they belong in a science textbook? There are many other religious perspectives on the matter, both Christian and non-Christian. Are we going to give them equal time? I believe that all of you would agree that this would not be reasonable.

True science never presumes an errancy. The scientific process is self-correcting and ongoing. An objective scientist is always willing to evaluate new data. Darwin's theories have been continually put to the test with adjustments and additions being made along the way. To me, it is the ultimate concession to God's unlimited capacity that he could create the universe with its natural laws that had the precise purpose and ability to result in the development of the persons sitting in this room. It seems a bit of an insult to God to suggest that he did not get it right the first time. Does God continually need to fiddle with nature to make up for his shortcomings?

We may never know or understand everything about the natural word. But to abandon a naturalistic explanation to some aspect of his

creation is a disservice to God's capacity. Isn't the natural process still a divine process as God is the author of nature?

I am a practicing Roman Catholic. One can be a Christian and accept evolution. The Catholic church has no serious problems with modern scientific thought, but it seems that there are many in Texas who do. However, we must keep these two interests separate. I am a high school teacher, science teacher of 31 years of experience and know the importance of keeping science a science.

As Einstein once said, "Scientists were rated as great heretics by the church, but they were truly religious men because of their faith in the orderliness of the universe."

Biology can only be properly understood through the eyes of evolutionary change. Without evolution, the natural world is a pile of arbitrary, disconnected and harsh realities. With evolution, the natural world is a beautiful and interwoven tapestry and a tribute to a good creator's capacity.

CHAIR MILLER: That's the three minutes, sir.

MR. CRAIG: Mr. Sanchez, since you

teach science and biology, I believe, have you had an opportunity to look at the textbooks?

MR. SANCHEZ: Unfortunately, I only saw some of them. They were not available on my campus. And when I went to Region 20, some of them had either disappeared or never were there.

MR. CRAIG: The ones that you've had an opportunity to view, do you believe they meet the TEK standards?

MR. SANCHEZ: I would say, in general, they do. I did have a couple of problems with Glencoe, but -- because they were including a page with a commentary on ID and it seemed that they were equating it with some other possible theories like asteroids and one thing and another.

MR. CRAIG: Thank you.

MR. MONTGOMERY: Madam Chair?

CHAIR MILLER: Ms. Lowe.

MS. LOWE: Mr. Sanchez, what book do you currently use in your classroom?

MR. SANCHEZ: At the moment, I'm teaching physical science, but I believe we're using the -- oh, geez, terrible.

MS. LOWE: If you're not teaching biology --

MR. SANCHEZ: Last year and previous years I did teach biology. And I'm just trying to remember the name. It's the one with a certain logo. And I believe it was Glencoe, but I'm not sure.

MS. LOWE: I'm sure you teach the TEKS in your classroom.

MR. SANCHEZ: Yes, we work very hard at it.

MS. LOWE: Can you give me a specific example of what you would use from your textbook to address strengths and weaknesses of scientific theory as the TEKS require from your textbook?

MR. SANCHEZ: If I was teaching biology, which I have for many years? Well, of course, they had the Urie experiment in some of the textbooks. And some of the books have addressed it as being, you know, interesting to begin with, but you know, since then other areas have been investigated as better examples of biochemical evolution.

MS. LOWE: So you would use the Miller-Urey experiment as your example of a scientific -- of scientific evidence that talks about strengths and weaknesses?

MR. SANCHEZ: I think it would show the ongoing process in science of self-correction.

MS. LOWE: Well, that's not the TEKS that I'm asking about. I'm asking about TEKS 3A, which specifically states that students should analyze, evaluate and critique scientific hypotheses and theories with their scientific weaknesses and strengths. What example from your textbook do you use to have students evaluate a hypothesis or theory with its scientific --

MR. SANCHEZ: There is an example of evolution of horses that has been used for many years.

MS. LOWE: Is that for strengths and weaknesses?

MR. SANCHEZ: And we know, of course, that, especially in some of the newer textbooks, they corrected this. But that, you know, it's not always quite so simple and that it's often a many-branched process. And that perhaps that particular fossil may not be the one, but there perhaps are others out there yet to be discovered.

MS. LOWE: But that's what you would present strengths and weaknesses of would be the evolution of the horse?

MR. SANCHEZ: Essentially, the incomplete nature of the data. Not that the information will never be found, but that the data simply may not be complete and, therefore, we are still looking.

MR. MONTGOMERY: Madam Chair?

CHAIR MILLER: Yes.

MR. MONTGOMERY: Mr. Sanchez, I appreciate the good work that you do for the school children of San Antonio in the Northeast Independent School District. And I'm glad to hear from a teacher, a biology teacher, a science teacher. And that goes for all of the other teachers that we've -- that we have had -- heard testimony from today. It's always good to hear from people that are actually out in the trenches and know what's going on in the public schools. And you say that you have observed or reviewed some of these books and would you -- do you think that they do meet the standards?

MR. SANCHEZ: To the best of my knowledge, I think the gist of the books are quite adequate. I could suppose one could argue a particular point or a phrase. If someone wants to bring up a point or a phrase, I'll be glad to

address it. But I think on the whole they seem okay. There -- as the gentleman who preceded me once said -- said, these aren't the best books. It's what we get. And part of that process is all of this wrangling that's going on today. The books could be improved, I'm sure. But right, now we have a set of books out there and we've got to decide whether we're going to accept or them or reject them.

MR. MONTGOMERY: But there's nothing in the book that calls into question your basic Christian religious beliefs; is that true?

MR. SANCHEZ: Not anything that would bother me at all.

MR. MONTGOMERY: Thank you for your testimony.

CHAIR MILLER: Ms. Leo?

MS. LEO: I have a question on the Glencoe book. And I know there's another book also that talks about intelligent design. Of course, there's nothing that requires a publisher to put that in, but there's nothing that prohibits them as well. I mean, they're not required to put that in. But in your opinion, should that section on intelligent design be removed from the textbooks?

MR. SANCHEZ: Well, I think it's interesting discussion, but I think it tends to throw a shadow on the process of science if it equates intelligent design with science, because they are not the same thing. And therefore, I would prefer that it not be there. But of course, it's something that as a teacher I could easily discuss in the class and handle in the class. You know, you don't necessarily have to throw the baby out with the bath water.

But the point I'm trying to make is that, if you have this page in which all of these things -- you know, why didn't we have included on that page something about, you know, UFOs bringing life down to Earth and so forth and so on. There's lots of other things they could have put in. So it makes -- it tends to give the impression that ID is on the same level as evolution in terms of science and it's not. And therefore, I would certainly question that, yes.

MS. LEO: I've read both that quote on ID and the one in the other book. And actually, I don't believe it should be in there as well. So we're in agreement on that. Especially, if it's going to be in there they need to define it

correctly, because in both of those books, it does not define in correct terms what intelligent design is.

MR. SANCHEZ: There should be --

LEO: So I think they should be removed as well.

MR. SANCHEZ: There should be a disclaimer saying that this is not science, but another position, if they wish to do that.

MS. LEO: Well, they should -- and they should define the position correctly.

MR. SANCHEZ: I would agree.

MS. HARDY: I thought in that particular text it said where conflicts come from science and culture come in conflict. I thought that was the title of that page. It's not on there?

MR. SANCHEZ: Intellectually, I think it's very good. I think that's a very good paragraph. And I think -- you know, I have no disagreement with it. But I'm just wondering if it needs to be there since -- at least for a 9th grade or 10th grade student who is casually looking through the book might get the impression that that is also acceptable science.

MS. HARDY: I just thought it was

kind of an inset. I know in social studies books we do a lot of that sort of thing.

MR. SANCHEZ: I would not throw out the book. And you know, if it was a big problem, I wouldn't even worry about it. But I'm just saying it's there. And it's an example of where you might get the wrong impression if you were a 14 or 15-year-old and that you might get the impression that intelligent design or some other nonscientific approach is on the same level from the standpoint of scientists.

CHAIR MILLER: Thank you very much.

Next?

MS. SALAZAR: Mary Porter, followed by Vera Preston-Jaeger.

MS. PORTER: Hello. I'm Mary Porter. I wasn't going to speak about the evolution in the textbooks, but listening to all of the speakers has brought a thought to me. I would like to caution the Board to be careful about limiting the textbooks to only the best science. The best science has advocated much error. Not very long ago in American history the best science said if you were sick, you should be bled. Would anybody have liked to have closed off the textbooks and

closed off inquiry? You know, we need to be humble about questioning.

But that is not the issue that I'm here for. I reviewed the Agri-science textbook by Delmar. It's the 3rd Edition by Elmer Cooper and Laveer -- L. DeVere-Barton.

I'd like to give a little bit of my background. I do not have a science background. I have a history degree. I am a former trustee for Care Foundation. I've traveled extensively in South America and in Africa on water projects, bringing water to remote villages, small farms, especially for women, to enable women and girls to have more education and independent incomes. So I do have a great interest in helping people better themselves.

And I learned a lot from reading this textbook. And on the whole, I would say that it is absolutely excellent. It's well organized. It comes with lab manuals. It comes with a CD ROM, lesson plans, tests. It emphasizes vocabulary, gives children or students mental hooks for a foundation. It covers a very, very broad spectrum from animal husbandry to the environment, to soils. I mean, the scope of the book covers a lot. And my hat is off to the authors.

I was very encouraged that we put this much content in a single book. Because just from my own children -- I have children from 37 to 26. The oldest is a doctor, the youngest is a vet. I noticed a dumbing down in the educational textbooks in that 11-year span between my oldest and my youngest child, but I don't think that this book is a victim of that. Maybe even turned it around a little bit.

However, I did have -- and in a 700-page book, this is not a lot of criticism, but it is something that concerns me. And perhaps because maybe the authors weren't familiar, but it talked about slash and burn agriculture and primitive people and losing the rain forest as and -- as if it almost gave the children, I thought, the impression that, you know, in 25 years the rain forests are going to be gone. That is not true. Slash and burn from primitive people -- the nutrition is not in the soil; it's above the soil. When they dry that out and burn it, it puts carbon and nutrients into the soil. After a few years, it is depleted by the third year. Also, by this time the ants are coming back, because that's an enormous problem. And they move on.

That comes back, it is not forever depleted. People have been doing this for thousands of years. That doesn't mean we need a big American company to come do that. That's for them to do. But it works for them. And I heard, in the last textbook hearings, a lady from Africa talk about an African tribe where hundreds had died because we won't allow hunting of elephants -- and she was not advocating hunting of elephants. But she said because there's no market for ivory and elephants die --

CHAIR MILLER: Ms. Porter.

MS. PORTER: -- that ivory was piling up.

CHAIR MILLER: Three minutes. I'm sorry.

MS. PORTER: Okay. That's quite all right.

CHAIR MILLER: Any questions?

MS. PORTER: Thank you very much.

CHAIR MILLER: Thank you for your comments.

MS. PORTER: And thank you very much.

MS. SALAZAR: Vera Preston-Jaeger, followed by Richard Neavel.

DR. PRESTON-JAEGER: Thank you. My name is Dr. Vera -- can you hear me?

My name is Dr. Vera Preston-Jaeger. I am a retired mathematics teacher.

The number of United States college students and graduate students who are majoring in science and engineering is decreasing. Students from other countries are coming to the United States' universities to major in science and engineering. The State of Texas should be encouraging students of our state to study mathematics and science in high school. Students will then be prepared to study science and engineering in college.

They are the scientists of the future who will have to solve environmental problems, develop new technology for providing electricity and fuel for transportation and develop new medical procedures and cures for diseases.

The students of today will be the doctors, lawyers, astronauts, pilots, legislators, citizens of the future. What will they think of your decisions as they prepare for careers and live their lives after high school? Do you want the scientists studying medical problems, economic

problems and technological issues in Texas to come from other states and other countries? Scientific methods and logical thinking are important in all aspects of our lives. Students should study subjects in public schools based on scientific principles. Our religious views should not be imposed on our students. I have strong religious views, but they do not belong in the classes I teach.

The State Board of Education is mandated to choose books that satisfy the knowledge requirements of a particular course as written by professional educators in that field. There has been talk of including the weakness of the evolutionary theory. This is just a strategy to open the door to nonscience. A rose by any other name is still a rose. Intelligent design or whatever creation theory is being called today is not science.

Kansas was the laughing stock of the nation when they added creationism to their curriculum. Do we want to be ridiculed around the nation and the world? When I taught in other states and served on committees to choose textbooks, Texas did not have a good reputation. Years ago

publishing company executives were told money needed to be paid or receptions held before their books would be considered. They were unwilling to do that, so their books were not on the adoption list. I am pleased that the necessity to pay money under the table was stopped and the company now has books on the adoption list.

Children are our future. Native American leaders consider how their decisions will affect the next seven generations. That's 140 years. I would like the Texas Board -- State Board of Education to make decisions in the best interest of students of Texas. Students should be able to study environmental issues in high school. This Board refused to adopt books for the course. I would like to be able to encourage friends to move to Texas. At this point I cannot --

CHAIR MILLER: Dr. Jaeger, thank you.

DR. JAEGER: -- in good conscience recommend it. Thank you.

CHAIR MILLER: Any questions? Thank you very much.

MS. SALAZAR: Richard Neavel, followed by Amanda Walker.

MR. NEAVEL: I'm Dr. Richard Neavel,

my Ph.D. is in geology. I worked for an Exxon research company for 30 years and I retired as a scientific advisor. Now, I know that Exxon geologists use fossils of creatures that evolved over million of years to help them find oil. Oil geologists and many other scientists solve practical problems with the knowledge of evolution. That's why TEKS requires students to learn it. So why do people here insult our intelligence by questioning the validity of evolution? And that's what I'm hearing. It's because evolution conflicts with their belief that humans were -- have a divine origin.

Now, advocates of intelligent design say, oh, no, we're scientists. We are not religious creationists. Did their designer just draw up a plan and then not use it to create something? Look, people, if your biology requires the intervention of a designer or a creator, it's not science it's religious creationism.

These creationists want to put so-called weaknesses of evolution into the biology textbooks. Now, they can't convince Exxon geologists that evolution is a weak idea, so they push their antievolution, religiously driven agenda

in political arenas like this. Creationists say criticizing evolution leads to critical thinking.

Pardon me. Do you Board members really want students to learn about critical thinking? Then be certain that the textbooks include the thousands of practical problems that are solved by a knowledge of evolution. And then be also sure that the textbooks include the fact that intelligent design, creationism or any other alternative has never solved a single practical problem.

Creationists say it's only fair to teach alternatives. What's to be fair? There are no, no scientific alternatives to evolution. If creationists' so-called alternatives were true, don't you think that Exxon geologists would be using them and making millions of dollars with them? They don't, because they are not. And that's the whole beauty of the free enterprise system. Exxon is not constrained by a political process. They use the best science that's available.

Education should prepare students for a future in our free enterprise corporate world. Creationists don't care about that, but you Board members should. Now, you can support these

creationists, but you can only do it by asking textbook publishers to lie about the strength of the evolutionary concepts.

You are elected to help educate our children. So why would you deliberately choose to confuse them with alternatives. I'm asking you please to perform your duties with integrity --

CHAIR MILLER: Thank you very much.

MR. NEAVEL: -- and with the dignity that your position on this Board requires.

Thank you for listening to me.

CHAIR MILLER: Okay. All right. Great. Thank you, sir, very much.

We are now going to break for our -- about 20 minutes. And reconvene after that.

(Dinner recess.)

CHAIR MILLER: We need to start, Board members.

All right. We're going to go ahead and start, because I assume people are probably getting -- going out to get little a respite for a moment.

Next on our list is what?

MS. SALAZAR: Amanda Walker, followed by Don S. Clark.

CHAIR MILLER: Okay. If they are here, please come forward.

MS. WALKER: My name is Amanda Walker. I have been a high school biology teacher for three years here in AISD, but I'm about to become a student again in hopes of becoming a better teacher in the future. I have never been as grateful as I am right now during this controversy for the stellar science education I received, as it has prepared me for graduate school.

The science education provided to me and the one I have provided to my own students is grounded largely in evolutionary theory, which is the most critical concept to a basic biology education. It is the concept which allows students to understand the relationships between organisms, both living and extinct. The mechanisms of DNA and the interdependence of organisms, structures and pathways and living systems.

I want my students and all Texas students to receive the same opportunity I now have in front of me. If you allow a vocal, unscientific minority to dictate our children's science curriculum by weakening the study of evolution, you run the risk of taking such opportunities away from

them.

Evolution is not a theory in crisis, despite the best efforts of creationists to make it seem so to the public through misleading tactics. Critics of evolution, such as the scientists here today from the Discovery Institute, would appeal to your sense of fair play and to your religious sensibilities. But the objections to evolutionary study they have raised are not based on accurate science. They would rely on TEKS 3A to achieve what they call expanding the study of evolution. In the reality of the classroom, it would weaken students' understanding of a fundamental biological concept. It would teach them that a -- a local school board can override the established scientific literature and can undermine the work of many professional scientists here in this room and around the world.

The textbooks under consideration for adoption today do conform to TEKS 3A. The question here today is not whether or not evolution is a solid theory. The vast majority of the scientific community and the data from many labs worldwide confirm that evolution is the mechanism by which new species arise.

The question here today is whether we

Texans will allow our religious beliefs to damage the study of science in Texas when our students rely on us to make decisions that will enrich their educational opportunities.

When I envision my students in the future, I see them as being excited by the possibility of succeeding in graduate science study, as I am today. I want them to share in the wonderful feeling of being well prepared for such a challenge. Not only my teachers, but also the textbook companies that published excellent textbooks and the people like you who approved them for my use deserve my thanks for preparing me as a student and a teacher of biology. And as a student and teacher of biology, I beg you not to damage the rich and fruitful study of evolution in Texas schools.

Thank you.

CHAIR MILLER: Any questions? Doctor.

DR. McLEROY: Thank you, again. You were here in July?

MS. WALKER: I was, indeed.

DR. McLEROY: Okay. Well, I appreciate your testimony. Excuse me, I put food in

my mouth. Excuse me.

Can you tell me, because you're very -- I asked you a question last time and you gave a good answer, so I'll ask you another question. Tell me, is the -- I have a question about the reality -- the actual reality of descent with modification from a common ancestor. Okay. Is that a hypothesis that is, as Dr. Virginia Scott says, is as assured as the atomic theory of atoms and things like that? Is that a scientific fact in the same category as atomic theory?

MS. WALKER: I don't know a whole lot about atomic theory. So I'm -- that's probably not a good example.

DR. McLEROY: Okay then I'll use my heliocentric theory of Copernicus. Okay. Are they in the same class of reality?

MS. WALKER: Descent from a common ancestor has a great deal, mountains of scientific data supporting it. Is it a proven theory absolutely beyond a shadow of a doubt? Well, gravity isn't. No, it's not. But it has an enormous amount of scientific data to support it. And it is the best theory.

DR. McLEROY: Okay. I know that all

science hypotheses are never ever fully proven. I mean that's part of your -- the nature of the science -- of science. But I would classify -- would you classify it in the same realm of what we know about the heliocentric theory of the Earth orbiting the sun? Darwin's theory of common descent. Would you put Darwin and Copernicus on the same level?

MS. WALKER: That's a difficult question for me to answer on the spot. Right now, I would say, yes.

DR. McLEROY: Thank you.

CHAIR MILLER: Thank you.

MS. SALAZAR: Don S. Clark, followed by Fred Bauhof.

DR. CLARK: Good evening. Ladies and gentlemen of the Board: I am Dr. Donald Clark, Ph.D. in physical biochemistry from Louisiana State University. It is good to be with you today.

I have worked in the pharmaceutical and biotechnology industry for over 20 years developing new pharmaceutical agents. I have published and presented over 25 research papers in the fields of biochemistry and clinical research. I most recently served as vice-president of

development and vice-president of clinical development with start-up biotechnology companies, Houston Biotechnology in the Woodlands and Medarex Incorporated in New Jersey.

I have spent several hours reviewing current and proposed biology textbooks in preparation for this meeting. After exhaustive study, with all issues taken into consideration, I have come to the understanding of how so many people have arrived at the following conclusion: There is an obvious and lack of the preparation of weaknesses to the materials as it relates to the origin of life question. This directly conflicts with the laws of the State of Texas in regards to this subject matter.

As just one example, in the textbook Biology: The Dynamics of Life, Glencoe McGraw-Hill, it is stated how the results of the Miller-Urey experiment provide evidence that support Oparin's hypothesis. This experiment purports to show how amino acids form in an otherwise sterile reducing environment of early Earth. It is found in both the current 1998 Edition, used in my daughter's school and the proposed 2004 Edition on Page 382. The discussion jumps to the next section on origins,

the formation of complex organic compounds. As in the case for many pages of text, no mention is given regarding any weaknesses about the Miller-Urey experiment. No alternatives, nothing.

The reader is left with a strong impression that there are no weaknesses in the experiment and that it proves how simple organic molecules were formed on early Earth. A process called abiotic synthesis. No mention is made of the many universal recognized problems with the theory. The abundance of oxygen on Earth is a problem. Oxygen would destroy ammonia molecules required for the formation of amino acids, a fact the textbooks ignore. The experiments, production of both kinds of amino acids is a problem. It is extremely improbable that natural causes could randomly select only left-handed amino acids needed for life in a chemical mixture that contains equal amounts.

CHAIR MILLER: I'm sorry. That's the three minutes.

DR. CLARK: Yes, I understand.

CHAIR MILLER: Any questions? Doctor?

DR. McLEROY: Explain real quick the left-handed/right-handed problem. We're all

left-handed on this Board.

DR. CLARK: Well, many organic molecules have correality. And you could have a left-handed molecule and a right-handed molecule. It could have the same chemical composition, but the stereo chemistry is just the opposite. And all biological proteins are made up of left-handed molecules, not right-handed amino acids.

DR. McLEROY: Thank you.

MS. LEO: And you looked at the Biology by Holt, you looked at the Advanced Placement Biology by Prentice Hall and the Biology: The Dynamics of Life. Does it talk about that weakness of the left-handed proteins? Do they give coverage to that?

DR. CLARK: All the biology --

MS. LEO: There is a weakness there with that experiment.

DR. CLARK: Yes. All of the biology textbooks, none of them address this issue of correality. And the Advance Placement Biology by Prentice Hall and the Biology by Prentice Hall at least point out -- and Holt's, at least point out some alternatives to the Miller-Urey experiment. And indeed, Prentice Hall points out that, well,

okay, now we don't believe that the Urie experiment that the atmosphere during that time was what the Miller-Urey experiment actually used.

MS. LEO: Okay. And so which -- there is a known weakness out there in science about the Miller-Urey experiment that they use that as microevolution supporting macroevolution. That that's -- amino acids, that's what creates the building blocks of life, that that would be the origin of life, that you can create that, correct? Am I saying that correct?

DR. CLARK: That's correct. But all the texts --

DR. McLEROY: Not micro, but macro, I'm sorry.

DR. CLARK: Yeah. No. All of the textbooks that I have reviewed -- and I reviewed five of the proposed textbooks and one -- one of my -- my daughter's textbook which was a 19 -- the 1998 biology textbook by McGraw-Hill. None of them, none of them talk about this issue of correality. And that's a very important issue when it comes to life and when it comes to proteins and biological molecules.

MS. LEO: So they are using the

Miller-Urey experiment, in other words, to support macroevolution; is that correct?

DR. CLARK: They're using the -- well, they're using the Miller-Urey experiment as an example to say that, okay, here is how simple organic molecules first form on Earth. But they're not pointing out what the problems in the Miller-Urey experiment was. That is, the atmosphere was -- with a Miller-Urey experiment was a reducing atmosphere. That is, it has no oxygen. Well, the Earth is composed of 29 percent oxygen. In the 29 percent oxygen is found primarily in hematite, which is ferric oxide or rust. And that percentage, you would expect would influence the early atmosphere. And they're completely ignoring those facts.

MS. LEO: So at one time, they didn't think that there was oxygen in the earlier atmosphere, but now they know there is. And when you do the experiment over, it doesn't create those amino acids.

DR. CLARK: That's correct. Oxygen destroys many of the organic molecules, including amino acids.

MS. LEO: Thank you.

CHAIR MILLER: Fascinating. Okay.

Any other questions?

DR. BERNAL: Let me ask. Can you explain how you came to the conclusion that in the very early years of the Earth's beginnings we had so much less oxygen at that time? Where did you get that as a fact?

DR. CLARK: Oh, I don't have that as a fact. That was the --

DR. BERNAL: Well, does anybody else have it as a fact?

DR. McLEROY: Yes.

DR. CLARK: Yes. Well, yes, other people do --

DR. BERNAL: I am asking this gentleman here, if you don't mind.

You made reference to it, so I'm asking you: Where is that factual evidence that there was less oxygen at that time than there is -- we know that there's so much oxygen now.

DR. CLARK: Correct.

DR. BERNAL: Because we can measure it. But how can we measure at the very beginning of the origins of this Earth? How would we know how much oxygen was there then?

DR. BERNAL: We don't. And that's my

point. My point is that there is abundance of oxygen-containing molecules just in the Earth's crust which pre -- in order to form these minerals, oxygen has to be in the atmosphere. And the Miller-Urey experiments completely omit any discussion as to how oxygen would be eliminated from the atmosphere. Am I -- I don't think I'm getting my point across.

DR. BERNAL: No, you're not.

DR. CLARK: I am not proposing that the early atmosphere did not have oxygen. I am proposing that the early atmosphere did have oxygen and many scientists today -- most scientists today realize that the early atmosphere did have oxygen. And so if oxygen is present in the atmosphere then you have a problem forming these organic compounds, primarily amino acids and nucleic acids, which are made up DNA and RNA. So the molecules of life are destroyed by oxygen.

Yes.

CHAIR MILLER: Ms. Knight.

MS. KNIGHT: Does it matter the percentage of the oxygen?

DR. CLARK: Well, the partial -- yeah, the partial pressure of oxygen, if -- it does

matter and it determines the rate. But any amount of oxygen will destroy organic molecules.

MS. KNIGHT: I have another question, Madam Chairman, that goes back to a question that Dr. Montgomery asked earlier. I still don't have a clear definition of what are the standards for determining the strengths and the weaknesses and how many weaknesses do you have to identify? And what are the crucial weaknesses? And I still haven't heard that.

CHAIR MILLER: That's something that -- I think Robert Leos and -- they need to answer that question for you. I think the staff. And I think they're going to -- Robert, did you want to speak to that?

COMMISSIONER SCOTT: We'll be keeping track of all the questions asked here today of the staff in terms of process of textbook adoption and any problems associated with it and get back to you in writing.

MS. KNIGHT: Thank you.

CHAIR MILLER: Any other questions?

DR. BERNAL: If you're making a comparison -- and thanks to Don, who gave me this paper. I guess it was Don. Let me read this, just

a couple lines.

DR. CLARK: Sure.

DR. BERNAL: It says, "Ideas about atmospheric composition and climate on the early Earth have evolved considerably over the last 30 years. But many uncertainties still remain."

DR. CLARK: That's correct.

DR. BERNAL: So we really don't know -- we can't compare something that we don't know anything about.

DR. CLARK: That's right.

CHAIR MILLER: Ms. Leo.

MS. LEO: But the weakness in the Miller-Urey experiments at the time they performed that and created the amino acids, they did that experiment without oxygen, assuming that the early Earth's atmosphere did not have oxygen. But now that we know it does, when you put oxygen into the mix, you get different results. So am I explaining that correctly --

DR. CLARK: Yes, you are.

MS. LEO: -- that that is the weakness, as well as the left-handed protein. So it's got really more than just that one weakness.

DR. CLARK: There are several

weaknesses, yes. It's the oxygen --

MS. LEO: And would that be religious in nature putting that weakness in a science book that now we know this about the atmosphere?

DR. CLARK: There's no religion in that.

MS. LEO: That's science, isn't it.

DR. CLARK: Yes, it's science. That's correct.

CHAIR MILLER: Are there any other questions?

It was very interesting. Thank you.

DR. CLARK: You're welcome.

MS. SALAZAR: Fred Bauhof, followed by Keith Ostfeld.

MR. BAUHOF: Good evening. Thank you for the opportunity to speak today. My name is Fred Bauhof and I have a bachelor of science in geology and a master of science in geological engineering. I'm also a professional engineer in the states of Texas and California and have over 25 year's worth of experience as a consulting engineer. My testimony today focuses on the explosion of life during the Cambrian geologic period and its impact on evolutionary theory.

In preparation for the public meeting, I reviewed the proposed textbook, Biology an Ecological Approach by Kendall Hunt publishing. And I'm also familiar with the other proposed textbooks discussion of one of the most remarkable features in the fossil record.

The Cambrian explosion, sometimes called biology's Big Bang describes the relative sudden appearance in the fossil record of many major phyla and classes of primarily marine animals during the Cambrian period. The explosion -- the Cambrian explosion gave rise to many of the marine animal phyla alive today as well as some that are now extinct. This factual record seriously challenges Darwin's great Tree of Life pattern of evolutionary development.

This picture of the history of life as a tree was the only illustration in the Origin of Species and indicated the small progressive branch in development of new species from a common ancestor at the root. Only over long periods of time could the small differences give rise to new families, orders or classes of life.

Precambrian fossils consist of only single-celled or simple multicellular organisms just

before the Cambrian period. The Precambrian fossil record does not provide evidence of this gradual development of Cambrian fossil ancestors required by Darwinian theory.

Darwin recognized this as a serious problem for his evolutionary theory. In the Origin of Species he wrote, "Several of the main divisions of the animal kingdom suddenly appear in the lowest known fossil of first rocks." Darwin also suggested only a small portion of the surface of the Earth has been geologically explored. Supposing that future paleontological discoveries would produce the missing evidence. Additional explorations over the last 150 years have identified more Precambrian and Cambrian fossils, but they have only provided more compelling evidence of the Cambrian explosion.

Neither is there any clue as to how the one-celled organisms of the primordial world could have evolved into the vast array of complex invertebrates of the Cambrian period.

Steven J. Gould, a Harvard professor and developer of the Punctuated Equilibrium Theory admits that, The Cambrian explosion was the most remarkable and puzzling event in the history of life.

Four of the 11 proposed textbooks do

not mention the Cambrian explosion, one of the most dramatic events in the fossil record. Five of the proposed biology textbooks mention the Cambrian explosion, but does not explore the challenges that it presents to Darwinian evolution. The remaining two textbooks discuss the Cambrian explosion, but also do not describe why the Cambrian explosion presents a challenge to Darwin's theory. So it does not adequately enable students to analyze, review and critique Darwin's theory that all life is descended from a common ancestor as to its strengths and weaknesses using scientific evidence and information.

CHAIR MILLER: Thank you. Are there any questions?

Ms. Leo.

MS. LEO: Stephen J. Gould is an evolutionist, by the way, right?

MR. BAUHOF: Yes.

DR. LEO: And he's recognizing that there are problems. If you tell children exactly what Stephen J. Gould said -- I mean, you can quote that in a book somewhere -- is there anything religious or creationistic or intelligent design about quoting an evolutionist saying that there are

problems with the Cambrian explosion and presenting that as a weakness?

MR. BAUHOF: I don't believe so.

CHAIR MILLER: Thank you.

MR. BAUHOF: Thank you.

MS. SALAZAR: Keith Ostfeld, followed by Dr. Barney Maddox.

Dr. Barney Maddox, followed by Saundra Coffey.

DR. MADDOX: I am Barney Maddox, M.D., a urologist practicing in Cleburne, Texas. My qualifications are listed on my handout.

Darwin's Theory of Evolution claims to be able to explain the origin of all the variety of life on Earth from the single mythical cell millions of years ago. Yet the three main mechanisms of evolution utterly fail to explain how one major type of animal could evolve into another major type over any imagined time span.

Natural selection can only explain extinction of unfit species or loss of genetic information over time.

Gene shuffling only involves various combinations of existing genes and cannot explain the origin of new animal types over any time span.

This leaves only mutation as the actual mechanism of genetic information. Darwin was totally ignorant of genetic science, since he died in 1882 and genetics began as a science in 1900.

Darwin strongly believed in the discredited 18th century belief in the inheritance of acquired characteristics. We now know that animals can only inherit their DNA from their ancestors and that specific DNA cannot be changed by any forces of nature, except the rare mutagens. Any change in DNA is purely random. It's called a mutation. And far from leading to new, improved types of animals only cripples and kills, usually, the animals.

If the DNA of reptiles doesn't change, reptiles can never evolve into mammals and birds as Darwin vainly imagined, no matter what the imagined time span. If the DNA of reptiles does change, the afflicted animals stagger around and die, if they are able to hatch out of the egg.

Throughout medical school, I learned that even the slightest genetic mutations cause the most devastating diseases doctors treat. The individual animal afflicted by a mutation usually will not even survive gestation, much less thrive

and reproduce. Most mutants are severely crippled and sterile. There are over 3,300 devastating diseases in humans caused by genetic mutations. There is not a single example of an unequivocally beneficial mutation in humans or any or animal.

Ladies and gentlemen, we must apply scientific facts to the Theory of Evolution. And those facts annihilate Darwin's theory. Prentice Hall Page 308, third paragraph states, "Mutations are also the source of genetic variability in the species." Some of this variation may be highly beneficial.

I urge you to reject this textbook and this attempt to brainwash our students into believing in evolution. Good science means altering or discarding theories in light of scientific facts. Prentice Hall is a bad textbook promoting bad science, clinging to an outdated theory in spite of the facts. How much longer will scientists and educators cling to Darwin's pre-Civil War fairy tales when they're contradicted by everything known about mutations?

Thank you.

CHAIR MILLER: Any questions?

Doctor.

DR. McLEROY: Dr. Maddox, on the -- on natural selection, the -- well, that's the process that is allowed that people considered debatable is the fact it's the process of evolution, genetic variation, random select -- I mean, natural selection of random variation.

I was going to ask: What is a -- the one example that is used, I don't know, maybe you could speak to it, is the example of the -- in Africa with the sickle-cell anemia.

DR. MADDOX: Thank you very much. That is not an unequivocally positive mutation. Okay. If I am supposedly the product of mutations over billions of years, I have many genes that are expressed; hands, eyes, et cetera. Those -- there are genes for those that are expressed.

Whenever sickling is expressed in the sickle trait or the homozygote, sickle disease, it is a disease state. It is a catastrophe. It causes illness. It is pathologic. Only when sickling is latent and is not expressed does it protect against the malaria organism. Okay. So whenever sickling is expressed it is catastrophic. It is fatal to the homozygote and will be fatal to the heterozygote, the sickle trait. I've seen them bleed. I've seen

sickle traits bleed. And they can bleed down real fast. Okay. So whenever sickling is expressed, it is a disease state.

My point is, any mutation that is expressed -- and all our -- you know, we're made of genes that are expressed, okay, any mutation that is expressed is going to be fatal or crippling or disastrous.

DR. McLEROY: Thank you.

CHAIR MILLER: Ms. Leo.

DR. LEO: Could you explain to us in the Prentice Hall book that you were looking at, you were talking about genetics shuffling being different than genetic change, a change in the DNA. And they use a couple examples in the Prentice Hall book on bacteria and on Grants' finches. Can you explain what the difference between gene shuffling is and actually changing the genes or changing the DNA? And I don't know, does this book use the fruit fly one, too?

DR. MADDOX: Well, basically --

DR. LEO: They don't even mate when they've been mutated.

DR. MADDOX: Okay. In sexual reproduction genes are just being shuffled. Okay.

They're not -- new DNA is not being brought into the process. For reference Prentice Hall Page 319, bold type. In other words, gene shuffling is just shuffling of existing genes. Darwin's finches, et cetera. There's not new genetic information present, even at the end of a microevolutionary study, that wasn't present at the start. Okay.

DR. LEO: So that would be --

DR. MADDOX: Now, percentages of the different variance may be fluctuating during a study as conditions are changed. But there's not new genetic information at the end of the study that wasn't present at the start.

DR. LEO: Okay.

DR. MADDOX: In other words, gene shuffling cannot explain the origin of any new genetic information. You have to have massive amounts of new genetic information occurring over billions of years for evolution to be true. All we observe is shuffling of existing genetic information and loss, extinction of animals. That's all we observe today. And we observe mutations, that's an actual change in the DNA destroying the animal. That's all we observe.

DR. LEO: Okay. That would account

for variation among species, which we all agree upon. But a weakness to that, that would be something that we would want to give the students is the Darwin finch is still the Darwin finch -- or the Grants' finch that he -- you know, the DNA has not changed. It hasn't evolved to another creature, right?

DR. MADDOX: If you would like me to specifically address Darwin's finches, actually an experiment was done where they transferred just a few birds off of the Galapagos Islands to Lausanne Island, which is west of Hawaii. Very isolated situation. The Darwinist predicted it would take 20 to 40 generations to get several different finch types. It took two. Okay. That's in the peer-reviewed scientific literature.

In other words, those finches that were carried over, carried the genetic information with them, okay, to Lausanne Island and you get several different finches from gene shuffling. Shuffling existing genes. In other words, my theory is that, the finches that were blown over to the Galapagos Islands, however many thousands of years ago, carried the genetic information with them. That genetic information did not arise by mutation,

it couldn't have.

DR. LEO: Okay. Thank you.

DR. MADDOX: Okay.

CHAIR MILLER: Any other questions?

Ms. Thornton.

MS. THORNTON: I want to ask you a real direct question.

DR. MADDOX: Okay.

MS. THORNTON: You say here that Darwin's theory in Prentice Hall Page 308, third paragraph, you state that some of this variation may highly beneficial. Are you saying as a doctor, this is false?

DR. MADDOX: I'm saying -- here's the direct quote. "Mutations are also the source of genetic variability in a species. Some of this variation," that's referring to some of the mutations, "may be highly beneficial." That is false.

MS. THORNTON: Period.

DR. MADDOX: Period. And I've given examples. You can see what a mutation does to an organism. It does not improve it.

CHAIR MILLER: Thank you.

DR. MADDOX: Thank you.

MS. SALAZAR: Sandra Coffey, followed by Ernest Snyder.

MS. COFFEY: My name is Sandra Coffey. I'm here today to represent the Cypress-Fairbanks Independent School District. Cypress brings high school, myself and many of my colleagues. Attached to copies of my testimony, you will find statements of support from some of those colleagues. I feel I am representing the great majority of the biology teachers that I have known and worked with in my 20 years of teaching experience. I am here to ensure that the students of Texas have access to the best available biology textbooks.

The first three year -- the three first-year biology textbooks that I have reviewed cover the important concepts of biology. All three have vital information on evolution essential to the quality of education Texas students should receive. Those textbooks include offerings from Glencoe, Holt, Rinehart and Winstead and Prentice Hall. Such textbooks include a definition of scientific theory. To quote from the Glencoe textbook, "In science a theory is an explanation of a natural phenomenon that is supported by a large body of

scientific evidence obtained from many different investigations and observations."

How do scientists evaluate investigations and observations used to support scientific theories? In science the standards are higher than in some other areas. Harcourt College publishers states the following, "Scientists regard only one type of communication is acceptable currency for the advancement of scientific knowledge. A peer-reviewed paper in a scientific journal."

Peer-review, means that before publication the paper is evaluated by other scientists who are able to evaluate the reported techniques, logic and relationship to other work in the field. A particularly important question about any paper is whether it gives enough detail so that another researcher could reproduce the experiments in another laboratory.

I introduce this information about theory and science and the peer-review process to preface concerns I have about the potential changes to the coverage of evolution in biology textbooks. Evolution is both a fact, organisms change over time, and a theory, various mechanism drive that

change.

The three textbooks I have mentioned present evolution in the scientifically valid manner. The textbooks are factually accurate -- that was two minutes?

The textbooks are factually accurate and meet the TEKS, including TEKS 3A. The books include critical discussions of the strengths and weaknesses of the Theory of Evolution. Aspects of the coverage of evolution in the textbooks currently meet the demanding criteria for acceptable science. The inclusion of so-called weaknesses not based on valid scientific data would be a disservice to the students of the State of Texas and an insult to the scientific community. The textbooks mentioned presently meet the requirements of being good textbooks for our students.

I ask the Board to seek fairness in making its decisions. I ask fairness to the data currently in science textbooks by not accepting data that has not been validated by the peer-review process. I ask for fairness to the students of the State of Texas by not subjecting them to textbooks that would diminish their understanding of evolution and put them at a disadvantage to students from

other states.

Thank you for hearing me and for allowing me the privilege of representing myself and so many of my colleagues.

CHAIR MILLER: Thank you. Are there any questions?

Ms. Lowe.

MS. LOWE: Ms. Coffey, could you give me an example from the Glencoe book of a clear presentation of a scientific theory with strengths and weaknesses?

MS. COFFEE: Of a clear -- in evolution or any theory?

MS. LOWE: Anything. You pick something from the Glencoe book that was a clear presentation of strengths and weaknesses in scientific theory.

MS. COFFEY: In all of the books, Glencoe, Miller-Levine, which is the Prentice Hall and the Holt, Rinehart book that I've looked at. They talk about the fossil record, okay. That's an interesting question, because the fossil record supports evolution. But admittedly, and one of the things as a teacher I do, because -- I guess, that's a misconception, teachers don't just teach from the

textbook, but we also include other things -- is that our students can see the fossil record isn't complete. Okay. That's something that they can all be aware of. It does not invalidate the significance of the Theory of Evolution.

MS. LOWE: So you feel that all three of those textbooks adequately covered the weakness in the fossil record?

MS. COFFEY: They all cover the weaknesses in the scientific -- that are scientifically valid.

MS. LOWE: The weakness in the fossil records?

MS. COFFEY: Yes, because they present the weak -- that the fossil record is there. They let you look at aspects of it. And you can determine, as a student, as a teacher, that we know things aren't there. We're lucky we have as many fossils as we do, the way I look at it, because the critter had to die in the right place and be found by the right person.

MS. LOWE: I looked up each of these references in the Glencoe book to TEKS 3A, the strengths and weaknesses. And none of them listed in this book is fossil record. I looked at the

strengths and weaknesses that the textbook reviewers listed for the Glencoe book for TEKS 3A and none of them listed in the fossil record. So you've seen something that someone else hasn't.

MS. COFFEY: Well, because I'm looking at what I consider scientifically valid data from a teacher's perspective.

MS. LOWE: Just not something that the publisher thinks that he put in there.

Thank you.

MS. SALAZAR: Ernest Snyder, followed by Sahotra Sarkar.

MR. SNYDER: I'm Ernest Snyder. Thank you for hearing me. Eanie meanie miney moe, let's pick a religion and teach it to our high school science class.

Now, I'm going out on a limb here and say it's fair to guess that everyone here would consider that idea utterly ridiculous. Yet, that's exactly what we're doing. When we teach the Theory of Evolution in our schools, scientists cannot even agree among themselves which theory regarding evolution is correct. If we are going to adhere to the guidelines set forth by our constitution then we will either demonstrate all the views for all

religions about creation or we will disregard this segment in the textbooks.

For the State of Texas to teach evolution as a scientific fact, it has taken the liberty of teaching its own religion, infringing upon the rights of all its students. We live in a country where we are free to practice our own beliefs and are protected by those rights. Slowly, they are being taken away. Take the Pledge of Allegiance, for instance, or the concert of prayer in schools. What has happened to America? Have the men and women in our armed forces protected us only to have died in vain?

In today's world, we need to protect our rights more than ever and stand together as a nation, even when our opinions differ. Teaching the Theory of Evolution in our schools is a serious violation of our constitutional rights and should be treated as such. I urge you to take a stand and draw the line here and now. Thank you.

CHAIR MILLER: Any questions?

Thank you, sir.

MR. SNYDER: You're welcome.

MS. SALAZAR: Sahotra Sarkar, followed by Robert Dennison.

MR. SARKAR: Hi. My name is Sahotra Sarkar. I'm professor of integrated biology at the University of Texas at Austin. I'm also professor of philosophy at the University of Texas at Austin. I'm the editor of the Encyclopedia of the Philosophy of Science and member of the editorial board of 17 scientific and philosophical journals and the author of over 100 papers in biology and in philosophy in peer-review journals.

I work partly with UTeach, which is an innovative teacher's training program designed to teach -- train high school teachers for Texas.

My colleague Michael Marter, who is the director of UTeach, will be giving testimony later. I have actually gone through each and every one of the textbooks that are being considered here. But I have only done so from the point of view of the university professor and not from the point of a high school teacher, which I'm not.

If there's anything about these textbooks that I would like to see changed, what I would like to see happen is much more evolution put in. Nothing in biology makes sense, except in the light of evolution.

I gather the requirements of the

Board in Texas is to make sure that when evolutionary biology is taught, people learn to think critically. And that, I think, is absolutely important in science education at every level, whether it be in schools, in undergraduate colleges or in graduate programs. And by and large these textbooks do a rather good job.

In particular, I want to go back to testimony by David Hillis in the last hearing that was held here where Hillis claimed very correctly that the process of evolution is something that no credible scientist impressions. Hillis and others also left open the issue that of course scientists sometimes debate the mechanisms of evolution, which is important when for what taxon and at what stage of evolutionary history. I repeat this because if he was misquoted, as is quite often, by a member of the Discovery Institute earlier today during testimony. Hillis said that. And I'll just give two examples of textbooks which clearly do that. The examples I have in mind bear with the question as to whether natural selection is the only mechanism by which evolutionary change can take place or whether you can also have random drift.

Both the textbook by Cecie Starr as

well as the textbooks by Peter Raven do an admirable job of showing when there is scientific disquiet about one mechanism versus the other, where more research needs to be done and how all of this can probably inspire our students to become better scientists.

In conclusion, I have also -- also circulated among you a letter that has been signed by 140 faculty members at the University of Texas. That letter notes how important it is for science education to be rigorous and of the highest quality in Texas, why it is absolutely important that this education prepares our students in Texas for a life in which they can compete with others in a marketplace that demands scientific expertise more and more. The letter also reflects a growing consensus among scientists that we are irritated with what the Discovery Institute has done, how we have been misquoted and how fraud has been perpetrated in the name of science.

I would have liked to have ended with a direct quotation of how I myself have been misquoted by the people of the Discovery Institute, but you've already heard some from David Hillis last time. And you will receive detailed testimony from

me over the next two weeks which details all the scientists who have felt that they have been fraudulently represented.

Thank you. I'm willing to answer questions.

CHAIR MILLER: Any questions?

Yeah, Mr. Craig.

MR. CRAIG: Would you go ahead and tell us how you were misquoted?

MR. SARKAR: Yes. If you go on the Discovery Institute web-site, you will find a paper on information and the origin of life written by Stephen Meyers in which I am quoted as one of the people who question the use of the concept of biological information and what that can do for molecular biology. And the article in which I'm quoted over there was an article that was devoted to show how you can have a better theory of biological information rather than the one that has been used. It is not skeptical about information at all.

CHAIR MILLER: Any other -- Dr. McLeroy.

DR.McLEROY: Well, I'll ask you what I asked the science teacher, because you're so well qualified: Is Darwin's hypothesis on the same plane

as Copernicus'?

MR. SARKAR: Without a doubt. We might argue about the details of the mechanisms of evolution, but the fact that evolution did take place, modification with descent is as certain as the theory of gravitation.

DR. McLEROY: No, I said Copernicus' theory.

MR. SARKAR: And even more so than the Copernicus theory, if that makes any sense to say something is more so.

DR. McLEROY: And the atomic theory?

MR. SARKAR: I'm sorry.

DR. McLEROY: And the atomic theory?

MR. SARKAR: As much so as the atomic theory.

DR. McLEROY: Thank you.

CHAIR MILLER: Any other questions?

Thank you, sir.

MR. SARKAR: Thank you very much.

MS. SALAZAR: Robert Dennison, followed by Oak DeBerg.

MR. DENNISON: Good evening. My name is Robert Dennison. I've been teaching biology in Texas for the past 25 years. I am currently the

president of the Texas Association of Biology Teachers. Furthermore, I've been fortunate to have been recognized numerous times in my career as an outstanding biology teacher. These honors include awards from both the National and Texas Associations of Biology Teachers, the National Science Foundation and President Ronald Reagan, to name just a few. Thank you for allowing me to speak with you today.

I'm here to strongly encourage the Board to adopt the text currently on the 2003 biology textbook list, thereby providing Texas teachers with numerous quality books from which to choose.

As a biology teacher, I am confident there is no more important field for my students to understand than the study of life itself. The textbooks considered today provide students with the means to carry out that study, and in turn, help assure them of success in our modern world.

However, we have heard individuals testify that most, if not all, of these textbooks are not suitable for use in Texas due to their coverage of evolution. These critics claim they only want to increase and improve the coverage of evolution by removing errors and exposing the

so-called weaknesses of the theory for students to debate.

The greatest rewards in science come from overturning accepted doctrine and thereby improving our understanding of the natural world. If the Discovery Institute and the other critics we've heard today have actually discovered viable scientific evidence that would overthrow or even alter currently accepted evolutionary theory, they should be submitting their research to major scientific journals for peer-review. That is the mechanism which makes science the powerful, self-correcting endeavor we know today. The rewards for successful effort in this proper arena would be tremendous. A natural result of that success would be the inclusion of those ideas in science textbooks.

This however, is not the approach favored by the Discovery Institute. It certainly appears that they are not willing to subject themselves to the long, arduous process used by scientists. Instead, they do their best to circumvent that process by going straight to local communities like ours and making attempts to force the insertion of their ideas directly into science

textbooks without any input from practicing biologists.

If the Discovery Institute is sincere in its belief that their work and ideas are scientific, then the proper path is clear. Do the work, have it peer-reviewed in science journals, get it accepted by a majority of sciences. That's the way of science. And it is an insult to all of us for them to attempt to get their views into the textbooks in any other way.

Finally, as a successful biology teacher, I want to assure you that there is no more important concept to my students' understanding of the study of life than evolution. Textbooks being considered for adoption did an admirable job of presenting the Theory of Evolution in a manner befitting its importance to biology.

I close by, again, urging the Board to adopt these books without requiring any changes which would weaken their coverage of evolution. Any such changes would do an injustice to the students of the State of Texas.

Thank you for your kind attention.

CHAIR MILLER: Any questions?

Dr. McLeroy.

DR. McLEROY: Is the American Biology Teacher, isn't that -- is that a peer-reviewed journal for high school teachers? I mean, it's a peer-review -- is it considered peer-reviewed?

MR. DENNISON: Reviewed by biology teachers, yes, sir.

DR. McLEROY: And that's your organization's -- one of your --

MR. DENNISON: Yes, sir.

DR. McLEROY: But it is peer-reviewed and Jonathan Wells did publish in that American Biology Teacher; isn't that correct?

MR. DENNISON: That's correct.

DR. McLEROY: Okay. I think it -- some of this statement about never been peer-reviewed. He has been in your own journal. Thanks.

CHAIR MILLER: Ms. Leo.

DR. LEO: And I have two copies of this in which -- this is peer-reviewed, you just said, in which Walter Bradley has written an article on the Origin of Life and evolution in biology textbooks.

MR. DENNISON: Could I --

DR. LEO: And this one is while -- on

Haeckel's embryos. So these are both from your organization's peer-reviewed journals that you just told us --

MR. DENNISON: That's correct.

DR. LEO: -- we can have.

MR. DENNISON: If I can just be self --

DR. LEO: Just a minute.

MR. DENNISON: -- deprecating a little bit about our organization, I wouldn't consider us a major scientific journal. We're a journal for discussion of ideas in teaching.

DR. LEO: Okay. But you submitted to this Board a non-peer reviewed article by Alan Gishlick, that was not peer-reviewed. And so we're supposed to not take a look at that, although you sent that out to all of us. It's not peer-reviewed, but this is peer-reviewed.

MR. DENNISON: I don't believe it makes the claims that we're talking about inserting these weaknesses of evolutionary theory.

DR. LEO: I think that's what it talks about in here, the weaknesses and how --

MR. DENNISON: I don't think you'll find it accepted by a majority of scientists.

DR. LEO: But it's been peer-reviewed.

MR. DENNISON: By biology teachers. Yes, ma'am.

MS. LOWE: You teach in high school?

MR. DENNISON: Yes, ma'am.

MS. LOWE: For your coverage of TEKS 3A, what strengths and weaknesses of what scientific theories would you -- pick a textbook and tell me a clear presentation --

MR. DENNISON: I use the Biology by Campbell. The current version is going to be Campbell and Reece, the 6th edition.

MS. LOWE: So it's the AP book?

MR. DENNISON: It's an AP book. I teach AP biology. And in the area of strengths and weaknesses of scientific work, we talked about alternative ways of looking at knowledge. And as far as a specific example from a textbook would be, I'd go with Sandra's example of the fossil record.

And if we're sticking with evolution today, the Campbell book does a particularly good job of talking about alternate views of tempo and mode of speciation. Gradualism --

MS. LOWE: But the AP book doesn't

have the same TEKS that the other books do. But that's what you would use as an example of a clear presentation of strengths and weaknesses.

MR. DENNISON: The fact that scientists disagree about mechanism of evolution, about the rate of change in evolution. There's a good discussion of punctuated equilibrium.

CHAIR MILLER: Any other questions?

MR. MONTGOMERY: Madam Chair.

MR. DENNISON: Yes, sir.

MR. MONTGOMERY: Are you telling us, Mr. Dennison, that you're -- or the American Biology Teacher magazine is a primary scientific peer-reviewed piece of literature or is it for science educators? Is it a --

MR. DENNISON: I said -- I'm sorry.

MR. MONTGOMERY: Well, I guess, you know, that's my question. When we speak of peer-review -- and this is the standard that, I believe, that we must use in determining whether or not these weaknesses or strengths should be placed in textbooks. We can't expect a textbook publisher to take a commercial book that's on sale at Barnes and Noble or wherever and put this information in their books, even though some of the information in

the book might be true. They must use peer-reviewed literature.

MR. DENNISON: I agree.

MR. MONTGOMERY: Are you telling me that the American Biology Teacher, a popular journal for science educators --

MR. DENNISON: Yes, sir.

MR. MONTGOMERY: -- is a primary peer-reviewed scientific literature?

MR. DENNISON: No. In fact, I profess it's not. It's not one that I would consider a major scientific journal. It's not a journal that scientists go to to share ideas in the -- the competition of the marketplace for ideas, that's not a place where scientists would go.

MR. MONTGOMERY: Even though it might have some information in there --

MR. DENNISON: Certainly.

MR. MONTGOMERY: -- that has been peer-reviewed, such as Haeckel's drawings and the Miller-Urey experiment problems and so forth?

MR. DENNISON: It hasn't been peer-reviewed by credentialed scientists.

MR. MONTGOMERY: But it could have proven material that it has been peer-reviewed?

MR. DENNISON: Yes, sir.

MR. CRAIG: Question: Mr. Dennison, do you know of any, what you would consider a peer-review process that the Discovery Institute has had something really published in so that scientists really can make a determination on one of their theories?

MR. DENNISON: I do not know of one.

MR. CRAIG: From your standpoint in your group, which is the Texas Association of Biology Teachers, do I understand that you're speaking for them as the president of that group saying that you believe that these textbooks meet the appropriate standards and are good textbooks that our students should have?

MR. DENNISON: Without a doubt.

MR. CRAIG: Thank you, sir.

DR. McLEROY: No. I was just --

CHAIR MILLER: Anybody else?

DR. McLEROY: I just have a comment. I'd just encourage us on the Board to stick around when the folks from out of state have a chance, because they can tell you about all the peer-reviewed articles.

Thank you.

CHAIR MILLER: Thank you, sir.

MS. SALAZAR: Oak DeBerg, followed by George Denny, II.

MR. DEBERG: Good evening. I'm Oak DeBerg. And if you look at my written testimony, you'll see that I allude to my granddaughter, Emily Cox, who was supposed to be here with me tonight. But her mother wouldn't let her come because she had a math test today.

I did testify before the Board in July. And since then, I reviewed the biology text a little bit more closely. And I only have two suggestions, because the bottom line is: I'm going to recommend that you accept all of them. But the two suggestions that I have: First, in McGraw Hill's Biology 8th Edition by Sylvia Mader. On Page 300 in the upper right of the text it discusses what they call a bioethical issue. And the text states, "In California, the Institution for Creation Research advocates that the students be taught an intelligent design theory." And then it goes on to discuss how that fits with science. I request that the text be changed to read, "In many states organizations such as the Institute for Creation Research and the Discovery Institute advocate that

students be taught intelligent design theory."

And the reason for this is, both organizations are staunch advocates of intelligent design and this will let our Texas students readily discern the similar agendas of both organizations.

Secondly, although I don't have the exact wording, at my disposal, I did read that Holt Rinehart has agreed to a change in their book which includes the statements that they include a portion on alternatives to evolution. Someone suggested that this be changed to scientific alternatives to evolution. And I want to make the point that I respectfully disagree with that.

Unless you're willing to put similar statements into all science books, physics, chemistry, geology and so forth, the implications are clearly that this Board has singled out one specific branch of science for special treatment. And the inquiring mind can only assume there must be some special reasons to treat biology differently from the other sciences. And hence, we are, once again, on a slippery slope of inserting specific personal views into the science classes. Therefore, I ask that you remove any such statements that even allude to those types of alternatives and accept the

texts as written.

Most importantly, I'm here as a concerned grandfather. There are many others who can address the scientific issues here much better than I can. But as you deliberate the proposed changes, I implore each of you to look only at the scientific issues. For it is correct scientific understanding that will help us cure disease, develop new drugs and ensure our understanding of nature. With that understanding perhaps my granddaughter, Emily, can contribute to the well-being of us all in the future.

Finally, just as an aside, I sent the Board copies of a paper that you requested last July. I did get it to you late, so I hope you did get a chance to read it. And if you have any questions, I'll be happy to answer them.

CHAIR MILLER: Any questions?

Ms. Leo.

DR. LEO: In your prior testimony, when you were here before, you said that, "Groups and individuals with access and power are allowed to meet privately with textbook publishers and often got their desires incorporated into text without any public comment or review."

And if a Board member meets with a publisher, that is documented and that is turned in. That's not behind closed doors. And as far as I know, the Texas for Better Science Education, they are the group that has reviewed all of the books, put those into written testimony. That's not behind closed doors. They have let everybody see their answers, what page numbers to each book. And so that was publicly done.

So would you also disagree that the National Center for Science Education, a quote from Eugenie Scott, "In some cases we made these suggestions directly to the publishers, out of the spotlight, so to speak." So I would say that that organization was influencing publishers behind closed doors.

MR. DEBERG: That could very well be true. I don't have any specifics. But I would submit to you that anybody who meets behind closed doors to change the text is doing a disservice to us all, because we don't know what they're saying. In theory, we have just as much right to talk. So for example, when the Discovery Institute -- if they do, when they send things to the publishers and say, "Do this. We would like you to consider this."

Whatever the verbiage goes. I think it only right that people know in advance.

If you read the rest of my comments, I asked for two weeks notice when anybody meets with a publisher so concerned people could go with them and do it in an open forum. That was really what I was getting at, not that somebody talks to them and it comes out later in the light of day.

DR. LEO: Okay. And I wanted to address your Holt comment just real quick. First of all, publishers are obligated, in Holt's defense, to respond to all comments. They don't consider where those comments come from. And you know, the changes that were made, I was reaching because I think it's -- they've been unfairly drug through the mud. It says -- the change was, "Finding and communicating information. Use the media center and Internet resources to study hypothesis of the origin in life that are alternatives to the hypothesis posed by Oparin Lerman and analyze, review and critique either Oparin or Lerman's hypothesis as presented in your textbook, along with one alternative theory or hypothesis that you can discover in your research."

And I think, actually, that that is a

superior question for science students. There are plenty of alternative hypothesis. If a student has to do a paper, they can go on the Internet and look at that. But I think it's a stronger -- it's more -- it's a -- the Origins of Life is a drastic underly (sic) explored topic. And I think that that's one of the most fascinating questions in science. And I think that Holt's change in their textbook really improved what they had before in there. And I think that it's a little overreacting to, I guess, withdraw from students the challenge of exploring alternative hypothesis. They do that anyway if they're given a paper to do that. They can go on the Internet. They're smart kids.

MR. DEBERG: Which alternate hypothesis would you suggest?

DR. LEO: It doesn't say.

MR. DEBERG: No, I know it doesn't. But I'm asking you: If you were doing the assignment, which one would you suggest?

DR. LEO: I don't know. I'm not -- that -- I'd have to get on the Internet and look that up, just like a student would.

MR. DEBERG: Fair enough.

DR. BERNAL: Madam Chair.

CHAIR MILLER: Any other questions?

Dr. Bernal.

DR. BERNAL: I was reading your paper, Mr. DeBerg. And I was interested in the three -- you called them the three main thrusts of the IDC intelligent design movement. I was interested in the third one in which I'm going to read just a couple of lines. "The third thrust of IDC or intelligent design, and perhaps the most important, you say, is the new creationism is to garner political and public acceptance of the IDC concept. It is for this reason I refer to IDC as a movement at the beginning of this paragraph, rather than simply a philosophical, religious or scientific view."

Could you elaborate on that?

MR. DEBERG: Yes. In my paper, if you didn't get a chance to read it, I basically called the intelligent design creationism a movement, rather than a philosophical or scientific entity in itself because it -- in order for the system to work, all three of those legs of the stool have to be in place. And if you read early in the paper, I talk about the history of creationism, biblical creationism and how that changed into

scientific creationism and how that basically was shot down in the scientific world to great acceptance by everyone, because creationism, as such, can't stand on a scientific basis.

So what people who still are intent on -- on inserting their particular views into science books have learned from what happened to the scientific creationists. And as such, they realize the only way you can get credibility is through scientific acceptance. You can't get up and say, "I am XYZ religion and therefore we ought to put this into the textbooks." But if you can stand up and say, "You must understand this and believe this and put this in the textbook because it's scientifically valid," then you get acceptance. And then you get into the textbooks and the thrust of what I was saying, that there's a whole political arm of this that, basically, uses that technique to get the foot in the door. Because once the foot's in the door, we all know where we're headed.

And so the political arm -- if any one of these arms fails, the whole thing fails. And the political aspect, I said, sir, was the most important because it really is the coordinating and overarching philo -- not philosophical view, but

actually practical view on how to get this to work. And if you can't -- the only way it can get into our schools is through scientific acceptance, because we don't have philosophy courses in high school, I don't believe. If we do, that would be the place for it.

But unfortunately, this is the attempt. And what you see is the scientific underpinnings of the political arm at work today. Because the only way this is going to work is through you. It won't work any other way.

CHAIR MILLER: Dr. McLeroy.

DR. McLEROY: Can you point to one example of anybody from the -- I mean, from Discovery Institute that has advocated intelligent design to be put in the textbooks? Can you give me just one example of what they're trying to --

MR. DEBERG: Well, no, you can't do that.

DR. McLEROY: Why?

MR. DEBERG: Because you're not allowed, because -- because it's basically --

DR. McLEROY: I mean, can you show me where someone from the Discovery Institute, Dr. Bolin or any of those guys, have tried to put

anything of intelligent design in the books? Just give me one list of one thing they've tried to put in the books that's intelligent design.

MR. DEBERG: Well -- well, I haven't said that they did. What I intended to say, if I said it poorly, I apologize, was -- was that you have to get the underpinnings in first. This is a slow process. And the way you do it is through some scientifically acceptable means. And once it's in there, it's a short step to then invoking the term intelligent design. I don't know of anybody who's invoked the term "intelligent design" and wants that put in the textbook, if that's your question.

DR. McLEROY: Well, or what's called intelligent design. Well, in your statement that you'd like to change the McGraw-Hill book from -- I think even the Discovery Institute has a problem with the Institute for Creation Research and intelligent design being used in the same sentence. But --

MR. DEBERG: Well, of course, they do. That's why I said it.

DR. McLEROY: It says here that you want to change the -- excuse me. It wants -- it says here that -- in your testimony that you want to

change it and you delineate both organizations. And they said that they advocate the students be taught intelligent design.

Now, John West is here, the associate director, in his testimony would say, Contrary to what you may have heard, "Discovery Institute supports the teaching of evolution. In fact, we want students to learn more about the theory." That is what every intelligent design person, Discovery Institute person has basically stated. They have not advocated intelligent design in the books.

All they're -- I mean, it's just the facts. The facts state that they're not pushing for it. They want to expand the coverage of evolution. So --

CHAIR MILLER: Thank you very much. Okay. We need to go on to the next speaker.

MR. DEBERG: Thank you.

MS. SALAZAR: George Denny, II, followed by Bob Cordes.

Bob Cordes, followed by Samantha Smoot.

MR. CORDES: It's almost good night.

Ladies and gentlemen of the Board, I'm Bob Cordes. I'm from Mason, about 100 miles

west of here. I want to take just a moment to ask you to help make Texas schools strongly scientifically oriented.

I am not a scientist. I am just an observer of life who is well aware of the effect that science has had on our lives. I'm here speaking for my grandchildren and for their future.

When my grandmother was born, the life expectancy of a woman was 44 or 45 years old. That was in 1880. She died with a now preventable disease at age 33 of TB.

My mother, on the other hand, died a few years ago at 95. And I don't think she was ever really sick a day in her life. I attribute that to science. The analytical questioning by people trying to determine what causes something to happen and then the applied science of using that information to directly improve our lives.

I would like this type of progress to continue so my grandchildren can reap similar benefits in the future. And I'm not referring to just medical science. I'm referring to all aspects of science, which cumulatively have improved our lives so immensely in the last 150 years.

We currently import scientists from

foreign countries by the thousands to fulfill the needs of industry. We desperately need to reverse this trend. We need to make science relevant, interesting and most of all applicable for our kids. We need for them to understand the importance of science and not water it down with nonscientific what if's and religious dogma.

If we don't stress science, other countries surely will. And being left behind scientifically as our nation ages is not a very comforting thought to me. I implore you, do not dilute the Texas science curriculum.

CHAIR MILLER: Thank you, sir. Is there any questions?

Let's go to the next --

MS. SALAZAR: Samantha Smoot, followed by Wendee Holtcamp.

MS. SMOOT: Madam Chairwoman, members of the Board, I am No. 60. I would respectfully request that you allow me, please, to trade places with No. 83, Nobel Laureate, Stephen Weinberger.

CHAIR MILLER: That's fine. Welcome.

DR. WEINBERGER: Thank you. Hello. Thank you for the opportunity to talk to you. I should say at the outset that I haven't read the

textbooks in question and I'm not a biologist. My Nobel prize is not in biology, but is in physics. But I have been a physicist for a long time. And I think I have a good sense of how science works.

It doesn't deal with certainties. We don't register things as facts that we have to swear allegiance to. But as mathematics and experiment progress, certain bodies of understanding become as sure as anything reasonably can be. They attract an overwhelming consensus of acceptance within the scientific community. They are what we teach our students. And the most important thing of all, since our time is so precious to us, they are what we assume as true when we do our own work.

Evolution -- the Theory of Evolution through natural selection has certainly reached that status as a consensus. I've been through these issues not very much professionally in recent years, but I was on a panel of the National Academy of Sciences some years ago that reviewed these issues in order to prepare an amicus brief in a similar argument that was taking place in Arkansas at that time. At that time, it had reached the courts.

We know that there is such a thing as inheritable variations in animals and plants. And

we know that these change through mutations. And it's mathematically certain that as given inheritable variations, that you will have evolution toward greater adaptation. So that evolution through natural selection occurs can't be in doubt.

As I understand it, many who want to put alternative theories into our textbooks argue that, although that may be true, we don't know that that's all that happens, that there is not some intelligent design that also assists the process of evolution.

But that's the wrong question. We can never know that there isn't something beyond our theories. And that's not just true with regard to evolution. That's true with regard to everything. We don't know that the theory of physics, as it's currently understood, correctly accounts for everything in the solar system. How could we? It's to complicated. We don't understand the motion of every astroid in the astroid belts. Some of them really are doing very complicated things. Do we know that no angel tips the scales toward one astroid moving a little but further than it otherwise would have in a certain time? No, we can never know.

What we have to do is keep comparing what we observe with our theories and keep verifying that the theories work, trying to explain more and more. That's what's happened with evolution and it continues to be successful.

There is not one thing that is known to be inexplicable through evolution by natural selection, which is not the same as saying that everything has been explained, because it never will be. The same applies to the weather or the solar system or what have you.

But I can say this, and many of the peak scientists here will have said, I am sure, the same thing. You must be bored hearing this again and again. But how can you judge? I'm not a biologist, you're not biologists.

There is a natural answer which is very congenial to the American spirit, I think. And that is, well, let the students judge. Why shouldn't they have the chance to judge these issues by themselves? And that, I think, is the argument that many are making.

But judge what? Judge the correctness of evolution through natural selection? Judge the correctness of Newton's law or the

conservation of energy or the fact that the Earth is round rather than flat? Where do we draw the line between the issues that we leave open to the student's judgment and the issues that we teach as reasonably accepted scientific facts, consensus theories?

The courts face a similar question. They often are presented with testimony or testimony is offered, for example, that someone knows that a certain crime wasn't committed because he has psychic powers or someone sues someone in tort because he's been injured by witchcraft. The Court does not allow -- according to current doctrines, the Court does not allow those arguments to go to the jury because the Court would not be doing its job. The Court must decide that those things are not science. And the way the Court does is by asking: What -- do these ideas have general scientific acceptance? Does witchcraft have general scientific acceptance? Well, clearly, it doesn't. And those -- that testimony will not be allowed to go to the jury.

How then can we allow ideas which don't have general scientific acceptance to go to high school students, not an adult jury? If we do,

we are not -- or you are not doing your job of deciding what is there that is controversial. And that might be an interesting subject to be discussed, as for example the rate of evolution, the question of whether it's smooth, punctuated by jumps or whether it's -- or whether it's just gradual. These are interesting questions which are still controversial which could go to students and give them a chance to exercise their judgment.

But you're not doing your job if you let a question like the validity of evolution through natural selection go to the students, anymore than a judge is doing his job or her job if he or she allows the question of witchcraft to go to the jury.

And why this particular issue of evolution? Why not the round Earth or Newton's theory or Copernicus, the Earth goes around the sun? Well, I think it's rather disingenuous to say that this is simply because there's a real scientific conflict here, because there is no more of a scientific conflict than with those issues.

CHAIR MILLER: Dr. Weinberger. Hi. I'm Chairman Miller and --

DR. WEINBERGER: I'm sorry, am I

going on too long?

CHAIR MILLER: Yes, sir. But I wanted to allow the courtesy of that, because we're delighted to have you come here and share.

DR. WEINBERGER: Well, actually, I was on my last sentence.

CHAIR MILLER: How about that. I'll let you finish. Doctor, go ahead, finish.

DR. BERNAL: Madam Chairman, could I make a motion that we allow him to extend three minutes as a matter of courtesy?

CHAIR MILLER: That's what we were doing. We were --

DR. WEINBERGER: Yeah, that's more than I need.

DR. BERNAL: Did you say three minutes?

CHAIR MILLER: Yeah, we've exceeded it.

DR. WEINBERGER: Thank you very much, anyway. I do get involved in this issue.

I think it's clear that the reason why the issue was raised with regard to evolution is because of an attempt to preserve religious beliefs against the possible impact of the Theory of

Evolution. I don't think teachers have any business either preserving religious beliefs or attacking religious beliefs. I think they should teach science. And science, as the courts understand it, in that other context, is what is generally accepted by scientists.

And what is the evidence that evolution through natural selection is generally accepted through science? I don't think -- general acceptance doesn't mean unanimity. I know there are Ph.D. scientists who take an opposite view. There's not one member of the National Academy of Sciences who does. There's not won one winner of the National Medal of Science who does. There's not one Nobel Laureate in biology who takes the view that there's any question about the validity of the Theory of Evolution through natural selection or that there is any alternative theory that's worth discussing.

So by the same standards that are used in the courts, I think it is your responsibility to judge that it is the Theory of Evolution through natural selection that has won general scientific acceptance. And therefore, it should be presented to students as the consensus

view of science, without any alternatives being presented.

Thank you very much.

CHAIR MILLER: Thank you, sir. Are there any questions?

Ms. Lowe.

MS. LOWE: I'm sorry. It's with great trepidation that I ask a question of a Nobel Laureate, but I do have one. I understand that the probability of spontaneous mutations having formed even the simplest of life is the probability of one to 10 -- one times 10 to the 40,000th. And yet I understood you to say that it's with mathematical certainty that we can say that evolution through natural -- I don't understand.

DR. WEINBERGER: Well, there are two different issues. Okay. Well, excuse me. There are two different issues there. One is the issue of whether or not the development of living things, once life started, has proceeded through the process of evolution as described by Darwin being driven by natural selection.

I would say that's mathematically certain, because you can prove that if you -- we know there are inheritable variations and that

changes occur through mutations. And once that happens, you know that there will be an increased adaptation to the environment. I don't say that you can prove that's the only thing that happens. That was the point I made.

Then you raise an entirely different point, which is the point about the origin of life. I didn't have anything to say about the Origin of Life. I don't believe that anyone knows what is the probability, given certain environment, that life will arise. It is not something that we know really how to calculate.

However, let me point out to you that it may be very low. It may be that on any given planet, the chance that the conditions will be right for life to start and that life will actually get started is extremely low. On the other hand, there are a lot of planets. I don't just mean the nine in our solar system. But I mean something like 100 billion stars within our galaxy, which we now know a good fraction of them have planets and billions of galaxies that we've observed. And very possibly, according to the most widely accepted cosmological theories, which are not at all a consensus, but just our best guess, very likely an infinite number of

galaxies.

Well, if you have -- even if the chance of life forming was 10 to the minus 40,000, which I don't think it is. I don't think we know that. If you have that many planets, then there's a good chance that life will form on one of them. And the people on that planet will look around and say, "Gee, aren't we lucky?"

CHAIR MILLER: Any other questions? Ms. Leo.

DR. LEO: I just kind of wanted to, I guess, clarify something in my own mind, because much of what you said, you were talking about requiring another alternative theory to be taught other than evolution. I'm not in favor of that. I think just because there are known scientific weaknesses and there may be factual errors that need to be taken out of the textbooks, that doesn't mean it's an alternative theory. And I am of the belief and I have not heard any other Board members recommending alternative theories. The TEKS do not require publishers to put alternative theories in the books. And from the reviews that were done by Texas for Better Science Education, they are not supporting the idea of putting alternative theories

in the books.

I happen to believe that science books should contain science. But if there is a scientific weakness to that theory or if there's a factual error, that needs to be addressed. And somehow there's a feeling that a scientific weakness equates with religion or creationism, when it doesn't. It needs -- it can't be in there. As you well pointed out, that would violate what the Supreme Court has already ruled on, that creationism is inherently religious.

I just wanted to kind of clarify that, because you mentioned the alternative theory several times in your speech. And I'm not supporting that. And I haven't seen any evidence in the reviews of the textbooks that are asking for an alternative theory to be included.

DR. WEINBERGER: Well, I'm not -- thank you. I'm not familiar with the testimony that's been presented here, so I can't respond in detail. But I -- I know about this issue in general terms through my own experience with it in the past. And it is certainly true that the same people who have, in the past, been -- been pushing for the idea of intelligent design as an alternative theory

to be presented along with Darwinian evolution are the ones who emphasize supposed weak points in the Theory of Evolution.

I am not aware of any weak points. I am aware, of course, that there are things that are -- where it's difficult to trace the chain of cause and effect that has led to the development of certain structures. The classic -- there are classic examples like the eye and feathers on birds. I think most of these actually have been answered. There always will be some things left that haven't been explained. I don't regard that as a weakness of a theory. I'm -- you know, the theory for which I'm responsible right now has left quite a number of things unexplained. There are a number of experimental results, which from the point of view of my own work, look -- haven't -- well, have so far defeated any rational explanation.

I would rather take umbrage if anyone said that was a weakness in the theory. We -- it just takes a long time to explain everything. And I feel that the weaknesses that are being presented to you are not -- are being -- and I don't know the people who are presenting them, I haven't heard their testimony. But I'm guessing from my previous

experience that they are being presented to you disingenuously in a way that would not occur with other theories as a means of weakening the -- well, of engendering a distrust of the Theory of Evolution because of its supposed religious implications. I'm sure that they haven't testified about their desire to preserve religion, but I -- I suspect they're not being entirely open about that.

CHAIR MILLER: Are there any other questions?

Dr. Weinberger, thank you --

DR. WEINBERGER: Thank you very much.

CHAIR MILLER: -- for coming and sharing.

(Applause.)

CHAIR MILLER: I thank the Board for allowing the extra time.

MS. SALAZAR: Wendee Holtcamp, followed by Andrew D. Ellington.

MS. HOLTCAMP: Dr. Weinberger is a hard act to follow. I'm a Nobel Laureate hopeful myself. I'm a NSF graduate research fellow and Ph.D. student at Rice University studying evolution. I'm also an adjunct instructor of biology at Kingwood College. I've taught there for

the last four years. My perspective comes from this very background. I'm also a mother of school age children. I have two elementary age children. But I'm also a Christian who believes that truth can be found in scripture, but also through unbiased systematic study of the created world.

Intelligent design and creationism supporters would like textbook publishers to essentially claim that evolution has major weaknesses. This is simply false. Scientific evidence supporting evolution is broad based and extensive. Evolution is more than a theory. It's a comprehensive paradigm that has explanatory predictive power. It provides a powerful framework that explains a genetic and morphological similarities and differences among organisms, embryotic development and patterns in the fossil record, among other things. There are literally hundreds of thousands of scientific studies documenting various aspects of evolution.

In contrast, there is not a single peer-reviewed scientific publication presenting evidence for intelligent design. Yes, you can use popular literature to publicize one's ideas, as Stephen J. Gould did also for science, but only

after the ideas are first published scientifically.

No matter how many people testify today in support of weakening evolution education or introducing alternative ideas or weakening -- or providing support for the so-called weaknesses of evolution, truth is not a democracy. We can't vote scientific theories or a favorite understanding of reality in or out of favor by a public show of hands. To deny the historic reality of evolution would be to live a lie. It would turn back the clock on all that we have been blessed to learn through science.

Evolution does not conflict with belief in God. God is not found by seeking proof or signs of his existence in the world, but rather through faith. St. Matthew wrote, "An evil and adulterous generation seeks after a sign."

At best the Discovery Institute and other antievolution, pro-design groups are the blind leading the blind. At worse they are wolves in sheeps clothing. These groups are using political force and religious persuasiveness to get their ideas taught in schools in science while sidestepping the scientific process.

Let science remain an unbiased way to

study the natural world and let it be taught to Texas school children as such. If textbooks need to be modified in any way, it would be to provide stronger support for the absolute certainty of evolution, natural selection and the common descent of all life.

CHAIR MILLER: Thank you very much. Are there any questions?

Ms. Leo.

DR. LEO: In the article that you submitted with your written testimony, you write that, "Hotly debated among scientists is whether natural selection alone can explain the development of new structures like wings with feathers in organisms over millions of years. Among the major parts of evolutionary biology outlined above. This is one small scientific, not religious disagreement."

So you acknowledge that there is scientific disagreement over just how much that natural selection can do. We've heard that same idea from other people here today. Would there be anything wrong with a textbook informing students about the existence of this scientific disagreement over the power of natural selection?

MS. HOLTCAMP: I think it would be great if Texas school children were taught that genetic drift is also a powerful force in influencing evolution. It is an alternate -- it's not a mutually exclusive alternative to natural selection, but yes, there are chance events that lead -- that isolate populations and then allow them to develop, also, then by natural selection.

But what I was talking about in that article was the influence of chance events that happen, you know, catastrophes, new environments, environments changing, the Pleistocene, glaciations, things like, that -- you know, climate change. Well, of course, you can adapt to those, also. So there's -- it's sort of a process of natural selection and genetic drift. That was the alternative I was talking about.

DR. LEO: Okay. And then also in your written testimony, you criticize what you call a philosophy of evolutionism. And I wonder whether you think that this passage is an example of evolutionism. This is from one of our textbooks. "Adopting this new idea of the world means accepting not only the processes of evolution, but also the view that evolutionary change occurs

without any goals. The idea that evolution is not directed toward a final goal or state has been more difficult for many people to accept in the process of evolution -- of evolution itself."

Do you think that this statement ought to be removed, then, as an inaccurate since you talked about your Christian faith and that, you know, you believe in both. And that seems to oppose what you're saying.

MS. HOLTCAMP: I believe that science is here to study the natural, material world and faith is there to help us understand God through faith, which is supernatural. It's above the natural. What we see in the natural world is a manifestation -- when I see the evil that's in the world like child abuse, September 11th, terrorism, I don't say that's evidence that God doesn't exist. When I -- I expect, because this is a fallen world, that we will see selfishness. We will -- that -- to me, that's to be expected in a natural fallen world, according to Christian theology. And it's faith and love and hope that come from belief in God and religion.

DR. LEO: So would you think that that statement in this textbook is inaccurate?

MS. HOLTCAMP: No, I think it's absolutely an accurate representation of the way that evolution has acted. It appears through science that it is driven without purpose. We cannot prove God's fingerprints on creation because that is not a scientific -- that's not falsifiable.

DR. LEO: Thank you.

CHAIR MILLER: Thank you. Next?

MS. SALAZAR: Andrew D. Ellington, followed by Russell Wayne Glasser.

MR. ELLINGTON: If I might beg the indulgence of the Board. Can Eric Hillis go before me, because it's approaching his bedtime.

CHAIR MILLER: What? I'm sorry, what did you say?

MR. ELLINGTON: Can Eric Hillis go before I do? Because his bedtime is approaching.

CHAIR MILLER: Sure. Well, Eric, welcome. We're so glad to have you here.

MR. HILLIS: Thank you. I'm sorry. I have school tomorrow.

CHAIR MILLER: I understand, it's a school night.

DR. BERNAL: You have to be in bed by 10:00, you know that.

DR. LEO: Do you have your homework done?

CHAIR MILLER: Yes, this young man behind you will hand them out.

MR. HILLIS: My name is Eric Hillis. And I am a sophomore at the LBJ High School Science Academy in the Austin Independent School District. I took biology as a freshman there and I also was on the Texas State Olympiad Science team that went to Nationals. So I have a large interest in biology. I plan to take AP biology in my upcoming senior or junior year, so I hope to use one of these AP textbooks in the future. I looked at nine of the 11 textbooks that are up for consideration tonight.

When I took biology last year, my teacher taught about the different scientific evidence that supports Darwin's Theory of Evolution by natural selection. But she also talked about the different weaknesses that Darwin's original ideas had and that scientists have discovered since then. For instance, Darwin did not understand genetics as we do today. And he proposed only the mechanism of selection to account for evolution. In biology class, we learned about the many advancements in genetics and evolution that have been made since

Darwin, such as genetic drift and the founder effects. So I looked at these textbooks to see if the strengths and the weaknesses of Darwin's ideas were thoroughly explained.

I found examples in each book that discuss the strengths and the weaknesses of Darwin's ideas. They all talked about the huge amount of scientific evidence that supports natural selection, but they also spent chapters on modern genetics and discussed the mechanisms for evolution like genetic drift and the founder effects. As one example, Miller and Lavine's biology textbooks starts at Chapter 16 on Page 393 like this: "As Darwin developed his Theory of Evolution, he worked under a serious handicapped. He didn't know how heredity worked. Although Mendel's work on inheritance in peas was published during Darwin's lifetime, its importance wasn't recognized for decades. This lack of knowledge left two big gaps in Darwin's thinking. First he had no idea how hereditable traits passed from one generation to the next. Second, although variation in hereditable traits was central to Darwin's theory, he had no idea how that variation appeared." The textbook then goes on to describe the many developments in genetics and

evolution since Darwin and fills these weaknesses.

For instance, the discussion of genetic drift on Page 400 begins, "Natural selection is not the only source of evolutionary change." The textbook then describes defines genetic drift and illustrates how it can result in evolution.

These are just a few short examples, but each of these textbook does cover the strengths and the weaknesses of Darwin's ideas in a way that I thought was easy to understand.

I think that Raven and Johnson's AP biology textbook is the best in its explanation, as it even includes a section on Darwin's critics and a "Was Darwin wrong?" section. But even though that may be my personal favorite, I have observed the strengths and the weaknesses be explained well in all of these textbooks. Therefore, I think you will approve these textbooks for use by high school students.

Thank you for your time.

CHAIR MILLER: Thank you.

(Applause.)

CHAIR MILLER: We appreciate you coming.

Are there any questions from the

Board?

Thank you.

MR. HILLIS: Thank you.

MS. SALAZAR: Russell Wayne Glasser followed by Patrick Blackhart.

MR. ELLINGTON: He wasn't substituting for me, I asked if he could go before me.

MS. SALAZAR: I'm sorry. Okay.

MR. ELLINGTON: Talking about a hard act to follow. I am Dr. Andrew Ellington. The Wilson M. and Catherine Fraiser research professor in biochemistry at the University of Texas at Austin. I have worked in the field of origins, chemistry and biochemistries for over 20 years and have published 165 peer-reviewed papers on this and related subjects. I wish to provide testimony concerning the critiques that have been leveled against the Miller-Urey experiment.

I would initially like to point out that the primary purpose in having the Miller-Urey experiment in textbooks is to show that biological compounds can be generated by relatively simple prebiotic chemistry. This purpose is set forth in nearly every textbook. For example, in Raven, Page

149, we find, "Organic building blocks arose from simpler chemicals."

However, the criticisms leveled by the Discovery Institute's preliminary analysis of evolution in biology textbooks do not focus on this important fact. In other words, the argument against the inclusion of the Miller-Urey experiment almost never talk about the meaning of the experiment itself.

In addition, though the criticisms that are advanced by the Discovery Institute are either completely wrong or misleading to the point of dishonesty. There are two prime examples of this, although others can be found. First, the Discovery Institute says that, "When the Miller-Urey experiment is repeated with carbon dioxide, nitrogen, water vapor, no amino acids are produced.

This statement is false. It is factually incorrect. Amino acids are produced when the Miller-Urey experiment is run with only carbon dioxide, water and nitrogen. This was shown in a classic paper by Schlessenger and Miller in the Journal of Molecular Evolution in 1983. The evidence is indisputable and has never been contradicted.

Why is this information which is readily available in the scientific literature not cited by the Discovery Institute? Dr. Wells, in fact, often cites a chapter by Dr. Henrik Holland of Harvard University that purports to prove their point. To quote Dr. Wells, "In 1984 Henrik Holland confirmed that mixtures of carbon dioxide, nitrogen, water vapor yield no amino acids at all."

In fact, the Holland chapter cited by Dr. Wells was a review. The primary literature referenced in that chapter does not support Dr. Wells' claims. The original papers never even tested to see whether amino acids were made or not. These facts can readily be discovered by anyone with scientific training, and yet, the Discovery Institute has chosen to both mislead you and the citizens of Texas.

Second, the Discovery Institute suggests that reducing gases would have not been present on the early Earth. This statement is false. It is factually incorrect. Current theories, in fact, support a mildly reducing atmosphere. Moreover, even if the overall atmosphere was neutral, there would have been multiple sights on the Earth's surface that were

locally reducing. For example, reduced gases such as hydrogen are produced at sites of volcanic activity. At many locales on the early Earth electric discharges precisely like those shown in the Miller-Urey apparatus represented in the textbooks would have yielded amino acids and other organics.

Scientists are supposed to be impartial, judging evidence on its merits. However, having read the inaccurate testimony of the data submitted by the Discovery Institute, I can only conclude that their testimony with regard to the Miller-Urey experiment, in particular, is based solely on bias, rather than hard scientific evidence that is readily available and accurately reported in each textbook.

As a further conclusion, I'd just like to especially ask not Dr. -- or not doctors, but members Leo, Lowe and McLeroy to please ask questions of an expert that you've been getting answers to by nonexperts.

CHAIR MILLER: Dr. McLeroy.

DR. McLEROY: This is real exciting. I mean, that's a lot of peer-reviewed articles. I'm very impressed. And thank you. And I love your

enthusiasm. I tell you, at this time of the night, you waked us up here a little bit. I like it.

Okay. Left-hand/right-hand.

MR. ELLINGTON: Thank you very much for that, sir. In fact, while that's frequently pointed out as one of the problems with supposed origin theories, what almost certainly happened and you can easily resolve such racemic mixtures by a variety of mechanisms. I was just talking with my colleague, James Ferris, of Rensselaer Polytechnic last week. He is now getting polymerization of nucleic acids without any handedness problems on the surface of clay. Clays probably were around in the early Earth.

So this supposed racemic mixture problem often cited by creationist and/or intelligent design folks really isn't a problem.

DR. McLEROY: What about amino acids?

MR. ELLINGTON: What about them? I just talked about them.

DR. McLEROY: Well, you just said nucleic acids are going to -- I mean, you just ignored the amino acids.

MR. ELLINGTON: I apologize for

answering the larger question on racemic mixtures. But for amino acids, in fact, if you have -- if you try and resolve amino acid mixtures in an air/water interface, you often get Chiral Formation of amino acids. So it is, in fact, not really regarded as much of an issue anymore.

DR. McLEROY: The left-hand/right-hand quality -- because -- explain how it happens. Because there's water in between?

MR. ELLINGTON: An water/air interface you actually get preferential orientation of the amino acids --

DR. McLEROY: Oh, so they rotate a certain way. So the right-hand --

MR. ELLINGTON: Yeah. So once you have a Chiral surface, a mineral, air, water, what have you, you can resolve such Chiral mixtures.

DR. McLEROY: Okay. What about the -- this is -- okay. The left-handed/right-handed -- I do have that -- that one. So you're saying that between air and water, that those amino acids that form, then, will all become left-handed in this one group or will they --

MR. ELLINGTON: No, you will selectively --

DR. McLEROY: How did the left -- all the left-handed get together and the right-handed just get secluded?

MR. ELLINGTON: Because, for example, with an air/water interface, you can get preferential crystallization of one or the other. And so, therefore, you concentrate one batch relative to the other batch.

MS. LOWE: Would that happen naturally?

MR. ELLINGTON: I think our water interfaces were present even at origin.

MS. LOWE: The separation -- the crystallization and the separatization of the right hand and the left hand, would that occur naturally?

MR. ELLINGTON: I would suspect so, yes.

MS. LOWE: Thank you.

DR. McLEROY: How do you get -- so in other words, there's -- has there been an experiment done? I mean, this really --

MR. ELLINGTON: Yes, I'm reporting on --

DR. McLEROY: There has been an experiment done that produces all left-handed amino

acids?

MR. ELLINGTON: That concentrates all left-handed or concentrates all right-handed or at least the polymerization of left hand or the polymerization of right hand. Yes.

DR. McLEROY: Is there an experiment that produces and concentrates left-handed amino acids?

MR. ELLINGTON: Well, if you concentrate them, it doesn't matter how they're produced. It's just like saying --

DR. McLEROY: No, no, no. If you -- can you produce them and concentrate them at the same time? Because that's what you're going to have to do.

MR. ELLINGTON: Yes. I would say --

DR. McLEROY: Is that a descent question?

MR. ELLINGTON: That's a very decent question, sir.

DR. McLEROY: Thank you.

MR. ELLINGTON: And I would say, yes, because as I just said in my testimony, under conditions where one of the gases is water, you get amino acids. Then presumably if water was around,

then they would also have been in air/water interface and they would have both been produced and potentially concentrated in a nonreceiving fashion.

DR. McLEROY: How do they -- do they preserve long enough? So now, you've got to have a situation where they're produced. They're all going to be left-handed and you have to have them last long enough before they get destroyed. And what the process that formed them, why doesn't it destroy them, also?

MR. ELLINGTON: Well, there is -- there's both spontaneous "generation" and spontaneous degradation of amino acids. And what you do is you reach a steady state level. And what that steady state level was, no one knows. But I applaud your questions, because this is the sort of questions we should be asking in these textbooks. These detailed scientific explanations of how scientifically origins arose.

DR. McLEROY: Okay. And I like what the -- it was very well -- clearly pointed out by our Nobel Prize associate folks that this has nothing to do with evolution. He says those are two different issues. When Ms. Lowe asked him about the origin of life and once life evolved whether -- you

know, once life -- there was life, whether it could evolve. And it's kind of like a side issue, this whole origin of life, though it's included in here.

I think -- I'm glad to know there's better research than I thought there was out there. I will check this out. And I appreciate your enthusiasm, again. That exhausts the limit of the dentist's questions on origins of life.

CHAIR MILLER: Okay. Gail, did you have anymore questions?

MS. LOWE: Well, Dr. McLeroy mentioned that I did ask a question of the Nobel Laureate scientists. So I'm sorry, I've not singled out. I have tried to focus on those who have actually read the textbooks.

CHAIR MILLER: All right. Anybody else?

Ms. Leo.

DR. LEO: Just a quick one. Has that been -- experiment been peer-reviewed?

MR. ELLINGTON: As far as I know, yes. I actually saw it at a conference, but I can try and find the original paper.

DR. LEO: Yeah, I'd like to see if that's been peer-reviewed. As well as I'm

encouraged that you think high school kids can understand the complexities and can understand the left-handed/right-handed thing that maybe I don't get altogether there. But I'm encouraged that you would say that, because I don't -- I think all of us on this Board do not want to see a dumbing down of the curriculum. And these are the very things that make science exciting. And so I'm glad you said that.

Thank you.

CHAIR MILLER: Thank you.

MS. SALAZAR: Russell Wayne Glasser, followed by Patrick Blackart.

MR. GLASSER: Hello. My name is Russell Glasser. I'm a software engineer at IBM. I have a 10-year-old stepdaughter who studies science in the Round Rock School District and a 16-month-old son who will someday do the same.

My parents both have Ph.D.s in physics and my father is involved in fusion research at Los Alamos National Lab. Fourteen years ago, my father taught me what happens when you do science without sticking to the scientific method. Two chemists named Ponds and Fleischman claim to have discovered something called cold fusion. If true it

would me that we could produce a virtually unlimited supply of energy at very low cost.

But Ponds and Fleischman chose to promote their ideas in a questionable manner. Instead of publishing papers in scientific journals that told other scientists how to repeat their experiments, they went straight to the press and told them that they had made a breakthrough.

Now, their ideas were dead wrong. But they couldn't have known this because they didn't invite outside criticism. They didn't follow the peer-review process that is a vital part of science. By trying to skip that process and go straight to the public, they wound up embarrassing themselves.

Unfortunately, I can see the same thing potentially happening to science education in Texas. Since evolution is scientific, there are legitimate criticisms of it. Science thrives on criticism. But many books that attack evolution come from outside the scientific community. An example of such a book is Icons of Evolution by Jonathan Wells.

Now, Dr. Wells is a member of the Discovery Institute and I believe he spent some time

advising this Board. He holds a Ph.D. in biology, but like Ponds and Fleischman he failed to follow the scientific method. His assaults on evolution are found only in a book that's located in popular book stores and not papers in mainstream peer-reviewed scientific journals.

One example of Wells' work is his treatment of the peppered moth. Now, in the papers that I've distributed to the Board, I describe how Wells falsely used research that was done by geneticist Michael Majerus to make it appear that it refutes evolution. And Majerus himself explains how Wells misrepresented him.

Science is designed to be self-correcting. And that is a good lesson to teach in our classes. But ultimately, published scientists figure out what constitutes legitimate science and then schools teach what they have found. It makes no sense to do this process backwards. The purpose of a science class isn't to let kids decide for themselves whether French science is real science. We don't put holocaust deniers side by side with World War II historians in history textbooks and let the students decide for themselves which ones are right. And we don't spend

time in physics classes teaching cold fusion. Now, a reasonable plan would be to let scientists agree on what is correct science first and then bring their work to Texas textbooks.

CHAIR MILLER: Okay. Thank you. Are there any questions?

Ms. Leo.

DR. LEO: The information in Dr. Wells' book has been peer-reviewed on the peppered moth story.

MR. GLASSER: Right. As I mentioned before, he took work from Michael Majerus, who did the research. But if you'll look at the other side, I provide a couple of links where he -- where Dr. Majerus actually responded directly to Wells and pointed out several ways in which Wells' quotations of his research were misleading, including the point that I brought up earlier tonight where Wells falsely claimed that moths never rest on tree trunks when, in fact, Majerus' own work showed that he was wrong.

DR. LEO: Okay. But I mean, he has been accused of having done no experiments, having done no peer-review publications. I mean, I -- that's why I wanted him to testify, so he could

defend himself to your allegations. But both of those claims are false. They asked -- the National Center for Science Education sent a letter from somebody who performed experiments with Jonathan Wells and asked to have a retraction and that was not retracted.

MR. GLASSER: And who was that?

DR. LEO: And it's not in the material -- that was Alan Gishlick on -- and by the way, his -- "The Talented Mr. Wells" was not a peer-reviewed article, but yet that was submitted to the Board. But, I mean, he has -- his degree is Ph.D. in biology.

MR. GLASSER: I am not at all disputing that Dr. Wells holds legitimate degrees.

DR. LEO: Well, but you said he's outside the scientific community.

MR. GLASSER: No, I said that his ideas come from outside the scientific community because they're not published in peer-reviewed papers. It doesn't just take a bunch of initials after your name to make you be doing legitimate science. In order to do science correctly, you have to start with the evidence and lead to a conclusion, not start with a conclusion and then misrepresent

evidence that's already available so that you could confirm what you already think you knew.

DR. LEO: But he is not outside the scientific community. He is a scientist --

MR. GLASSER: I didn't say he was outside the scientific community.

DR. LEO: Okay.

MR. GLASSER: I said that his work was.

CHAIR MILLER: Thank you so much. Let's move to the next one.

(Applause.)

MS. SALAZAR: Patrick Blackart, followed by Lauren Meyers.

Lauren Meyers, followed by William Geoghegan.

MS. MEYERS: Members of the Board, thank you for your endurance and for taking on this enormous responsibility.

My name is Lauren Meyers. And I spent many of my early years in Austin elementary and middle schools. And my husband and I are looking forward to raising children in the Austin Independent School District. Therefore, I have a deep, personal interest in the outcome of these

hearings. I'm also a professor of biology at the University of Texas.

Having received my undergraduate degree in mathematics from Harvard University and my Ph.D. in evolutionary biology from Stanford University, I now conduct research on the evolution and spread of infectious bacteria and viruses. Our ability to fight infectious diseases like SARS and West Nile Virus, smallpox truly hinges on our understanding of the evolution of both viruses and humans.

Scientists in my field, like many fields, make progress by questioning each other and the ideas and theories that have been published in scientific literature. So I wholeheartedly agree that students should not only be taught the facts and the accepted scientific theories, but also how to think critically about science. I've looked at many of the textbooks before the Committee. And I believe that they all do an excellent job of encouraging critical thinking in describing weaknesses and controversies surrounding certain theories.

Here are just a few of many, many examples I found in the textbooks. In the Holt

textbooks, students read about evidence supporting both sides of the ongoing scientific dialogue as to whether evolution occurred gradually or through a punctuated trajectory. The National Geographic textbook asks the students to, "Summarize, analyze and critique the direct and indirect evidence used to support the Theory of Evolution." The BSCS human textbook asks, "How does the history of biological classification illustrate that science is characterized by its openness to change and modification?"

This is the right way to do it. Teach students about science and the scientific process through examples from science. Show them that science is an enterprise that continually improves our understanding of the world and thereby helps us improve technology, health and lives.

These textbooks, as they are now, will provide a solid foundation for the scientists of tomorrow. Scientists who must think critically and understand modern evolutionary theory in order to help us confront emerging infectious diseases and the threat of bioterrorism.

In contrast, allowing nonscientists, who undoubtedly have a creationist agenda, to modify

textbooks is both outrageous and dangerous. Wasting time on their so-called weaknesses not only takes away time that could be much better spent on meaningful scientific education, but also presents an entirely misleading picture of how science works and what we truly understand about the world.

I urge you to accept the textbooks as they are now. Please do not let political and religious agendas hurt our children and our future.

Thank you.

CHAIR MILLER: Thank you.

MS. LOWE: I will try to make it brief. I have a quick question, about antibiotic resistance bacteria. That would be something in your specialty area of infectious diseases?

MS. MEYERS: Uh-huh.

MS. LOWE: When a bacteria or a virus develops that antibiotic ability, does it -- do you take into a new species, a new variety or is it simply an adaptation of that same bacteria or do you give it a new species name?

MS. MEYERS: Typically, it's not considered a new species, although often the mechanism of adaptation is actually -- is actually brought into the bacteria through exchange from --

exchange of genetic material from a completely different species.

MS. LOWE: But it's not a new species. It remains the same bacterium that it was before, it's just --

MS. MEYERS: Typically, we don't consider it a new species, that's correct.

MS. LOWE: Thank you.

CHAIR MILLER: Next.

MS. SALAZAR: William Geoghegan, followed by Art Woods.

MR. GEOGHEGAN: I thank you for letting me speak here. I'm here to support the selection of the best science textbooks for Texas schools that present evolution as it is currently understood by scientists who perform the research and who submit their work to peer-reviewed science journals. No science textbook author, publisher or teacher should be subjected to pressure from religious or political groups as to what to teach their students.

I spent approximately 20 years in the field of medical research, 11 of those at the Texas Medical Center in Houston. My wife and I raised and educated our children in Texas. Our children

graduated from UT in Austin. I've been teaching biology, microbiology and biotechnology at Montgomery College in Conroe, Texas, for the past nine years. Montgomery College is a Community college, so I'm familiar with students who come from our many high schools.

High school biology includes a solid list of biological skills and knowledge to be taught to our students. Many of the students that I teach lack much of that knowledge and many of those skills. The student is, for example, expected to compare the processes of mitosis and miosis and their significance to sexual and asexual reproduction.

I teach these topics in my college biology class. Yesterday, I asked the students, "How many have learned about mitosis and miosis in high school?" Four out of 18 students raised their hands. It seems we are not teaching the majority of our students basic biology in the high schools.

I understand that a group from Seattle, Washington, associated with the Discovery Institute are concerned about the quality of biology textbooks in Texas. The Discovery Institute analyzed 11 biology textbooks and gave all of them a

grade of C-minus or worse. Based on that analysis by the Discovery Institute, one might think you should reject all of these textbooks.

I was bothered by their analysis because I didn't come across the word "mioses" or really any other topic outside of evolution in my reading of their document. Their analysis was only concerned with the treatment the evolution. Why was that? The Discovery Institute web-site proposes what they call the Theory of Intelligent Design.

Intelligent design has no basis in science and does not belong in a science textbook. It is a religious concept that, if taught to children, should be taught in Sunday school and at church, not in public biology classrooms in our high schools. Our children cannot learn and practice critical thinking skills if we allow creationism or intelligent design to be presented as science, when, in fact, it is not.

America has a great tradition, separation of church and state. As a result, we all enjoy one of the greatest freedoms mankind has ever experienced, freedom of conscience. I believe religious fundamentalists feel threatened by the teaching of evolution. They want textbook writers,

publishers and biology teachers to teach that evolution is a scientifically weak idea, when quite the contrary is true.

Evolution is an overarching concept of biology. It knits all the pieces together and explains the relationship of one part of biology to another.

CHAIR MILLER: Thank you.

Questions?

Okay. Next.

MS. SALAZAR: Art Woods, followed by Patrick Doyle.

DR. WOODS: I appreciate the job you're doing and the fact that you're taking the time to listen to all of us.

I'm Art Woods and I lecture in biology at the University of Texas. And I do research on insect physiology and evolution. I earned a bachelors of science degree in biology from Stanford University and a Ph.D. in zoology from the University of Washington. My wife and I have lived in Austin for several years and we intend to send our kids to public school in Austin. We believe that a strong science education, including modern evolutionary biology, is one of the most important

parts of K through 12 education.

I'm testifying today because I strongly object to the organized attempt by creationists and intelligent design groups to undermine your confidence in the way evolution is covered in these textbooks. I have read parts of the evolution sections in most of them. And I've found that the discussions and analyses of evolution to be surprisingly well done. I particularly like the extensive coverage in Biggs, et al, Biology, The Dynamics and Life and in Campbell and Reece's Biology.

Some of the earlier speakers, both in their testimony today and in books written in the last 10 or 15 years, have declared that Darwinian evolution is dead or have advocated fringe alternatives to the Theory of Evolution, such as intelligent design. However, these self-proclaimed experts build their alternative theories by misreading and misquoting evolutionary studies published in the mainstream scientific journals. And their arguments are wholly rejected by the scientific community.

Now, I want to amplify some of the earlier comments that people have made by giving you

an example of this sort of thing. George Gilchrist, a biologist a few years ago, performed an electronic search. He electronically searched five computerized databases containing scientific papers published between about 1990 and 1997. And these databases covered 5,000 or more mainstream journals, representing hundreds of thousands of scientific papers. Altogether, he found tens of thousands of papers on evolution. And yet, he could not find a single one on biological research using intelligent design theory.

Therefore, contrary to the claims of their proponents, creation science and intelligent design theory are not viable alternatives to the Theory of Evolution. In fact, these ideas have not formed the basis of any meaningful or publishable research in biology. To me, the conclusion is clear. The right decision is to stand up for the Theory of Evolution, which the world's scientific community agrees is powerful and explanatory. Please don't return our children's education to the Dark Ages by embracing the etiological agendas of a few fringe groups.

The textbooks you are considering contain well-written, accurate representations of

the history and current state of evolutionary biology and I urge you to accept them.

Thanks for your time.

CHAIR MILLER: Thank you. Any -- Dr. McLeroy.

DR. McLEROY: What's your most -- as a zoologist, what's your most compelling evidence that evolution is happening?

DR. WOODS: It's overwhelming. There's --

MR. McLEROY: The most overwhelming.

DR. WOODS: The most overwhelming is the fossil record, I would say. If you look very far back in time on the Earth, say about -- rocks that are three billion years, you find very simple forms of life. By about two billion years ago, you get more complicated cells called eucaryotic cells. Then later on you find the evolution of much more complicated structures, multicellular plants and animals and fungi and all the things we're familiar with today. And all of those things appear in the correct order in the fossil record. And to me, that is compelling evidence that evolution is true.

DR. McLEROY: But you really don't know their common ancestry. You're just assuming --

you're just looking at it and -- that's the best -- that's what I figured out, too, when I read all the evolution books and Dawkin's books and all that, that the fossil record is the No. 1 evidence.

DR. WOODS: Well, so it depends on where you're coming from. So Linnaeus, when he invented the hierarchical organization of life -- he himself was a creationist and thought he was discovering the hand of God in all these organisms. In fact, evolutionary theory encompasses that hierarchical organization of organisms and explains it beautifully well.

CHAIR MILLER: Thank you very much.

DR. McLEROY: Real quick. You don't have any problem with the origin of feathers?

DR. WOODS: I mostly --

DR. McLEROY: I asked about feathers, too, you know, in July. I'm just curious.

MR. WELLS: So what, in particular, do you have in mind?

DR. McLEROY: How did feathers, you know, develop? I mean --

MR. WELLS: Well, I'm an insect evolutionary physiologist, and so I haven't studied the evolution of birds per se.

MR. McLEROY: Okay. I'm not an expert on insects.

MR. WELLS: But I'm convinced that they evolved along the way.

MS. SALAZAR: Patrick Doyle. Followed by Matt Winkler.

CHAIR MILLER: Wait a minute our court reporter.

THE REPORTER: May we take a break?

CHAIR MILLER: Yeah. We're going to take -- she needs to change the paper in her -- yeah, we all need a little break. About five minutes, six minutes.

(Brief recess.)

CHAIR MILLER: Robert and I have committed to be here and to hear you. Now, for those who signed up late, I hope there was no misunderstanding that we will not be able to hear you, unless you switch with someone else that has already, you know, signed up earlier. I'm -- we made that very clear from the beginning, because we knew there were so many people that had signed up. So I want to apologize. I hope there was no misunderstanding with that one. But we are -- for the out of state, we are staying to listen to the

seven that -- if they're still here. And hopefully, they will be.

All right. Now, let's begin.

MR. RIOS: Matt Winkler, followed by Stephen Miller.

DR. WINKLER: Good afternoon -- or I guess I should say, good evening, Chairman Miller and Board members.

My name is Matt Winkler and I'm the founder and CEO of Ambion a biotechnology company here in Austin. I'm a scientist by training I received my Ph.D. from the University of California at Berkeley. I'm also a former University of Texas zoology professor.

About 14 years ago, I started Ambion Inc. to invent and sell kits and products that helped scientists perform biomedical research. Our customers are cancer researchers, urologists, biochemists and other kinds of biologists. We've been very successful. Are products are used by molecular biologists in universities, medical schools, pharmaceutical and biotechnology companies around the world. We grow at over 30 percent a year and in 2003, we'll do almost $40 million in revenue. We currently have about 250 employees here

in Austin and another 20 at our European subsidiary in England.

The success of my company depends on our ability to recruit the very best scientists. This includes scientists who we recruit outside of the Texas and ones that are trained here in Texas. Having high quality biology in science textbooks that are not diluted with creationist's views is important to my ability to recruit first-rate scientists.

The first step in recruiting good scientists is getting them to answer want ads. The State of Kansas shot themselves in the foot by acquiring an international reputation in the scientific community as having an education system that taught watered down science. I would hate to have to compete to recruit the best scientists with other states if Texas had a reputation for teaching creation science.

A second issue is that job candidates are frequently concerned about the quality of the school system that their kids would be attending. When they show up for interviews, they frequently have researched the quality of school systems here in the Austin area. Again, I would not want to have

to have them worrying that their children are going to be getting a first-rate scientific education.

A second issue is the ability of the State of Texas to educate first-rate homegrown scientific challenge. Again, I would like to see the focus of biology textbooks used in Texas to be on science and not religion. My company depends on being able to hire the very best scientists. This doesn't mean that my employees are not religious or that they do not believe in creation. What it does mean is that they have had a rigorous scientific education.

One final issue is that I have three school age children. I would like to see science textbooks used in Texas get the best quality science education that's available.

Thank you very much.

CHAIR MILLER: Thank you, sir. Okay. Next.

DR. McLEROY: Can I ask just a real quick question? Very quick.

CHAIR MILLER: Dr. McLeroy.

DR. McLEROY: I just want to ask: Given the testimony of all these UT profs -- professors that have been teaching here and

talking. Should we worry about what the --

CHAIR MILLER: Go ahead ask your question, okay. But it's the same question.

DR. McLEROY: No, no, no. I just -- should we -- with these professors that have just spoken, should we be really concerned about people hiring Texas graduates?

MR. WINKLER: Absolutely. If the State of Texas gets a reputation, as I pointed out Kansas did, that will have a real serious effect. The repercussions of the Kansas decision went through the whole business community in Kansas. And that's why, I think, things were turned around in Kansas. So I think I catch the drift of your question. If I don't, me, as a businessman, want to see the absolutely first-rate education here in Texas.

DR. McLEROY: Thank you.

CHAIR MILLER: So do we, sir. Thank you very much.

Okay. Next.

MR. RIOS: Stephen Miller, followed by Sharon Rankin.

MR. MILLER: Members of the Board, good evening. I had hoped to be able to say good

afternoon, but here we are with good evening.

My name is Stephen Miller. I'm a technical writer here in town. I have no credentials in biology, just a lifelong interest in the area of paleontology and various sciences. I'd like to ask a rhetorical question. And the question is: Why are the proponents of Intelligent Design Theory here? Why are they in the room tonight?

And let's look back just first with a little lesson from history. Today, Alfred Vegner is in the person given the most credit for the idea of continental drift. Continental drift was a controversial idea. There was some evidence for it, but the mechanisms were unknown so they didn't quite know what to think of the idea. But Vegner and others persevered, though, and the idea prevailed. It prevailed because the idea accumulated enough supporting evidence to be accepted and now it's in textbooks.

Vegner and others did the work that actually convinced other scientists that this was a real phenomena. He actually went out and did science. Indeed, he froze to death in 1930 in Greenland on -- during an expedition. What Vegner did not do -- what Alfred Vegner did not do is come

and argue his case before boards of education.

Textbooks reflect the current state of science. If you have a fantastic science -- scientific discovery, you prove your discovery and then later it shows up in textbooks. But the ID people are trying to influence textbooks directly. They want to skip that part where you actually provide your proof. And they're forced to skip that part because they literally have no science to back up their claims. In the arena of scientific research, they don't have anything to offer, literally nothing. They don't do any science.

Someone previously spoke about a literature search done by George Gilchrist. And that's one of my handouts that I have that summarizes his work. The results are quite clear. Over hundreds of thousands of scientific journals, the phrase "intelligent design," as it relates to biology, just wasn't there. The meaning is clear. The ID folks don't publish. And since the proponents of intelligent design have lost in the arena of science, they show up at Board of Education meetings to pitch their story. The very fact that they're here is an admission that their so-called science is bogus.

Consider an analogy to meteorology. We don't know quite everything about how hurricanes are formed. We know quite a lot, but we don't know everything about them, every causal factor. So does it make sense to postulate an intelligent hurricane designer so that when asked to explain things that we don't know about hurricanes --

CHAIR MILLER: Mr. Miller, that was the three minutes.

MR. MILLER: Okay. Then I'll shut up.

CHAIR MILLER: Any questions?

Okay. Thank you. Next.

MR. RIOS: Sharon Rankin, followed by Dr. Donald Baker.

Dr. Donald Baker, followed by Dr. Don R. Patton.

DR. BAKER: My name is Don Baker. I'm a computer science Ph.D. from Rice University. I've taught for two years as an adjunct professor at the University of Texas.

I'm here today to request that the Texas high school biology textbooks include material on universal Darwinism as a means of improving them with respect to six of the TEKS objectives. All

seven biology textbooks that I reviewed lacked any mention of ideas from evolutionary biology making their way into other fields. This idea of universal Darwinism is being applied to linguistics, cultural anthropology, immunology, cosmology, and a host of other areas.

Interestingly, the process of science itself is evolutionary in nature. Universal Darwinism has been very successfully applied to the area called evolutionary computing. This fascinating branch of computer science is rich and mature enough as a science to deserve mention in biology textbooks for two reasons. First, evolutionary computing allows the creation of a virtual environment where the essential aspects of the Theory of Evolution, which are variation, hereditary of replication and deferential fitness can play out in a relatively short time scale. Such modeling gives us insights into the evolution of biological life and helps us understand those aspects of biological evolution that are essential for it to work.

The second interesting and relevant aspect of evolutionary computing is how it is being used as an unconscious design tool. In any area

where a design space can be modeled and a fitness measure created, evolutionary computing can be used to create a zoo of competing designs with ever increasing fitness. This approach has been used to design electronic circuits, neuronetworks, computer programs, bridges, natural language processors and a wide variety of other things. A February 2003 Scientific American article describes how evolutionary computing has been used to recreate or improve upon 15 patented designs. I've included this article in your packet.

This same technique can be used to create new designs in areas where we lack good design methods. Inclusion of universal Darwinism or evolutionary computing in the textbooks under consideration, perhaps in the from of an one to two-page inset, would improve these books greatly. Such a change would exemplify how the Theory of Evolution can be applied in nonbiological domains in science itself and would demonstrate how biology interrelates with different areas of science. It would describe how computers can be used as a tool to understand the evolutionary process that are not readily grasped due to the large time scales involved and would inspire students to see how

evolution can be used to solve challenging practical problems.

Thank you.

CHAIR MILLER: Are there any questions? Thank you very much.

MR. RIOS: Dr. Don R. Patton, followed by Janis Lariviere.

MR. PATTON: Madam Chairman and members of the Board, I'm Dr. Don Patton. I'm a fifth generation Texan who has dug up dinosaurs all over the world. Two years ago, I excavated the longest consecutive dinosaur trail on the American continent in Texas. And I'm deeply concerned about the biology textbooks.

I understand that the laws of this State require teaching the strengths and weaknesses of evolution and the weaknesses of which I'm aware are systematically excluded.

Geology impacts biology, especially at the issue of the origin of life. The rocks themselves demonstrate obvious weaknesses in the theories that are taught in the textbooks. These theories, as has been pointed out, the Origin of Life require a reducing atmosphere, no oxygen. It's acknowledged that life could not form in the

presence of oxygen.

Notice the presentation that we find from Prentice Hall biology text by Miller and Lavine. They say that oxygen would destroy these leading organisms. And, therefore, they confidently affirm that there was little or no oxygen in the Precambrian atmosphere, where life was supposed to have formed.

But the earliest rocks are full of oxygen. This rock is considered one of the earliest Precambrian rocks. And one of the primary constituents of this rock is oxygen in the form of Hematite FE203 and Magnetite FE204. This is objective, hard evidence of an oxygen-rich environment in the Precambrian. This is not a Sunday school lesson. This is patrology. And geologists understand this.

Notice in the peer-reviewed journal Geology, under the heading "Oxygen in the Precambrian Atmosphere, an Evaluation of the Geological Evidence," the authors list rocks from all over the world from the red beds to the oceanic crust in the Precambrian area where you find all kinds of oxygen, and conclude the earliest dated rocks had an oxygenic atmosphere. Well, why is it

then that the biologists believe in a reducing atmosphere?

We'll allow that to be explained by Walker in his book Evolution of the Atmosphere. He says the strongest evidence is provided by the conditions for the origin of life, a reducing atmosphere is required.

And so we see an obvious circular argument here. This Origin of Life theory, which is presented as evidence for evolution, rests squarely on the assumption of evolution. And this is just one of the many weaknesses of the theories of the origin of life. Others are mentioned, actually, in one of the textbooks, but only one of them.

I see our children being deprived of significant information necessary to make informed decisions. I understand this to be contrary to the requirements of the State of Texas and I find it intolerable.

CHAIR MILLER: Thank you, Dr. Patton.

Next.

MR. RIOS: Janis Lariviere, followed by Roger E. Mills.

MS. LARIVIERE: I'd like to trade

places with a classroom teacher that needs to go now, No. 132, Del Passovoy.

MS. PASSOVOY: Good evening, ladies and gentlemen. I come as a classroom teacher. I have a MS in education, not in science. This is my 34th year teaching. I teach at Stony Point High School in Round Rock, Texas.

As I see it, my job as an educator is to present the consensus view of the scientific community to my biology classes. Therefore, it is crucial that the textbook I use to present must represent this perspective. The books in question have been reviewed by teachers and scientists and found to report state-of-the-art science. Why then would you allow nonscientists to pressure you to second guess this review process?

As regards evolution, scientists worldwide embrace this theory and believe that natural selection is a major mechanism guiding it. In fact, the UT graduate biology student that I was privileged to work with and worked with my biology students last year, states that our scientific fact base on this subject moves it beyond the theory stage.

He's not alone in this belief. With

current DNA technology, we have irrefutable evidence supporting evolution with natural selection as a shaping mechanism. Not the only shaping mechanism, but a shaping mechanism for all naturally evolving species.

The Discovery Institute's beliefs are not science driven, not science driven. In fact, their criticisms against the review textbooks have been rejected by the scientific community. While the State dictates curriculum, high school teachers such as myself must look to the university level for guidance to be sure students are adequately prepared for the rigors of college. In biology, this means we must present the scientific evidence on evolution as understood by evolutionary biologists. We cannot dilute our high school curriculum by presenting nonscientific or pseudo-scientific explanations that are not accepted by the experts. That is, the scientists.

Science textbooks are not perfect, but they are accurate in that they reflect the consensus view of the scientific community. Our TEKS specify that students be able to review and critique scientific explanations, hypotheses and theories, supported by facts not pseudo-science.

Allowing nonscientists to control our science curriculum is like allowing our students to use invalidated Internet information from unquestionable sites. Anybody can put anything on the Internet and present it as fact when it is actually opinion.

Please, I can only teach science. Thank you, ladies and gentlemen.

CHAIR MILLER: Thank you so much.

MS. LOWE: May I real quickly ask what you use in your classroom to teach the strengths and weaknesses? I mean, pick a theory. Pick a major theory --

MS. PASSOVOY: Okay. The -- I have used the Glencoe textbook in Round Rock. And the very first thing that I tell my students about science on the very first day of school is that it is self-correcting and ever changing. The very nature of science makes it dynamic. As more facts become available, we change our thinking. But the point is, that what we teach must be peer-reviewed first by scientists for us to teach it to our children.

MS. LOWE: So what scientific theory or hypothesis do you use in your classroom to

teach --

MS. PASSOVOY: Oh, genetic drift. Okay.

MS. LOWE: Genetic drift.

MS. PASSOVOY: Absolutely, genetic drift. But of course, genetic drift could still be said to be, in part, part of natural selection. But, yes, I do use genetic drift.

Anything else?

Thank you for the opportunity to speak.

CHAIR MILLER: Surely.

MR. RIOS: Roger E. Mills, followed by Marty Shanklin.

MR. MILLS: Good evening. My name is Roger Mills. I have a doctoral degree from Ohio State University. And I spent nearly 30 years teaching physics at the University of Louisville. I now live in Houston.

Darwin's Theory of Evolution based on natural selection was as revolutionary and as challenging in the 19th century as Benjamin Franklin's discoveries about electricity and lightening had been a century early. Just as Franklin was accused of impiety because of the

lightening rods, so was Darwin accused of impiety because of his ideas on the Origin of Species. Just as Franklin's ideas have been improved and become securely based in extensive scientific evidence, so also have Darwin's.

But attacks are still made upon the ideas of evolution as it was proposed a century ago, as though there had not been a great accumulation of fossil evidence to support it. And more recent studies made in molecular biology would show that the molecular basis for the reproduction of species is entirely compatible with the basic ideas which are now put forth under the heading of evolution.

These studies of molecular biology have been carefully tested in laboratories. The nay sayers would have you believe otherwise, but the fact remains the careful, scrupulous scientific studies have both extended and strengthened the set of ideas that fall under the heading of evolution. Some questions remain which may be considered weaknesses. And other people have testified that these are, indeed, covered in the textbooks.

Excuse me. If young people who use the textbooks which are being considered for adoption are to become capable of making

well-informed judgments in the more mature years, they will need to understand the difference between carefully developed scientific studies and dogmatic declarations dressed up in pseudo-scientific guise.

Intelligent design, a disguised form of creationism, is in no way a competitor with evolution as a scientific explanation of the development of a different species. Intelligent design is not a genuine science, but only a dogma dressed up to look like a science. The people who are trying to confuse the issue by presenting intelligent design as scientific are guilty of substantial intellectual dishonesty and should not be allowed to influence the selection of textbooks for public education by interjection of nonscientific weaknesses. The textbooks that have now been offered for adoption discuss carefully the very important difference in the common speech usage of the word theory or loose conjecture and the scientific usage of that same word, a carefully tested set of hypotheses. The texts emphasized a need for any scientific hypothesis to be testable.

CHAIR MILLER: Thank you. That was our three minutes. So appreciate your comments.

Any questions?

Next.

MR. RIOS: Marty Shanklin, followed by Michael White.

MR. SHANKLIN: My name is Marty Shanklin. I'm a professor of biology at UT, have been here for seven years. Prior to that, I spent 11 years on the faculty of Harvard Medical School. My area of research is developmental biology, but I also have extensive experience in teaching not just developmental biology, but also in college level introductory biology, which in fact, uses the textbooks that you're considering for AP biology in high school. I've also looked at some of the other high school textbooks.

I'm going to focus my comments tonight -- excuse me -- on one main point of scientific accuracy that relates to these textbooks and to the issues being discussed.

As I pointed out already, I am a developmental biologist, which means that my expertise is understanding the process by which something is simple, seemingly simple as a fertilized egg, which is what every one of us in this room started out as. How that simple thing can grow and organize itself into a complex being.

Could be a plant, could be an animal, could be a human. The developmental biology provides us with one of the many kinds of evidence that life on Earth is evolved.

This evidence is the finding that embryos of different species often show much greater similarity than the adult animals they give rise to. For example, adult humans do not have gills. But if you look at the early embryos of humans, or for that matter of mice or chicken, we find rudimentary gills similar to those found in fish embryos.

Now, this observation is readily explained by evolutionary biology. Modern species arose by the modification of ancient species and the early stages of embryotic development of the modern species still carry traits of their ancient ancestors, even though some of those traits have been lost or obscured at later stages, after birth.

Now, the textbooks all state this line of reasoning I've just given to you. But the opponents of the evolution propose the textbooks that do make those statements are unfit for our schools. Why? Well, the opponents do not even try to address the body of scientific evidence

supporting this line of reasoning. What they do is, they try to discredit individual 19th century figures, most commonly Ernst Haeckel, whose work helped to lead to these ideas.

But in fact, there is overwhelming genetic evidence that the structures in question are rudimentary gills and evidence supporting the existence of ancestral traits in embryos in general. Most of this evidence has come out in the last century, much of it in just the last three decades. It is evidence that involves studies of DNA and gene expression, which are ideas that people like Haeckel couldn't even have imagined in the middle of the 19th Century.

Even though those modern results copiously validate the conclusions of those 19th century biologists -- and gills are just one of hundreds of examples I could tell you about. And much of this confirmatory work has been performed medical in laboratories where no one has any interest, believe me, I've spent my time in a medical school, in trying to prove or disprove Haeckel's ideas.

So why bring all this up? The reason is that there is obviously pressure to eliminate or

down play this very story that I have just told you in our high school biology textbooks with the only explicit rationale for that elimination being that there are imperfections in Haeckel's work. But there is a huge mass of subsequent data which supports the conclusions of Haeckel's work regardless of any 19th century imperfections.

CHAIR MILLER: That was the three minutes.

MR. SHANKLIN: I understand. Thank you.

CHAIR MILLER: Appreciate your comments.

MR. RIOS: Michael White, followed by Edward Theriot.

Edward Theriot, followed by Dean Mohlman.

MR. THERIOT: Actually, it's Theriot, but I kind of like "the riot." I'm told that similar a word means huge wild animal in Greek, so --

I am Edward Theriot. I'm director of the Texas Memorial Museum and I'm the Jane and Roland Blumberg professor of molecular evolution in the section of integrated biology, another

University of Texas person. Although I did work at Texas A&M for a year. I've been on the editorial Board of three professional journals in my field. And I'm past president of the National Science Collections Alliance. And I've been on numerous National Science Foundation boards.

I'm here today to argue for these textbooks. I'll admit I've read through the Senario 1. And that is, all I've had the time to do. I apologize. But I've skimmed briefly the others and they seem to be similar.

The textbooks -- why is evolution so important? I think if there's sort of an assent maybe on one thing missing. I heard somebody earlier, the gentleman talking about computer evolution models. It would be great to see more applications of evolution and phylogeny, because there's a growing number. And evolution is indeed the unifying concept for all of biology.

One of the issues is the Tree of Life. The product of evolution is the Tree of Life and the principle that all life is through -- related through that tree. What I -- the point -- brief point I want to make here today in my three minutes is that these trees are not just a result of

assumptions about evolution, but they make various predictions about evolution and other parts of Earth history that lead to other tests.

We no longer rely on the fossil record to read the Tree of Life.

The example I'll give you is from my own work in comparative morphological and molecular biology where we start off inferring phylogenetic trees from the comparative method. Yes, assuming descent with modification. It makes certain predictions.

The one I'm going to talk to you about today, I'm picking it because it also shows probably one of the best examples of microevolution that exists today.

I work on ocean, lake and pond scum, specifically diatoms. Some of you may know what diatoms are, a lot of people in the petroleum industry will have heard of diatoms. They're little single-cell plants. They leave very dense fossil records in a lot of lakes and many oceans.

Is that the two minute?

And to make a long story short, in Yellowstone Lake, I discovered a diatom that just lives in Yellowstone Lake. I did one of these

comparative analyses I was talking about without reference to the fossil record and determined that that was most closely related to a group of other things in this genus. But particularly one called Stephanodiscus niagarae, you don't have to remember the name. There won't be a test. But what's important about this is that this method also allows you to infer something about ancestry. And it's said that the ancestor of the thing in Yellowstone Lake should look just like niagarae.

Well guess what? After that, we cored the lake, went all through the core. There's an 11,000-year record at the bottom of the lake. All through the lake was these diatoms. At the bottom, it looked like niagarae within 1,000 years -- and I have samples at 40-year intervals -- this thing just slowly becomes Yellowstone ensis. And then it stays that way for 10,000 years.

The questions about peer-review journals -- well, I'll just leave it at that, then, and anticipate that question.

CHAIR MILLER: Thank you.

Okay. Ms. Knight.

MS. KNIGHT: I wanted to hear the question -- the answer to the question about

peer-review journals.

MR. THERIOT: And I want to apologize to the Board. I hope I'll be allowed to present documentation of this post-fact. But part of this -- the first part, the phylogenetic trees published in Systematic Biology, one of the leading journals in the field, in 1992. The other part is in review with the Journal of Paleo Biology right now. The core record.

DR. McLEROY: Is this reviewed in Finding Darwin's God? Does he talk about it? Kenneth Miller?

MR. THERIOT: I'm sorry?

DR. McLEROY: Does Dr. Kenneth Miller discuss this in his book, Finding Darwin's God? Does he use that as an example? I think I've -- I've read this somewhere.

MR. THERIOT: I don't -- I know it has been cited in a few other journals. We checked these sorts of things because that's what part of our review is based on if we're cited by other scientists. But I don't have a record of which ones it's in.

CHAIR MILLER: Thank you so much.

MR. THERIOT: As I say the core

record, that's under review right now.

CHAIR MILLER: Appreciate it.

MR. RIOS: Dean Mohlman, followed by Claud Bramblett.

MR. MOHLMAN: Hello. I'm a high school biology teacher, so I've got to go home and prepare for the lesson, so I'll try to keep this sort of short. I'm an advocate of better science instruction and better teaching of evolution.

This does not involve the teaching of creation by intelligent design of any kind. This question of teaching intelligent design is actually at the core of understanding what science instruction is all about. Science, as we've heard before, deals with observable evidence, that which is testable and repeatable.

The question of whether there is a God or not is simply not within the scope of my science instruction, anymore than it is within the scope of mathematics instruction or computer instruction. If students want a class about intelligent design, simply offer electives in humanities. But please don't water down, dilute and distract from the accurate presentation for the facts supporting evolution.

There is no science to support intelligent design. Science cannot comment on the supernatural ideas -- God, angels, ghosts, miracles, Aggies. You can laugh about that. That was for my previous speaker, Mr. Theriot. I don't know him.

As a matter of fact, I say that some aspects -- actually some aspects of this special creation don't show evidence of an intelligent design. For example, why do we have a blind spot in your vision? A squid doesn't have a blind spot. This doesn't seem very intelligent, like we've got a defective version of the eye. Ours is simply not the best design. It simply is just a different pathway of evolution, just like there are some marsupial mammals and some mammals that are placental.

And what about vestigial structures? I haven't heard anything about that yet tonight. These are physical characteristics or structures that simply don't have a function. A couple of examples: Blind salamander that lives in a cave. It doesn't have any eyes. It only has remnants of eyes. The pelvic bone and internal hind limb bone present in snakes. They don't need these structures for support. The fact that these structures are

present actually seems like the design wasn't so intelligent or they are just holdovers from when an animal needed it in its ancestral past.

And I wanted to say something about theory, because I hear people saying this phrase that evolution is -- or evolution is just a theory and it really bothers me. By saying "just a" in there, it's an attempt simply to lessen the foundation which this theory has built, as if a theory that I've got the Longhorns winning the national championship is the same as a scientific theory. This is particularly probably weak, since I'm an Aggie. However, I don't hear people commenting about or questioning Einstein's Theory of Relativity as just a theory or the cell theory, which I teach, as just a theory.

All these scientific theories are based upon a huge amount of evidence. Evolutionary theory has evidence from cell comparisons, DNA comparisons, vestigial structures, radioactive decay rates, fossils, embryology, sedimentary rock layers. All this evidence takes a long time for me to explain in my biology classes to my ninth graders.

Please don't handicap the science

curriculum by introducing intelligent design in the curriculum. It would be a distraction from what is scientific. I'm not advocating a disbelief in God of any kind, I'm just saying this kind of discussion should be in a humanities department and not in my biology classroom.

CHAIR MILLER: Thank you, sir.

MS. LOWE: You mentioned cell theory. And I'd like to say that I believe it's two of the major textbooks do very explicitly teach strengths and weaknesses of cell theory. I would like to see that type of presentation cover other major theories in the textbooks. So that was a good example of how one has very overtly and directly teach strengths and weaknesses.

MR. MOHLMAN: Right. And there's a couple of actually -- actually, while other people were speaking, I did find -- there was a lot of concern, as I've been here for four or five hours, about this 3A, this discussion of theory. And I found quickly that haven't been mentioned about spontaneous generation, Page 381, Francisco Redi, this idea about decaying meat producing flies. There was a great presentation in Glencoe. There's another one in Holt about this bubble model and

primordial suit. And there's one in Kendall Hunt about the green version. And, you know, which has been mentioned before about punctuated equilibrium and gradualism.

So I think these textbooks do offer questions about theory.

Thanks.

CHAIR MILLER: Thank you.

MR. RIOS: Claud Bramblett, followed by David Cannabella.

MR. BRAMBLETT: Thank you for -- thank you for hearing me at this late hour. I'm a professor emeritus, recently retired after 36 years on the anthropology faculty at the University of Texas at Austin. My areas of training and specialty are the nonhuman primates, forensic human skeletal anatomy, African prehistory and human evolution. I'm here because I care about children's education. Other than health and security, there's nothing else that I can imagine more important.

One of -- I won't try to talk about science, because it's late and Dr. Weinberger did such a marvelous job. But it is very important to appreciate that it is self-correcting and that's -- when we find something is wrong and needs to be

corrected, that's cause for celebration. That's not a problem or something that should be criticized.

Now, an example of this, in the 19th century, Ernst Haeckel's Ontogeny Recapitulates Phylogeny was an interesting idea, but it was discredited even by his peers. By the time I started my college education some 50 years ago, the -- Haeckel's model had been updated and changed into ideas that are -- that are more compatible with modern developmental biology.

Now, some of the criticisms of the texts rely on critiquing Haeckel. But the idea that embryonic stages recapitulate adult phases of ancestors hasn't been taught, at least in any curriculum that I've seen in the last half century.

Now, a basic -- I think the basic issue here is science and nonscience.

We've -- we've made a tremendous amount of progress in population genetics and understanding molecular biology since Darwin's time. But natural selection remains still the primary explanation for adaptation and function and the complexity of function that we see in these marvelous organisms and communities.

A conflict that has brought us here

today is really not about faith or fairness. In the last three decades me and my anthropology colleagues -- and we do teach human evolution, I've had colleagues of many different religious backgrounds. And in no case, have I seen any impact on the teaching of science in the curriculum as reflecting the religious backgrounds of the instructors.

You do future generations of Texans a great disservice if you do less.

CHAIR MILLER: Thank you, sir, very much.

MR. RIOS: David Cannabella, followed by Randy Linder.

DR. CANNATELLA: Good evening. Thank you for sticking with us. I have to teach at 8:00 tomorrow morning, but I'm here to the end. I'm a professor of biology here at UT. I teach systematics, which is the branch of evolution that deals with making evolutionary trees. I have also been the editor-in-chief of the journal Systematic Biology, which is one of the main journals of evolutionary biology. And I am currently the president-elect of the Society of Systematic Biologists, which publishes this journal. So in a

sense, I speak to you somewhat as someone who is familiar with the peer-review process.

I have read most of the proposed biology textbooks. And the material on evolution that is in these textbooks is accurate, it's solid. If anything, it should be stronger, but it definitely doesn't need to be qualified or weakened or cheapened. Keep these textbooks strong.

I've also read another book, the Icons of Evolution. And I've heard parts of this book spoken by many people arguing -- talking here tonight. This book is by one of the fellows of the Discovery Institute, Dr. Jonathan Wells, and it claims that much of what we teach about evolution is wrong.

I have to say, as an editor of peer-reviewed journals, I have never read a supposedly scientific book that distorts basic facts as much as this one does. This book is slickly written, but it is full of half truths and errors of fact. This book has no original research and, in fact, it reads pretty much like a badly written term paper. In fact, I'm planning to use parts of this book in my course this semester to teach students how not to write about science.

Additionally, I personally know 12 of the biologists who are cited in this book whose work is directly cited. Everyone of them feels that their quotes are taken out of context and misconstrue the intent of their original scientific papers. If an author submitted to me a scientific paper for peer-review in our Journal of Systematic Biology and took quotes out of context as this book does, it would be sent back with no further consideration.

Lastly, I'd like to finish by saying that, as a baptized Christian, which I am, as someone who was raised in strongly Christian household, who taught Sunday school, who studied for the ministry for many years, and whose father is still a church deacon, that to members of the Board, your vote for keeping solid information in our biology textbooks is not a vote against religion or religious belief in creation. Rather, it is a vote for a quality education for our children.

Thank you.

CHAIR MILLER: Thank you, sir.

DR. McLEROY: I have a question.

DR. CANNATELLA: Yes.

DR. McLEROY: This really is really

our first -- this is a really good opportunity to have experts --

DR. CANNATELLA: Sure.

DR. McLEROY: -- of your credentials in systematics. And one of the things I have studied and I read about classification and the discontinuities that appear in the -- in the trees of life and all that, the discontinuities. And one of the things that I've read and maybe you comment on it is -- I don't know how you say his name, the French -- Cuvier.

DR. CANNATELLA: Cuvier.

DR. McLEROY: Cuvier okay. Yeah. Cuvier stated that it was possible to predict an entire morphology. That's what made it possible to have a small piece of a jawbone and be able to recreate what the jaw looked like was based on the discontinuity. They could count on that. So how does that support evolution, the discontinuities that are found in the fossil records? In the --

DR. CANNATELLA: How do the discontinuities that are found in the foss --

DR. McLEROY: Well, everything's dis -- yeah, you've got --

DR. CANNATELLA: Actually, that's not

true. In the sense of opponents of evolution often emphasize the discontinuities that are seen in the fossil record. And there are, in fact --

DR. McLEROY: And in life today.

DR. CANNATELLA: And in life today. In fact, there are many, many, many thousands of instances in the fossil record. And my colleague Ed Theriot was talking about them with his diatoms. Where the change from one species to another is so obvious that any idiot could see it. It takes no particular scientific expertise to interpret this sort of thing. So in fact, discontinuities are what we expect to see at times, because certain forms go extinct as part of evolution. We neither expect to see a totally discontinuous fossil record nor a totally continuous fossil record. Rather, we see parts of both. And that's, in fact, what we see.

DR. McLEROY: What about the discontinuities of present life?

DR. CANNATELLA: Can you tell me what you mean by "discontinuities"?

DR. McLEROY: Right. I mean, a dog and a cat. One's a dog, one's a cat. That's -- they're totally separate. It's like a triangle versus a rectangle.

DR. CANNATELLA: They're different because they've evolved to be that way.

DR. McLEROY: And basically, that's the way all life is. We don't have those transitional life -- you know, organisms living today. Everything is -- and that allowed those -- Linnaeus, when he classified originally, and come up with the binomial system of nomenclature, he was able to do it because of the discontinuities. And Cuvier was able to count on the fact that the discontinuities for him -- the quote that I have from him is -- I hate reading quotes, because it's so hard to follow. Basically, Cuvier said, because of discontinuities they were able to predict what things look like. And discontinuities are present everywhere. I'm just -- to me --

DR. CANNATELLA: I think I can address that. I'll try my best. Opponents of evolution used to argue that evolution didn't occur at all. Now, more recently, they sort of allow microevolution because they claim that's just change within a species. That's not really evolution.

Of course -- by definition, it is evolution. But then they argue, but we don't really see macroevolution, which are changes among the

really different sorts of things. That's patently false. And in fact, microevolution and macroevolution are simply ends of a continuum of change. At some points it is very easy to see that you have minor changes within a species. And then you can compare things like a cat and a dog that are very different and you can say, well, yes, there are obviously big changes here. But there is a continuum of changes all along the way. These aren't always manifested in the fossil record, but a source of evidence for these changes can be found in molecular evidence using DNA where -- my lab does this, actually. We do research using evolutionary -- making evolutionary trees from DNA where, when you analyze DNA you can see that within a species where we actually sequence the DNA of 10 individual organisms from a species, the DNA is only very slightly different. And then as you get more and more -- you go from within species to among species to among genera to among families, the DNA is progressively different. But if you just looked at the DNA itself, you couldn't tell what was a species and what wasn't.

DR. McLEROY: That's kind of like the molecular clock you're talking about.

DR. CANNATELLA: It's -- no. I didn't say anything about a clock.

DR. McLEROY: Well, that's -- you see, that's in our textbooks. They talk about the molecular clocks.

DR. CANNATELLA: You can ask me a question about that but --

DR. McLEROY: Okay. You said the DNA sequence.

Okay. Well, thank you very much.

DR. CANNATELLA: Okay.

MR. CRAIG: Doctor, what is the position of the National Academy of Sciences and the American Association for the Advancement of Science as it relates to the Darwin theory versus the intelligent design theory?

DR. CANNATELLA: I don't have the direct quotes with me. But and someone who knows the direct quote could probably tell me. But the position is that -- is that intelligent design is not science. I mean, that is -- I'm not quoting them verbatim, but that is the position. And the American Association of Science, AAAS, is the largest American associates -- it involves all scientists, not just biologist. The National

Academy of which Dr. Weinberger was a member is the most prestigious group of scientist who actually act as advisors to the government about science policy and the development of science in the United States.

MR. CRAIG: Thank you.

DR. LEO: Madam Chair, I just wanted to point out that Jonathan Wells is also a member of the AAAS, so they don't represent all viewpoints. Many scientists do that. And the four people that issued that resolution, all four of them had admitted to not reading anything on intelligent design.

DR. CANNATELLA: No, but even though -- anyone can -- you could be a member of AAAS by sending in $110 a year. So it's -- AAAS is not limited to people who are legitimate scientists. Anyone can belong.

CHAIR MILLER: Thank you, sir.

MR. RIOS: Randy Linder, followed by Samantha Smoot.

MR. LINDER: Okay. So thank you for providing this time to make comments about the textbooks. I'm also a professor at the University of Texas in Austin. I am an evolutionary biologists. I study adaptation, primarily in plants

and also work in the field of systematics as well. In addition, I'm also a parent. I have two children so this is very important to me.

Because of the limited amount of time, I'd like to actually leave my comments within the realm of debunking the Discovery Institute's criticism of the peppered moth example of natural selection.

Most of you probably already know the outline of the peppered moth example, especially after tonight. In industrial regions of England, prior to pollution laws, trees became covered with black soot and it was noticed that in these areas dark or malonic forms of the moth predominated, whereas in areas without the soot the lighter peppered form predominated. After pollution laws were enacted, the trees became less sooty and the peppered moth became predominant over the malonic form.

No one doubts that the frequencies of the dark moths increased prior to pollution laws, nor did they doubt that the peppered moths increased in frequency once the pollution was reduced. Precisely this would be expected if natural selection were operating. In other words, if birds

ate larger members of the more conspicuous form, the peppered moth, that is, in the sooty areas and the malonic form in the more pristine areas.

There are, in fact, open questions surrounding the case of the peppered moth. Mostly details about exactly when predation takes place and where. It's just that these questions do not invalidate the example, especially not in the way the Discovery Institute claims.

In the 1950's, Kettlewell tested whether natural selection could account for the distribution of the forms of the moth. His efforts showed clearly that there was differential predation on the forms in the way that he anticipated.

The Discovery Institute claims that this interpretation is wrong because Kettlewell put the moths on tree trunks when they really rest on the underside of branches. In fact, at this point now in time, there is still debate in the scientific community about the most common resting places of moths. So the jury is really out on this point as far as the scientific knowledge.

However, in addition to the experiments where moths were placed on trunks, Kettlewell conducted experiments where he released

moths and then recaptured them a day later to measure rates of predation. These experiments, which allowed the moths to choose where they wanted to rest, also showed the differential predation that was predicted.

The Discovery Institute also complains that the standard photographs of the moths on different backgrounds are deceptive because the moths were placed on the backgrounds for the photographs. This is hardly damning, as the intention of the photographs is simply to illustrate the relative visibility of the forms on the different backgrounds. In some 34 years of moth observations, one of the major researchers in the fields, Majerus, who's been mentioned already tonight, has only found 47 moths resting during the day. Had researchers waited for an entirely natural situation, students would not have a visual demonstration of the moths' visibility on the backgrounds at all.

In general, all the texts available -- and I've read nine of the 11 for adoption -- address the peppered moth example in an appropriate fashion.

I'll stop there. Any questions?

CHAIR MILLER: Questions?

Appreciate your testimony.

MR. RIOS: Samantha Smoot, followed by Rodney Gibbs.

MS. SMOOT: Thank you, Madam Chairwoman, Board members. I appreciate your consideration earlier in allowing me to switch places.

I want to start by telling you that last week I met with a Methodist minister in San Antonio about this issue. And she said to me, "I believe in intelligent design. I believe that behind every facet of the natural world there's divine intention and purpose, but I don't want it taught in science classrooms. I don't believe my faith is science and I don't want it in science classrooms."

Yesterday, a baptist minister, someone you haven't heard from today, said to me, "You know, when you mix religion and science, religion suffers and science suffers."

I think these ministers are where most Americans and most of us are here today. In the middle, deeply committed both to our faith and to the rigorous pursuit of scientific inquiry and

education. When it comes to science textbooks, they'd like them full of science, approved and written by scientists.

You've seen a lot of information, heard of a lot of voices from a group called the Discovery Institute and other proponents of intelligent design. Web-sites, polls, people flown in from out of state, even infomercials now airing on Texas television stations. If this sounds more like a political campaign than a discussion based on the merits of science, that's because this has become about politics, not about science. Why else would the views of an out-of-state think tank count more than the views of dozens and dozens of esteemed Texas scientists and teachers you all have heard from?

I want to deviate from my written statement and also add: Things have not only gotten away from science, I believe they've gotten out of hand. We had a Discovery Institute spokesperson say that science should be more like the Jerry Springer show. We had a Discovery Institute fellow mislead you earlier today about his affiliation. We had a Discovery Institute person you'll hear from later tonight on a radio show in San Antonio a couple

months ago compare me and others to Nazis. And just a couple of hours ago, a minister who testified to you all was followed out into the hall by four people from the Discovery Institute who surrounded him, got in his face and one of them slapped him on the back and called him a bastard. I think things are out of hand here.

Back to my written testimony. Teaching creationism in science classrooms is unconstitutional. Teaching intelligent design, the new creationism is radically unscientific. And despite the protest of intelligent design proponents, profoundly religious in nature. That's why what we're seeing from the very people whose stated goal is to advance creationism and intelligent design is instead an attack on the teaching of evolution, an attack under the guise of so-called strengths and weaknesses.

But each of these books already addresses the strengths and weaknesses of the Theory of Evolution. The weaknesses alleged here today are founded on ideology.

CHAIR MILLER: Ms. Smoot, that's three minutes.

MS. SMOOT: Okay. Oh, sorry. Thank

you.

CHAIR MILLER: Any questions? Thank you.

MR. RIOS: Rodney Gibbs, followed by Ellen Hobbs.

Ellen Hobbs, followed by Susan Moffat.

Susan Moffat.

MS. MOFFAT: Good evening, my name is Susan Moffat. I'm not a scientist, but I am a parent of a sixth grader in the Austin Independent School District.

I'm here tonight to express my concern about the possible inappropriate addition of religion based theories into public school science textbooks. In recent months, I have become increasingly alarmed at the inroads vocal religious extremist are making in this area. It is time for mainstream parents like myself to speak out strongly against this trend.

I've also heard a lot of talk tonight about introducing alleged weaknesses in the Theory of Evolution into school science texts. But it's apparent that this is just another maneuver to open the door for creationism or so-called intelligent

design, both religion based theories emanating from a far right Christian perspective.

I have no problem with such theories if they are taught, for example, as part of a course on comparative religions and are clearly labeled as a set of beliefs held by a particular religious group. But I have a huge problem with such beliefs being put forth as fact or legitimate scientific theory in a science text to be used by all children in our public school system.

Please remember that you, as the State Board, do represent all Texas students, not just fundamentalists Christians, but Muslims, Catholics, Jews, mainstream Protestants of every stripe, agnostics, Atheists, Buddhist, Seventh Day Adventist and more. Please do not allow pressure from one vocal religious faction to dilute and distort the accuracy of our science texts or even worse to give unfair precedence to the beliefs of one religion over another.

The First Amendment wisely provides that our government shall make no law respecting an establishment of religion or prohibiting the free exercise thereof. The fair and workable way to do this, as amply demonstrated over the past 200 years,

has been a clear separation of church and state. Each individual is free to pursue his or her own religious beliefs and practices. Government, be it Congress or local municipalities or our public school system, does not and should not intrude here. By allowing one religious group, in this case conservative Christians, to insert its beliefs into science textbooks used by all our children dangerously threatens this fundamental freedom.

Neither our government nor our public school textbooks should express preference or support for one system of beliefs over another. I respectfully suggest that the State Board honor our constitution and firmly reject any attempt to insinuate religion-based theories into our public school science textbooks.

Thank you very much.

MR. RIOS: Arturo DeLozanne, followed by Ann S. Graham.

DR. DeLOZANNE: Hi, good evening. My name is Arturo DeLozanne. I am also a faculty member at the University of Texas at Austin. I am a cell biologist. I have been an active scientist for 21 years. I have been a teacher of undergraduate, graduate and medical students for now 12 years.

And I am here to try to convince you, first, as a parent of two children in our public schools; second, as a teacher of science majors at our great university; and third, as a scientist with an active research group in biology. I am here to try to persuade you that the biology textbooks being discussed today do a great job in presenting the facts of evolution in a very clear and accurate manner in that they do a wonderful job in presenting scientific strengths and weaknesses, as required by the TEKS requirements, of various aspects of evolutionary mechanisms.

As a parent, I ask you, please, do not dilute the science curriculum in our public schools. Doing so would be detrimental to the complete preparation of our future generation of doctors, scientists, et cetera. Our Texas children will be at a disadvantage in the international, professional market if you allow the science curriculum to be watered down.

As a college teacher, I can sincerely tell you that high school students that do not have a clear understanding of evolution will face severe deficits when they reach college. In my own courses, we use these very concepts to understand,

at a deep level, the organization and function of different structures within ourselves. As an active scientist I can assure you that evolutionary principles are used daily in our research efforts throughout this country. I would be delighted to show each of you how we can see evidence of evolution at every turn one can take. I can also tell you that as a laboratory head, I need well-prepared people to work in my laboratory.

Therefore, you must be fully aware that the decisions you make will have a profound effect on the long-term economic and social growth of Texas. If you listen to the proclamations of the people from the Discovery Institute, you will be mixing science with narrow religious views. You need to ask yourselves: Why is it that all scientific and educational organizations have come out strongly against the DI's statements. Can it be really possible that thousands of scientists and educators across America are so ignorant or devious as the Discovery Institute implies? I prefer to think not.

Thank you.

CHAIR MILLER: Thank you so much.

MR. RIOS: Ann S. Graham, followed by

Stephen Elliott.

MS. GRAHAM: Hello. My name is Ann Graham. I'm a parent of a fifth grader and a seventh grader in the Austin Independent School District. My husband is a professor of molecular biology at the University of Texas. I'm sorry, he couldn't be here. He's meant to speak two people after me. He shares these view, so he would say them in a more scientific way, I believe.

I'm here to urge your support of the current science textbooks and to ignore the rhetoric of the religious right in their attempt to insert ideologically-based ideas into the science curriculum. Because of its size, population and budget dedicated to the purchase of textbooks, Texas sets a standard across the country regarding textbook adoption standards. You likewise, have an opportunity to set a standard for review that will draw the respect of other statewide education agencies.

Your charge, set by the Texas State Legislature, is to reject textbooks only on the nonconformance to curriculum standards, factual errors or manufacturing defects. I would also hope that your charge is to accept the authority of a

panel of science educators appointed by the Texas Education Agency to review these books and who found that they did indeed conform to the requirements set forth by the curriculum.

While surely there is room for improvement in textbooks across the disciplines, the current science textbooks being considered have been reviewed extensively by the scientific community and by teachers statewide and have been found to be acceptable. And the views being proposed by outside organizations such as the Discovery Institute attempting to change text and insert their own ideology such as intelligent design have been flatly rejected by that same scientific and educational community.

I urge you to resist the addition of religion-based theories into our children's science textbooks.

Thank you.

CHAIR MILLER: Thank you.

MR. RIOS: Stephen Elliott, followed by Dr. Arlen W. Johnson.

MR. ELLIOTT: Hello. I'm Stephen Elliott. I've been a citizen of Austin for over six years. In that time, I've become concerned

about science education in Texas.

Specifically, I'd like to talk -- I would like to discuss what happened in Kansas a few years ago and how it relates to what we are discussing today and what we can learn from it. In July of 1998, a committee that was appointed by the Kansas Board of Education began researching the national science of standards. Ultimately, the committee presented a 100-page report to the Board of Education in the summer of 1999.

Meanwhile, Steve Abrams, a Creationist school board member, rewrote an earlier draft without any reference to evolution. In August of 1999, the school board voted in favor of what Steve Abrams wrote with a six to four vote.

In Responsa Christum, Sheryl Vaught, chairman of the board, and Linda Holloway, vice-chairman of the board, criticized the original, unaltered report by saying, in part, "That there was no indication that the theory contained weaknesses, such as a lack of uncontested transitional species or the lack of evidence of -- that chemicals can give rise to life, also. No other theories of origin, evolutionary or otherwise were mentioned."

This, particularly the reference to

weaknesses, seems similar to some of the criticisms being raised today. I think it is important to point out that lack of complete understanding with regard to a well-established theory, such as not having the complete fossil record for a particular species, is not best characterized as a weakness that of theory.

In response to the August vote in September of 1999, a joint position statement denying the use of copyrighted materials was issued from the American Association for the Advancement of Science, the National Research Council and the National Science Teachers Association.

Finally, in November 7th of 2000, the Board of Education was subject to an election that resulted in all but one of those who voted in favor of Steve Abrams' document being replaced. That one survivor happened to be Steve Abrams. The new Kansas Board of Education later rejected Steve Abrams' document.

If any lesson is to be learned from Kansas, it is that there is a latent interest in preserving science education that is roused when science education is threatened. I believe that I, as well as many of the other 170 people who are

speaking today, are evidence that some of us, including myself, have not previously been involved in Austin Board of Education politics.

In conclusion, I would like to reiterate my unequivocal support for the teaching of evolution unequivocally. Let's not have a double standard where we, for ideological reasons, cast out upon a well-established theory, we don't cast doubt upon imperiable theories.

I, as well as many of the 170 people who are speaking today, won't stand for a lesser standard of fairness.

CHAIR MILLER: Thank you. We will now take brief break for our court reporter who needs a little bit of respite.

(Brief recess.)

CHAIR MILLER: Well, I think we all -- all those that are still here at 10:30 at night, we all need a medal of honor, don't we, or something for endurance? But I will say this has really been interesting. And I just want to reiterate, again, that it's been my privilege and my honor for 20 years on this Board. And I have sat through many, many of these kinds of hearings. And I still believe that this is a wonderful country and

it's democracy in action, you all.

I deeply appreciate you all participating and listening to all different points of view, because that's what America is about. And just remember what tomorrow is. So let's -- with that -- I think we're ready to continue our testimony.

And would you call the next testifier, please?

MR. RIOS: Arlen W. Johnson, followed by Keith Parsons.

Keith Parsons, followed by Nicole Gerardo.

Nicole Gerardo, followed by Sarah Berel-Harrop.

MS. GERARDO: Hello. My name is Nicole Gerardo. I am a fourth-year graduate student in the ecology, evolution and behavior program at the University of Texas in Austin. Before attending UT, I received a bachelor of arts with honors in ecology and evolutionary biology at Rice University in Houston.

As a student at two of Texas' top-ranked universities, I have had the opportunity to take classes from and be advised by many of the

leading scientists in the world. Texas is fortunate to have such evolutionary biologists as James Bowler, David Hillis, Joan Strassman, Mike Ryan, Dave Queller and many of the scientists that have talked to you today. These leaders of their field are teaching Texas' undergraduate and graduate students and involving these students in vital research programs.

Because of these scientists, I feel that Texas has the opportunity to continue to be a world leader in evolutionary biology. This, however, is dependent on foundations set early on in Texas curriculum. By giving Texas middle school and high school students a firm understanding of evolutionary processes, the Texas education system will a prepare its students to continue on in science and to exploit the enormous resources that Texas higher education programs have to offer.

Any minimization of the coverage of evolution in middle school and high school biology, however, will limit these students' abilities to fully understand the mechanisms and outcomes of evolution. The study of evolution in the classroom is often limited by a focus on the evolution-creation debate rather than on scientific

principles. While I attended one of the nation's most prestigious private high schools in New Mexico, my education in and understanding of evolution suffered because of a focus on the evolution-creation debate, rather than on in-depth coverage of the evolutionary processes.

Because my school chose to cover the premises of both evolutionary theory and creation beliefs, we had little time to discuss the complex mechanisms behind and consequences of evolution. Though over the course of my higher education, I have overcome this discrepancy in my high school education, I had to play catchup. Clearly this is not what we want for Texas students.

Based on my experience in and exposures to the study of evolution, I ask the following of you today. Give the next generation of Texas scientists the opportunity to gain an understanding of evolutionary processes and give Texas teachers the time to fully cover this complex subject by minimizing the time spent on other nonscientific beliefs. By doing so, you will guarantee that Texas will remain a leading force in the scientific study of evolution.

Thank you.

CHAIR MILLER: Thank you.

MR. RIOS: Sarah Berel-Harrop, followed by John F. Yeaman.

John F Yeaman, followed by Greg Aicklen.

MR. YEAMAN: Two podiums, is this supposed to be in stereo?

I am John F. Yeaman from Williamson County and one of the constituents of Ms. Thornton. She and I have e-mailed each other, but I haven't ever met her. So I'm not sure which one of you is Ms. Thornton.

CHAIR MILLER: She's no longer here.

MR. YEAMAN: Oh, okay. I have a master's degree in theology from Southern Methodist University and a master's in social work from the University of Texas. And I want to speak from those two disciplines.

First, as a scientist, a social worker must work as a result of knowing the social sciences, reading peer-review literature and studies and knowing how to evaluate research and get to the heart of the research and what is accurate. So I feel I can speak as a scientist and say one thing. I have heard from some of the speakers talk about

gaps in knowledge, gaps in fossil records, areas that are not known or understood. But what I think needs to be said is that there's continual discoveries that are filling in those gaps. The purpose of science is to learn those missing gaps to find out what is the answers to those.

Second, as a theologian, I want to say, we're often tempted to look for God -- a lot of people are tempted to look for God in the distant, the unknown, to find God in what is not known. And I've always preached that that is wrong, because those unknowns get known. And the effect is to get rid of God. We need to look for God at the center of ourselves and of our social groups, in our interaction with each other.

Finally, I want to say, this whole talk about creation is, I think, theologically all wet. The Christian theology about creation is about our co-creating with God, children, co-creating in our teaching of children, their learning and their knowledge and their experience. It is co-creating of architects, co-creating with God in the physical universe, the physical science, structures and cities. It is creation in this time and in this world. It is the creation of peace. It is the

creation of justice. It is the creation of therapy, my own profession. This is what Christian theologies creation is about, not something that happened a kajillion years ago. So, please, don't look at creation in that narrow and false way.

I'd like to close by reading as much as I can from a -- is that two minutes?

CHAIR MILLER: Three. Sorry, sir, it was three. Yeah.

MR. YEAMAN: I wanted to read from Kenneth Miller's Finding Darwin's God on Page 101, where he shows some major failures of intelligent design.

CHAIR MILLER: Okay. Thank you, sir. I appreciate it.

MR. YEAMAN: And they are on the handout.

CHAIR MILLER: Okay. We'll read it.

MR. YEAMAN: Any questions?

CHAIR MILLER: Any questions?

DR. McLEROY: Thanks. I'll tell Cynthia you were here.

MR. RIOS: Greg Aicklen, followed by Randall Hughes.

DR. AICKLEN: Good afternoon. I'm

going to consider it afternoon.

My name is Gregory Aicklen. I have a Ph.D. in electrical engineer from UT Dallas and I'm a partner in a business located in McKinney, Texas.

The Discovery Institute, with Raymond Bolin at point, is the prime mover behind the push to include intelligent design in Texas science textbooks. Although the Discovery Institute tries hard to hide it, science is not the Discovery Institute's main agenda. The Discovery Institute's goal is nothing less than the complete replacement of what they refer to as scientific materialism with, in their own words, a science constant with Christian and theistic convictions.

If the argument about evolution in textbooks were only about the science, the discussion would have been over decades ago. Evolution is well-tested and has easily survived every challenge to merge as the fundamental unifying concept of all the life sciences, but opponents of evolution understand that science is a true free market of ideas. Useful concepts thrive while unsupported, unproductive ideas are rapidly discarded.

Intelligent design fails -- falls in

the latter category and so intelligent design is cloaked in pseudo-scientific jargon, labeled scientific and presented in the arena of public opinion where its supporters hope for an undeserved victory. Simultaneously, antievolutionists try to inaccurately characterize evolutionary theory as a theory in crisis. The result is then a call for fair presentation of alternatives to evolution in our science classes, when in fact, there's no crisis and intelligent design is no alternative to evolution.

There are many people here today with better credentials than I who can tell you exactly why intelligent design is bad science and why evolutionary theory shines as one of the greatest scientific achievements. In this regard, I'm going to refer to those more eloquent. I want to talk about Texas and our future.

I have lived in Texas most of my life. I studied in Texas schools and have graduate degrees from a Texas university. My wife, a dedicated career teacher in our public school system, also studied here in Texas. We're both very proud to be Texans and have had the opportunity to receive a superior education in this state from our

public institutions.

We want future Texans to be able to say the same. It would be difficult to overestimate the importance of a good science education. We need only look around us to see what science has brought as a basis for the technological marvels our engineers produce, the medical miracles we witness daily and as fuel for the economic engines that keep us fed and let us pay our Texas-size air conditioning bills.

If we allow antievolutionists to pressure textbook providers into inserting into our textbooks false weaknesses of evolution, the textbooks will simply no longer be accurate. Given the nature of modern textbook industry, this would result in dumbed down Texas editions of our textbooks that would result -- that would be inferior to the texts used in other states. Our children, our future, would be at grave disadvantage when competing against students from other states or indeed other countries and throughout the rest of the world.

An understanding of evolution is critical in medical research, epidemiology, environmental sciences and other vital studies. We

owe it to our future to teach science in the science classroom and reject pressure to politicize the teaching of science in Texas.

CHAIR MILLER: Thank you, sir.

MR. RIOS: Randall Hughes, followed by Rusty Osborne.

MR. HUGHES: Who do I give these to?

Good evening, members of the Board. It's been a long day. The issue today is not just about what is being -- excuse me -- I need to introduce myself, first. I'm Randall Hughes. I'm a graduate student at the University of Texas at Austin, working on my Ph.D. in biochemistry.

The issue today is not just about what is being taught -- or is to be taught in biology textbooks in Texas schools. It's about the right to academic freedom and the validity of science as a profession dedicated to the understanding of our natural world. The evolution in theory and fact is a well-supported part of the biological sciences. It should be represented as such in textbooks given to students in Texas schools.

The beauty of the scientific method is that it is self-correcting. When a theory is

proven wrong by empirical evidence, it is modified or a new theory is proposed and tested to help explain a given phenomenon. The longevity of evolution is a testament to its explanatory power.

While science does not have all the answers as of yet, progress continues. Data is collected, analyzed and published in peer-review journals. Every day we learn something new about the world around us. Science presupposes we can understand our world through natural laws and careful observation.

Science can neither confirm nor deny the existence of God or the intelligent engineer. It is beyond the powers of science to do so. Therefore, any treatment of intelligent design is irrelevant to true scientific discourse. You wouldn't teach biology in a Sunday school and you shouldn't teach design in biology.

Intelligent design supporters will argue that design can be inferred from nature. The weakness here is that the credibility of knowledge gained by inference. This can be equated to getting your morning news from supermarket tabloids. It can be done, but there are better methods. The only leg they have to stand on is the gaps in our current

understanding of some natural phenomenon. Gaps that will eventually be filled by empirical data and experimentation, as well as established scientific methods.

What would happen to science if you could just say, it's too complex to understand the origins, therefore it was created by an intelligent designer? What would be the purpose of science then? There would not be a purpose of science if this were the case. What would be the point in trying to know anything in the world and presupposing such an explanation, can we as humans really know anything? If everything is, therefore, designed we can't know it and we can't know it through science. And how can we know it for sure?

Some would say by faith. Okay. But how did the scientific explanation of things contradict knowledge by faith? The short answer is, it doesn't. If it does, you don't have much faith to begin with.

Texas has to stand for progress and science. Evolution, as taught in context of biology, is a central part of our understanding and, therefore, should not be diluted or eliminated from biology texts. Students should be allowed to draw

their own conclusions about the origins question, but the valid science must be presented. The Texas State Board of Education does not want to follow in the misguided footsteps of their brother in Kansas by eliminating --

CHAIR MILLER: Thank you very much.

MR. HUGHES: Thank you.

MR. RIOS: Rusty Osborne, followed by Don Morrison.

MR. OSBORNE: Members of the Board, ladies and gentlemen, fellow citizens.

My name is Rusty Osborne, I hold a bachelor's degree in biology from the University of Texas. I am the father of two children in the Eanes public school district here in Texas. And I'm here today to demand that this Board adopt biology texts undiluted with creationist dogma.

On Page 1 of his epic book A Brief History of Time, physicist Stephen W. Hawking recounts an interaction between scientists and creationists belief thusly: "A well-known scientist, some say it was Bertram Russell, once gave a public lecture on astronomy. He described how the earth orbits around the sun and how the sun, in turn, orbits around the center of a vast

collection of stars called our galaxy. At the end of the lecture a little old lady at the back of the room got up and said, 'What you have told us is rubbish. The world is really a flat plate supported on the back of a giant tortoise.' The scientist gave a superior smile before replying, 'Well, then, what is the tortoise standing on?' 'You are very clever, young man, very clever,' said the old lady, 'but it's turtles all the way down.'"

Okay. Now, this creation story, one of only thousands, might be funny to most of us, but to its holder, it's a serious world view. And as implausible as it sounds, it has two extremely important things in common with current assault on evolutionary theory, the remodeled creationist concept known as intelligent design. Namely, no experimentally derived evidence and no publication in a peer-reviewed scientific journal.

Are we going to really pack our children's already time cramped study schedules with such theories? Are we going to call this science? Which creation stories get elevated to the status of science theories? Of course, the theory of heliocentric solar system was once in the same hot water with religious fundamentals as evolution

theory is today.

The Copernican revolution threatened to take humanity off center stage in the grand scheme of things to make a trifle of God's most important work, us. Threatened theists attacked and harassed the holders of the heliocentric model because in its earliest expressions it couldn't account for certain observations. Never mind that it did account for many previously unexplained observations and never mind that the dogmas -- the theists explanations were ad hoc. Then, as now, the criticisms of scientific deduction were based on a faulty syllogism that goes like this: Evolutionary theory can't explain everything. If evolutionary theory can't explain everything, it's wrong. Therefore, creationism is right.

Intelligent design creationists attempt to point out supposed weaknesses in evolutionary theory. To them a gap in the fossil record is evidence that the theory evidence is wrong. You know, we might conclude that aerodynamic theory is wrong because we don't know everything about it, but that doesn't stop us from building airplanes and getting on them.

Thank you.

CHAIR MILLER: Thank you.

MR. RIOS: Don Morrison, followed by Dan Wivagg.

Dan Wivagg followed, by Stephen James.

Stephen James, followed by Martin Wagner.

MR. WIVAGG: I'm honored to speak before the Board of Education and appreciate the opportunity the democratic society provides to express my opinions.

I'm Dan Wivagg and I'm not from the University of Texas. I am from Baylor University in Waco where I'm the professor of biology and director of undergraduate studies in biology. I'm also president-elect of the Texas Association of Biology Teachers and a member of the Advance Placement Biology Test Development Committee. I can also say that I have -- I served for 10 years as the Associate Editor of the American Biology Teacher. So I could speak to that if there are any questions about it.

I began teaching biology at the secondary level in 1966 and have taught college biology for the last 29 years. I've attended many

workshops and conventions and listened to what biology teachers and biologist are saying. Biology teachers want their students to understand the nature of science and the concepts of biology. The most important concept, the central unifying concept of biology is evolution.

Biologists have considered evidence for evolution. And some evidence that seemed contrary to evolution since well before Darwin's Origin of Species was published in 1859. By the late 1800s, this ceased to be any question among biologists about the validity of Darwinian evolution. The idea of intelligent design was discarded by biologists at that same time.

Thus evolution is not a theory in crisis. Among biologist, there are not profound, intractable problems with evolution, as has been earlier suggested. There certainly are things that we don't understand and would like to understand. And it would be an ongoing process, perhaps indefinitely. We certainly are never going to get to where we know it all. But what we have, then, are some different hypotheses explaining various things that we have seen. And that is appropriate for science.

I have examined the textbooks proposed for adoption and find them to provide sound treatments of our modern understanding of biology. I prefer those texts that most effectively integrate evolutionary concepts throughout the book, but all are acceptable. When considering biology textbooks we need to consider several ideas.

Point No. 1 I would make is that science is not democratic. We can't vote to repeal the Law of Gravity, nor can we legislate away the overwhelming evidence for evolution. The good people of Montgomery County can't diminish the importance of evolutionary theory by petition or referendum.

Point No. 2 in biology, hypotheses are hypothetical, but theories are not theoretical. There are no laws of biology as there are in chemistry and physics. Theories are the strongest statements that biologists make. They only call theories after the evidence for them has become overwhelming. Anyone who says evolution is only a theory demonstrates ignorance about the nature of biological science.

Point No. 3, we live in an anti-science society. We all want to enjoy the

benefits of science, such as increased agriculture productivity and advances in medicine, yet many people do not understand science and deny scientific evidence when it conflicts with their hopes and superstitions.

CHAIR MILLER: Sir, the three-minute bell just went off.

MR. WIVAGG: I'm sorry.

CHAIR MILLER: I'm so sorry. Thank you very much for coming.

MS. LOWE: May I ask a quick question?

CHAIR MILLER: Yes.

MS. LOWE: If there are no laws in biology, if one of the textbooks refer to Mendel's Laws of Hereditary, would that be a factual error?

MR. WIVAGG: That's -- it's a philosophical question. The philosophers of science debate whether there are laws in biology or not. And some people would like to call that a law.

MS. LOWE: And some of our textbooks do call that a law. They pick something to call law and other things --

MR. WIVAGG: It's as close as we have to a law.

MS. LOWE: And that doesn't bother you?

MR. WIVAGG: Doesn't bother me a bit.

DR. McLEROY: Law of Biogenesis? Is it considered a law of biogenesis?

MR. WIVAGG: No, I don't think so.

MR. RIOS: Steven James, followed by Martin Wagner.

Martin Wagner, followed by John W. Heffner.

MR. WAGNER: Good morning.

CHAIR MILLER: Not yet.

MR. WAGNER: Getting close.

My name is Martin Wagner. And I'd like to say a few words on the appropriateness of teaching so-called alternative theories such as intelligent design or ID in school curricula. Oh, boy, something new.

I am not a scientist nor even a parent, but my concern for the quality of education should not, I feel, hinge upon these prerequisites.

There are two claims being made by advocates of ID that need to be addressed. One is the claim that evolution is a weak or flawed theory and the other is that ID is not religiously

motivated. Is either of these claims true? Since many of the other speakers today whose scientific credentials are stonger than mine have addressed the first claim, I will deal primarily with the second.

Since evolution is as open to critical analysis as any other scientific theory, why then shouldn't the ID proponents be allowed to have their critics published in textbooks? Well, I think this hinges on the motivations of the ID proponents, most of whom claim publicly that science, not religious ideology forms their position. But their own literature seems to refute this. A document titled The Wedge Strategy produced by the Discovery Institute states that the goal of ID is purposefully religious. "Design theory promises to reverse the stifling dominance of the materialist's world view and to replace it with a science constant with Christian and theistic conventions -- convictions," I'm sorry.

Jonathan Wells, in an article title "Darwinism, Why I Went for a Second Ph.D.," confesses, "I asked God what he wanted me to do with my life and the answer came not only through my prayers, but also through father's many talks to us and through my studies. My prayers convinced me

that I should devote my life to destroying Darwinism."

And William Dembski in a book revealingly titled, Intelligent Design, the Bridge Between Science and Theology, plainly states, "Any view of the sciences that leaves Christ out of the picture must be seen as fundamentally deficient."

So the claim that ID does not have a hidden religious agenda is actually kind of true. If these published remarks are any indication, what ID has is an overt religious agenda.

One must remember that science does not provide absolute final truths on any subject -- we've heard that many times tonight -- and that every single one of its findings is contingent upon new discoveries. As the September issue of Discover Magazine in its cover story on evolution points out, "Any article on the subject published more than a few months ago probably contains outdated information."

It is perfectly appropriate to teach students that science is an active discipline and that its self-correcting methodology, such as peer-review, serve both to acknowledge the possibility of error, while applying the best

possible means to address error should it occur. But it is not appropriate to feed students the idea that because a particular scientific theory appears to leave a lot of unanswered questions, that theory is weak or flawed, especially when the point is motivated not by a stronger scientific theory, but by a fundamentalist movement whose stated goal is to shore up a cherished belief system perceived to be under attack.

Thank you very much.

CHAIR MILLER: Thank you.

MR. RIOS: John W. Heffner, followed by John T. Marshall.

MR. HEFFNER: Thank you very much. This late at night it's somewhat survival of the alertist, isn't it?

My name is John Heffner. I'm a career mathematician in Texas public schools. I'm in my 34th year. I'm head of the math department at Kilgore High School. I'm also on the adjunct mathematics faculty at Kilgore Junior College. I am here representing only myself and, I guess you could say, my three grandchildren, as well as the students that I care a great deal about.

Actually, my talk has evolved a

little bit tonight. I had planned to come at this from a mathematic standpoint and show you some pretty incredible numbers right here. But I've decided I just have to address some of the things that I've heard since the supper break, particularly.

I have the strong impression that we have quite a number of people that were coached. If not, it's amazing that I keep hearing the same phrases. The religious right and the desire to weaken or to dilute the science education in Texas. I've been here all day long. I got up at 3:00 a.m. this morning to be here from some distance. I was the third person in this room today and I have hardly left. I've not heard one person say, we'd like to get creation in the school or we'd like to get intelligent design in there. Now, if you know about hidden agendas or something, I certainly haven't heard about it today.

I just want to ask a rhetorical question: What's wrong with the truth? What's wrong with teaching the whole truth, nothing but the truth? If evolution is on such solid ground, what are you afraid of by telling some of the weaknesses? And there are some obvious ones. To do

any less, in my view, is not education, but is indoctrination, the very thing that you're so afraid of from these alleged religious right people or whatever.

I'd like to say that, you know, we don't trust used cars salesman very well, because they generally just present one side of the issue. They don't tell the weakness in the car. And yet, evolutionists enjoyed such a protected status where any of the obvious weaknesses and the many weaknesses. I'd like to give you a list, if my three minutes isn't up, of some of the things that merit some discussion in the classes. Maybe some of these are stronger, some are weaker.

When you get your prescription filled at the store, do you not get a little piece of paper in there telling you about side effects? You see, you not only have the strength of the pharmaceutical product, you also have a potential weakness, a side effect. And I think that's just good education and a reasonable thing.

A few of the things in this last 30 seconds or so, mutation. Supposedly the mechanism that drives evolution is beneficial mutations, mutually exclusive terms. Mutations represent a

loss of information. You heard today there's 3300 of them that are harmful or maybe fatal.

To believe in evolution, you have to believe in spontaneous generation. And those that would raise their hand, a show of hand, yes, we believe in spontaneous generation, I ask you: Do you believe it in because you have faith in that or have you actually demonstrated that in the lab and you've brought non-living chemicals to life?

We also have the concept of irreducible complexity, Michael Behe in the room most of the day. Blood clotting is one example of that.

CHAIR MILLER: Thank you. This is -- I'm glad you came at it from that perspective. Very interesting. Thank you.

Any questions?

DR. McLEROY: Thanks for getting up this morning.

CHAIR MILLER: And thanks for getting up this early and staying with us this whole time.

MR. HEFFNER: Thank you for letting me participate in this process.

CHAIR MILLER: You're welcome.

MR. RIOS: John T. Marshall, followed

by Andrew Riggsby.

MR. MARSHALL: Hello. My name is John T. Marshall. And I'm going to go off from my written testimony just because I've seen a lot. I'm an engineer, double E, master's degree. I have two children who will be in the Round Rock School District -- who are in the Round Rock School District, high school and middle school. So what we talk about today will affect them. And as their father, I am concerned about the education that they'll get.

I reviewed three books before I came to this meeting. I also reviewed the July 9th testimony, almost all 169 pages of it. I got through about 124. And I saw some things that are neat. And I've seen things repeated tonight. I saw that everyone agrees that we're going to teach evolution to our children. I thought that's great. And everyone agrees that we're not going to put any type of creationism in the workbooks -- in the books, the textbooks. That's great. I saw we're not going to put any intelligent design in there either, which I'm very happy for, because I think it would be thrown out by the courts very quickly. So that's good.

So what I'm wondering about is, what the heck are we doing here and why are we talking about this stuff? Because you know, why is DI here? Why is the Discovery Institute here? It really worries me. And it's also -- you know, I'm an engineer, so we call a spade a spade. This is our problem being engineers. If we see a problem, we have to identify it. It's just nature.

And it just occurs to me that, you know, there's something else going on here. And I'm really curious, because I'd really like to know, if we're going to do -- if we're going to teach evolution, we're not going to teach -- and we're not going to put any of this other stuff in there, we've all agreed upon that, then what the heck are we going to do in these textbooks and what is that evolution class going to look like? Because I'm pro-evolution. And I'm big enough to stand in front of everybody and tell you that. I'll also tell you this is stupid, but I voted for Perrot back in '92 or whatever. It was an idea at the time, all right.

So -- but my point is still that there are some hidden agendas here. And you hear them in the questions. You hear them in the

questions to the people who are getting up to speak. There are some people here who are on this committee, on this SBOE, who have some hidden agendas. And I really wish everyone would come clean. And Discovery Institute, too, I wish you guys would come clean, whoever you guys are.

I read the article by Jonathan Wells, by the way. He wrote, "Survival of the Fakest." I went to their web-site because, again to be fair, I tried the pro-evolution and the antievolution. And what was really interesting is that I read his article "Survival of the Fakest." And it started off as this innocent graduate student learning about biology. And lo and behold, he finds inaccuracies and discrepancies and it just makes him challenge everything.

Well, what got me mad was later, I read that article that was just referred to where he explains how -- and this predates the "Survival of the Fakest," this article that he writes that he says, I'm going to devote my life to kill Darwinism, to destroy it. I have the exact quote in my speaker notes. Unbelievable. I mean, so there's some chicanery going on here that I don't understand. And again, I want these people to come forward and

call a spade a spade, identify what their real agenda is so that I, as a parent, will know what to expect.

DI does not put any information about what their idea of evolution teaching should be. And I scoured their web-site looking for it.

Thank you very much.

MR. RIOS: Andrew Riggsby, followed by Kaye McLaughlin.

MR. RIGGSBY: I think I have macroevolved since the beginning of the meeting.

My name is Andrew Riggsby. And I've been an educator here in Austin for more than a decade.

In previous testimony some have expressed worries about the presentation of evolution in public schools and called attention to the TEKS requirement that both the strengths and weaknesses of theories be included in Texas textbooks. Now, that would be good science, even if it weren't State law already. But there is no TEK that requires scientific theories to have weaknesses. We're all pretty secure about gravity and electromagnetism and the rest.

Publishers can't be required to list

problems scientists haven't found, so I looked into the supposed weaknesses raised in testimony. And while I'm very much not a scientist, even I could see that most of them were logically incoherent. There were complaints about a few specific examples, nearly all those highlighted in Wells Icons of Evolution.

Now, first, as others have testified here, most of these icons are either actually not flawed or readily fixed. And the replies from Glencoe, Holt and Prentice Hall show that they've all done a good job of bringing their textbooks up to date.

Second, while these cases are commonly trotted out as illustrations, they're not a significant part of the proof relied on by professionals. If their past misuse in textbooks shows anything, it's laziness in writing the books, not weakest in the underlying evolutionary theory. To use a historical parallel, we would rightly object to a book which used the story of Washington and the cherry tree, but you don't fix that problem by questioning the existence of our first president.

Then there are complaints of gaps in the fossil record, whether individual, so-called

missing links were on a larger scale in the Cambrian. There are technical responses to all those objections individually, but there's also a general rebuttal to the whole group.

We can trace lines of descent by tracking shared and divergent features. Even antievolutionists admit as much when they point to specific supposed gaps in the record. If we didn't have descent with modification and without crossover as in design lineages, the pattern wouldn't be clear enough to show specific gaps. Doubting the overall the pattern of evolution on these grounds is like doubting that Texans at the Alamo were killed in battle because we don't know exactly who killed Bowie or Crockett.

Finally, there are complaints that evolution can't explain so-called irreducible complexity of certain biochemical systems. "How can you imagine the simpler ancestor of a mouse trap?" they ask. But Darwinian theory doesn't claim earlier is automatically simpler. Intermediate stages can be more complex, just as you might have to hike up part of a hill to get out of a mountain valley and back down to sea level.

Irreducible complexity isn't

practiced just a way to say, I haven't figured this out and I'm not going to try. Or, in one last historical parallel, I can't figure out how the Egyptians built those pyramids, so I guess they didn't.

There are, of course, interesting debates about the details of how various evolutionary processes have worked in specific case, but "how" is not the same thing as "whether."

None of the textbooks under review can be rejected for underreporting the weakness of evolutionary theory, because no one's found anything to report.

Thank you.

CHAIR MILLER: Thank you.

MR. RIOS: Kaye McLaughlin, followed by Melvin L. Johnson.

Melvin L. Johnson, followed by Matthew Levy.

CHAIR MILLER: Welcome.

DR. LEVY: Well, thanks for having me. I am Dr. Matthew Levy. I hold a Ph.D. in molecular biology and an MS in chemistry. The past eight years I have studied and worked as an Origins of Life research scientist and I have numerous

publications in peer-reviewed scientific journals.

Before coming to Texas, I worked for three years in the lab of Dr. Stanley L. Miller, the namesake of the Miller-Urey experiment, at the University of California, San Diego. I therefore believe that I am qualified to speak on this subject.

As my friend and colleague, Dr. Andrew Ellington has previously testified, we have read the Discovery Institute's preliminary analysis of evolution in biology textbooks and find their arguments regarding the Miller-Urey experiment to be inaccurate and untrue.

The Discovery Institute claims that when conducted in the presence of carbon dioxide, nitrogen and water that the Miller-Urey experiment fails to produce amino acids. This is simply not true. Amino acids are produced under these conditions.

The Discovery Institute also claims that under these conditions, "The molecules produced include toxic chemicals, such as cyanide and formaldehyde, but not amino acids." This again, is not true. Amino acids, as well as other organic compounds are produced.

Moreover, these so-called toxic chemicals, cyanide and formaldehyde are actually prerequisites for the formation of important biochemical compounds, such as amino acids, nucleotides and sugars. That is, these compounds are expected to be present because they are the building blocks for these important biomolecules. Labeling these compounds as toxic is extremely misleading and has nothing to do with their role as important prebiotic chemicals.

As a scientist familiar with this field, it is evidence that the authors of the document are not familiar with the literature regarding the Miller-Urey experiment. Instead, they have been selective in their use of facts to support their cause. As a reasonable person and a citizen of Texas, I find this attempt to discredit, sensor and an amend this experiment and the material presented in these 11 textbooks deplorable. I can only hope that making you, the Committee members, aware of this attempt to misinform you, will allow you to act accordingly.

CHAIR MILLER: Thank you, Dr. Levy.

Any questions?

MR. RIOS: Bob Jansen, followed by

Kathy Rider.

Kathy Rider, followed by Barbara Tenbrink.

Michael Marty or Barbara Tenbrink.

MS. TENBRINK: Is this the most exciting place to be? This is so much fun. In my 32 years in public education, 21 years as a science supervisor, I looked around at the other disciplines and oh, my gosh, they had a booster club for the band and there was a booster club for the football team. And I wished, as I sat in the rows for the TEA staff, years ago when I worked for you-all, I wish that science had a booster team. And ladies and gentlemen, I think we had one here tonight.

This has been fabulous. It's been so much fun as a science educator to watch each of us learn as presentations were made. I saw each of you gain information. We, in the audience, gained information from hearing from our colleagues. And it was a fabulous event.

Tonight I'm presenting to you a position statement for -- from the Texas Science Education Leadership Association. Our president sends you her blessings.

I'm past president. I also want to

tell you that I'm a member of the Texas Academy of Science, but in more than just paying my dues, I'm a fellow of that academy.

Past president of the International Science Teachers, founder of the Elementary Texas Science Teacher. So I hope that I come with some credibility, unlike a Nobel prize.

We represent over 400 people. Our science -- scientific theory is not a guess, an approximation or even a hypothesis, but a well-substantiated explanation of some aspect of the natural world that will incorporate facts, laws, inferences and tested hypotheses. And this is the National Academy of Science.

Examples of commonly accepted scientific theories include cell theory, which states that all living things are composed of cells. Atomic theory, which states that all elements consist of unique building blocks termed atoms. Heliocentric theory, which states the Earth and planets revolve around the sun, et cetera.

Maybe one thing that we've done in our position statement is state the Texas Administrative Code, because we very much agree with you in the TEKS as they were written and approved by

this Board.

Also, we quote the Texas Assessment of Knowledge and Skills, the TAKS, which will test children whether they understand the theory of biological evolution. I state for you the national education standards in science. And then, of course, judicial decisions, which has -- have been stated here tonight.

Our organization advocates -- advocates presenting evolution as a theory supported by overwhelming data and facts. And as an extensive explanation developed from well-developed reproducible sets of experimental-derived data.

Thank you so much.

CHAIR MILLER: Thank you. Enjoyed your remarks.

MR. RIOS: Michael Marty, followed by Andrea Bassinski.

MR. MARTER: Good evening. It's been, I think, an extraordinary evening to watch a complete course in evolutionary biology taught in three-minute segments by 120 guest professors.

I am going to raise some points which I think are actually rather different from those which have been raised until now.

My name is Michael Marter. I'm a professor of physics. I will not speak to biology at all, but I will speak for this gathering because I'm the head of UTeach. I'm director on behalf of the College of Natural Sciences and I'm, therefore, responsible for preparing secondary teachers. We have over 400 students currently enrolled in the program, over 70 biology students. I think it's the largest crop of new secondary teachers coming up in the State. And I come here to listen very carefully. Because I think that, unlike most other people, I do not have the right to tell you what I think, but I have to listen very carefully to what people in Texas want us to teach to the students. And if professors don't want to teach what the State wants taught, then I have to listen and find people who will teach it. So as I said, I will listen to everything I've heard hear and think about it very carefully.

What I'd like to point to is the educational system is a complex, interacting machine with many, many parts. They are the tests that the students take, there are the standards that the educators imposed, there are the textbooks that are supplied, there are the certification exams the

teachers take, there are the courses that they take at the universities for which they learn the things that they will then be tested on and the certification exams upon which they go to the school and teach it all to the students.

Now, this only works because the different parts work together, because there is a broad consensus in the scientific community. And so when the professors stand up in front of the students in the classroom and tell them things, those same things, say, welcome to the classroom, and tell the secondary students it all fits.

Now, what's quite dramatic about the things being talked about here today is discussion of changing one little piece in that system. It's like looking into a complicated working engine and saying, I think it would work better if that gear were changed. I'm going to make it bigger. And someone says, well, shouldn't we stop the car? And he says, no, I'll do it on the fly.

So I would ask you: What will replace those books? I think that's really the question everyone has in mind, because if the minor changes we talked about were to be made, I think they would actually, in and of themselves, be

relatively uncontroversial.

There have been many points about the questioning of scientific theories. And I care about this a lot. I teach a course personally. I've been working on it for years. And the sole purpose of it is to try to teach people how to develop and test and question scientific theories.

So if that is the goal, it is a great subject for discussion. But I do not believe it will be addressed by adding or subtracting lines from these existing textbooks.

I want to close by mentioning some things that I think are rarely talked about in public, but I think they're important. And they have to do with how one should regard the responsibility to preparing teachers. So I'll mention some principles that help to guide me. First, I believe that future teachers need to be educated on the great controversies of the day. And that certainly includes evolution.

I'll close with that and leave the written testimony.

Thank you.

CHAIR MILLER: Thank you very much. I appreciate your remarks.

MR. RIOS: Andrea Brassinski, followed by Anthony D. Niesz.

MS. BRASSINSKI: Hi. I'm not a professor and I'm not a lobbyist, I'm a concerned parent. So I hope you bear with me while I stumble through my speech this evening. I'm not used to doing a lot of public speaking.

My name is Andrea Brassinski. I have a bachelors degree in biology and a masters in business administration from the University of Texas. I worked in the semiconductor industry for about 10 years prior to becoming a stay-at-home mom. I probably should be home with my five-month-old right now, but this issue is extremely important to me. And I feel it's my duty to speak out about this.

Organizations that we've heard from today, such as the Discovery Institute propose adding strengths and weaknesses of evolutionary theory to state textbooks. I believe that it is clear to all present, as well as those on the Board, that this discussion is a thinly veiled attempt to replace hard science -- the hard science of evolution in public schools with creationism.

Creationists argue intelligent design

or creation science as fact and not hypothesis and argue that teaching it in public schools is not a violation of church and State. Since they cannot raise doubts about creationism, they strive to create doubt about evolution in spite of the hard science and the majority of scientists supporting it.

I've heard -- I've heard those who wish to change the textbooks state that they're only wishing to explore the strengths and weaknesses of a scientific theory. And that this discussion is not about religion. If that were the case, why is evolution the target here and not the laws of physics?

Texas schools are already ranked as some of the lowest in the nation. I worked in the semiconductor industry for almost 10 years and I know that hi-tech and scientific companies are already looking elsewhere to locate. Yes, partially due to cheaper labor, but partially due to the poor math and science skills found in the Texas labor force.

Let's not contribute to the economic losses our state is already feeling by showing the rest of the nation, and the world for that matter,

that fact has become fiction in Texas science education.

My son is only five months old now and I'm trying very hard to maintain my support of the public school system. But I do not trust a governmental agency or a science teacher that I did not personally choose to teach my child about creation. Regardless of religious denomination, I believe that creation is something that cannot be taught uniformly and without causing great harm to Texas school children if evolutionary science is diluted. It's unconscionable for the TEA to approve of textbook language which misinforms and dilutes scientific facts.

In short, religious discussions don't belong in State funded school and intelligent design doesn't belong in a scientific text or any other State-funded textbook. Mainstream Texas voters don't support this agenda and I implore you to consider the ramifications of your decision with gravity.

Please don't let Texas follow in the footsteps of Kansas and Alabama and become a laughing stock of the nation and the world, for that matter. Leave religious teachings up to parents and

science up to the scientists and evolution in our textbooks.

Thank you.

CHAIR MILLER: Thank you. Pat?

MS. HARDY: I guess just to show I'm still here, I'm still awake, but I do take offense at your comments about Texas being backward in the way of education. And if you look at statistical information, you'll find that that is not true.

MS. BRASSINSKI: I apologize, I didn't use the word "backward." I'm relying on information --

MS. HARDY: You said we were one of the worst in the nation and I take offense at that.

MS. BRASSINSKI: I did say that Texas schools are ranked among the lowest in the nation and I --

MS. HARDY: And you are incorrect.

MS. BRASSINSKI: I honestly would love to see that information and depending upon --

MS. HARDY: Contact the -- Just for the Kids and get the Nape reports. You'll find that we aren't.

MS. BRASSINSKI: Yeah. And I'm sure depending upon -- I have seen studies that have

ranked it around the 48th. And I honestly am not sure whether that --

MS. HARDY: Studies are 10 years old. We've made a difference.

MS. BRASSINSKI: Thank you. I apologize for upsetting you.

MR. RIOS: Anthony Niesz, followed by Anne Ahola.

Anne Ahola, followed by Amit Motwani.

Amit Motwani, followed by Samuel Tarsitano.

Samuel Tarsitano, followed by Andrew Rowe.

Danielle Tierney.

MS. TIERNEY: Good evening, members of the Board. My name is Danielle Tierney. I am the director of public affairs for Planned Parenthood of the Texas Capitol Region. I am not here to testify about evolution or creationism tonight. I am wish to testify on selected sections of the biology, parenting and child development textbooks. I appreciate you being here so late and allowing me to testify before you tonight.

The Planned Parenthood operates three

clinics here in Austin which provide the full range of reproductive healthcare services and community health education to approximately 20,000 clients each year, 12 Planned Parenthood affiliates in Texas serve approximately 300,000 clients each year. We know that most parents want to teach their values to their children and want to be their children's main source of information about sex. We also know that most parents want help. Planned Parenthood supports responsible sex education in the schools to compliment what parents can do at home.

A recent Scripps-Howard Texas poll found that 86 percent of Texans favor teaching public school students age-appropriate, medically accurate sex education that includes information about abstinence, birth control and prevention of sexually transmitted diseases and HIV.

A consistent problem I noticed in the biology textbooks is the lack of current, complete and correct information about all FDA approved methods of contraception. Although there are numerous inconsistencies, I'll just highlight a few that I think deserve your immediate attention.

First and foremost is the inclusion of abstinence. I think all textbooks should

emphasize abstinence as the only method of contraception that's 100 percent effective in preventing both pregnancy and sexually transmitted infections.

Another concern is over newer contraceptive methods, which either do not appear in any of the textbooks or only a few. The newest FDA approved methods, including the patch, the ring, the female condom and the Marina IUD should be included in any diagrams or text that list contraceptive methods. Norplant, on the other hand, is mentioned in several textbooks, yet is no longer available on the market.

I was really quite alarmed to discover that in two textbooks douching is mentioned as a method of contraception. Furthermore, one textbook describes it as "40 percent effective" and the other describes it as "less than 70 percent effective." This is not and never has been am FDA approved method of birth control and should be removed from all discussions of pregnancy prevention.

Most textbooks mention the morning after pill, but with numerous inconsistencies. This method is now referred to as emergency contraception

or EC. It's a special dose of birth control pills that can prevent pregnancy for up to 120 hours following unprotected intercourse, a contraceptive failure or an incident of sexual assault. Because of it's enormous potential for reducing rates of unintended pregnancy, I strongly urge you to adopt textbooks that include the most up-to-date language pertaining to this method.

Several textbooks mentioned nonoxynol9, a spermicide used to lubricate condoms. The World Health Organization and the Centers for Disease Control have reported recently that nonoxynol9 offers protection against no sexually transmitted infections, including HIV. Any references for the use of nonoxynol9 as a means of preventing disease should be updated with the correct information.

I read with interest the chapters that address abstinence and teen pregnancy in the textbook entitled, Parenting Rewards and Responsibilities by Dr. Verna Hildebrand. This book contains practical information for high school students who choose abstinence --

CHAIR MILLER: Thank you.

MS. TIERNEY: Okay. The only other

thing I wanted to mention is that it doesn't mention any other methods of contraception. I'll gladly answer any questions.

And again, I appreciate your time tonight.

CHAIR MILLER: Thank you for your comments.

MR. RIOS: Walter L. Bradley, followed by Ken Heydrick.

MR. BRADLEY: Thank you for the opportunity to be here for three minutes tonight. I realize you've worked long and hard and I will try to be brief. I'm going to only address two of the four points on my sheet for sake of time.

My background training is in material science and engineering. I actually have a Ph.D. from the University of Texas in material science. I have worked extensively in polymer science and engineering and some years ago wrote a book on the origin of life. And so I'd like to specifically address Origin of Life treatment in the books.

As a general comment, one gets a very different impression reading the textbooks than one gets going to the two most recent International Society for the Study of the Origin of Life

conferences. I brought abstracts from these, where, in fact, one finds there are many, many questions that seem to be quite challenging and difficult on which scientists are currently working. Yet, when one reads the textbooks one gets a very different impression, that there really aren't very big problems and the ones that are there are going to be covered or easily answered in the near future.

Let me give two examples of this. I think the first, the Miller-Urey experiments, which we've had comments back and forth on this evening. I brought a most recent paper and I'm going to leave it. I only have one copy. So I'll leave this with you. But it's entitled, "Prebiotic Synthesis from CO Atmospheres, Implications for the Origin of Life." And one of the four authors is, in fact, that same Stanley Miller. Fifty years later, Stanley Miller is still trying to work on this problem, because it hasn't been satisfactorily solved.

In the abstract of this paper, he acknowledges that most people think the atmosphere probably was dominated by carbon dioxide, but the problem is, when you have carbon dioxide rather than carbon monoxide, you can't make any significant

yield of prebiotic building blocks. And so he goes on to suggest maybe there's the possibility we could have carbon monoxide and maybe we can have cosmic rays and the cosmic rays might, in fact, be able to generate a yield. But it's interesting to read this paper, which is presented in a way that's very, very interesting but speculative, and contrast that with the treatment that we find in the typical textbook. And this is the same Stanley Miller 50 years later. If the problem was actually solved once and for all with his early experiments, then why 50 years later, is he still trying to solve the same basic problem? I think he knows, as everybody knows, the atmospheres he used were energy rich, allowed one to get a successful experiment, but not with an atmosphere that was meaningful.

The second comment I'll make in the minute that I have left has too do with the problem that all of the textbooks seem to ignore. And that is, when you put these building blocks together to make polymer change, whether it's protein or RNA or DNA, the books all seem to ignore the fact that getting the right sequencing is extremely critical if you're going to get biological function. In much the same way that getting letters sequenced on this

page of paper is necessary to get any kind of a coherent paragraph. And the books seem to act as if you could stick the building blocks together in any way, you would get some kind of biological function. And I think that trivializes what, in fact, is an extremely challenge issue.

DR. McLEROY: Ms. Miller.

CHAIR MILLER: Thank you so much.

DR. McLEROY: Well, first of all, I'd like to say that this is one of my longtime friends, Dr. Bradley. And he has written this book, The Mystery of Life's Origin, which was written in -- published in 1984 or something like that. It's one of the classic books on the Origin of Life. It's very up to speed on this. One of the authorities, I would say, around on this subject.

And you've got to read the testimony we had earlier from the most lively -- remember the lively guy that wanted me to ask him questions, Dr. Ellington, and then Matthew Levy, who will be a doctor soon. Can you comment on -- he was talking about there's no problem with left and right, the accumulation of these organisms and the water/air interface or something. Could you -- I'm just curious if you could just expand a little bit on

what he had to say.

MR. BRADLEY: Don, I didn't get to hear his testimony. I was given the two-page written testimony that he provided. And he seemed to be arguing that you can use carbon dioxide, nitrogen and water and still get satisfactory results and so the Miller-Urey experiments are just fine. In fact, you get very, very minuscule yields that are quite unsatisfactory, if you're going to go to that next step and make polymer change. Okay.

So I think the problem is that -- and in fact, see, Miller acknowledges this in this paper. And this is National Academy of Science November of 2002. Extremely recent. What Miller is saying is, if you have a carbon dioxide rich atmosphere, you simply can't get efficient yields, you can't get enough material out of that to work with. And that being the case, then, he tries to postulate, maybe we might have had some more carbon monoxide. But he provides no real evidence for that. And then he also acknowledges, for example, "The synthesis of organic compounds from carbon monoxide atmospheres is difficult because of the strong triple bond of carbon monoxide." And he goes on to talk about you can do this, but it's quite

challenging. You have to use cosmic radiation. In his case he uses high-energy protons.

But I think the thing that I find interesting is, this paper gives a very realistic picture of where we're at. And it's different than the picture I get in the textbooks. And it's 50 years later, Miller working on exactly the same problem and certainly acknowledging, we don't really have a completely satisfactory answer yet.

DR. McLEROY: Is Origin of Life research -- are they more optimistic today or pessimistic or the same?

DR. BRADLEY: Well, I would say that the '50s and early '60s, people seemed to have the idea that, gee, final success is just around the corner. And it seems to me, as you go to the Origin of Life conferences and follow over the last 30 years, I think it's become much more sanguine that the more we study, the more we learn how challenging the problems are and that simple solutions to these problems are not emerging after all, that the problem has become, I think, recognized to be much more complex than people had originally thought. And probably people are much more, I think, at least cautious in trying to speculate on what might have

happened and whether we'll really to be able to explain that.

DR. McLEROY: I've just got one other question, because I know Dr. Bradley's got a good opinion of this. It's often stated, it was stated just a few minutes ago in a statement by a science teacher, some type teacher group, said, nothing makes sense in evolution -- I mean, nothing makes sense in biology except in the --

MR. BRADLEY: Evolution.

DR. McLEROY: Could you make some comments about that? And then I'm through.

MR. BRADLEY: Well, I would say, first of all, that when they're talking about evolution, it's distinct from the Origin of Life. However life began is going to be conceptually distinctive. And I'm not an expert on macroevolution. But I think that certainly microevolution is a very compelling heuristic for understanding much of what we do in life science. It doesn't appear to me that macroevolution, at that much bigger scale, really is necessary for the work that we typically do. And I'm not so impressed with that as a principle.

DR. McLEROY: Thank you.

CHAIR MILLER: Thank you. Appreciate your comments.

MR. RIOS: Ed Darrell, followed by Dr. Ken Heydrick.

MR. DARRELL: You should have copies of my planned remarks. I'm going to depart a bit from them. I'm the same guy who testified here in July. I'm still the guy who worked with the Senate and with the Education Department for a long time. And I've added one more thing. Now, I'm teaching up in the Dallas area. And it's teaching high school instead of college for a change. That's an interesting challenge.

One of the things that's become very apparent to me as I've sat here through the entire day is that a comment I made in July is more important now than it was then. And that is that very simply, I don't think the textbooks emphasize evolution enough in a particular way. And the particular way they don't emphasis it is in talking about the facts of evolution as facts that form the foundation of theory.

You probably can't see that much. They are basically five -- five facts that Darwin dealt with that undergird evolution theory. And

Ernst Mayr put this together in much more understandable form. We ought to give a little deference to Mayr. At 99 years, he's one of the last great deities in biological science.

The first principle is that most living things, almost all living things, are going to make more offspring than can possibly survive to maturity and to breed.

The second point, just an observation, a simple fact is that most populations are stable almost all the time. There's some fluctuations, but they're generally stable.

The third point is that in almost every case, and there are very few cases where this doesn't apply, food is limited. Now, if you have those three facts of evolution, you will get a struggle for survival. There's not enough food to go around, the people who get food very efficiently do better than those who don't.

The fourth fact is that variation is rampant. There are very few creatures that produce clones, armadillos being among them. We can be proud that we have armadillos in this state. But basically any offspring is going to be unique from its parents. And with very few exceptions, you're

going to find that variation is rampant.

The fifth point is that some variations are heritable. Now, if those variations are heritable, if there is an advantage, then the creatures with the advantage will compete better. And those advantages will accumulate over time.

If you understand that, then you know that all of the complaints from the Discovery Institute do not apply. If there were a problem with the peppered moths -- and I don't think there is a problem and none of the citations in the paper that Mr. Wells gave you earlier check out, including "Of Moths and Men," which mentions the people like Mr. Mel -- Wells will indeed offer it as a criticism, but it will be wrong. But if it doesn't work, so what? We know that the moths change. The question is: What triggered it? We don't know. Well, find something. When Kettlewell ran the experiment. The birds made the selection very easily. If they don't do all the selection, we've got to find another agent. But that's all it means.

So in short, stick with what the books say. They're good and they've got the science well.

Thank you.

CHAIR MILLER: Thank you.

MR. RIOS: Dr. Ken Heydrick, followed by Peter Johnston.

DR. HEYDRICK: Good evening. My name is Ken Heydrick. I'm the science and health coordinator for the Pflugerville School District just north of Austin here. I'm former president of the National Science Education Leadership Association, former president of the Texas Science Supervisors Association. And, currently, I'm a member of the Earth Science Task Force, which is going to be reporting tomorrow here at 10:30 a.m. So it's going to be a short night.

And I also want you to know that I'm a Christian. I belong to St. Martin's Lutheran Church here and I missed choir rehearsal tonight. So this is very important.

The scientific integrity of our high school biology textbooks is at stake. Please adopt the 2003 biology textbooks list that is being recommended by the TEA staff and the official biology review panel. Furthermore, please do not require any changes in those books that would weaken the coverage of evolution, either by altering the coverage itself or by adding nonscientific

alternatives such as intelligent design.

Evolution is a unifying concept in science. Scientific disciplines with a historical component such as astronomy, geology, biology and anthropology cannot be taught with integrity if evolution is not emphasized. One of the best biology teachers I know teaches in Pflugerville. Her name is Julia Levy. Ms. Levy was appointed to the TEA biology review panel who reviewed your textbooks. I truly trust her. And she wholeheartedly supports the biology textbooks as written.

Evolution is a very important unit of study in Biology 1 and AP Biology. From a larger perspective the following organizations and associations have clearly stated that they oppose the inclusion of creationism in the science curriculum. Furthermore, all of these groups have clearly stated that evolution needs to be included in the science curriculum. This includes the National Academy of Sciences, the AAAS, the National Science Teachers Association, the National Biology Teachers Association, the National Science Education Leadership Association, the Science Teachers Association of Texas, the Texas Biology Teachers

Association and the Texas Science Education Leadership Association. Quite a group of individuals.

The proposed biology books meet the requirements of our academic standards, the TEKS. In fact, 20 percent of the biology TEKS center around the concept of evolution. And about 12 percent of the biology TEKS are on the high school TAKS exam. Please adopt the books as they are now written with no changes in the coverage of evolution. Kansas, Ohio and New Mexico ultimately rejected the claims of the intelligent design movement. Please do not make Texas the brunt of jokes and ridicule. Please accept the proposed textbooks without dilution or distortion of evolution, which is fundamental and a unifying concept.

Thank you.

CHAIR MILLER: Thank you so much. Appreciate your time.

DR. McLEROY: See you in the morning.

MR. RIOS: Peter Johnston, followed by David Mixon.

MR. JOHNSTON: My name is Peter Johnston and I speak today as a father, as an

educator, as a graduate of law school, a recipient of an undergraduate degree from Cornell University and president of Texas Center for Family Rights. All that of is simply to say that I am deeply devoted to education, even as you are, also.

As a former teacher and administrator, committed teachers in any discipline, whether science, literature or history, yearn to help students to develop critical thinking skills. Oftentimes, though not always, it is more important to develop those critical thinking skills than to remember specific facts in a given subject, since those critical thinking skills transfer to just about every vocation and facet of life. Those critical thinking skills are constant with your TEKS requirement for biology. The student is expected to analyze, to take apart, piece by piece, to review and critique both positive and negative scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information.

Two goals for biology teachers therefore are: To teach the subject and give students an opportunity to develop critical thinking skills. In America, freedom of speech and minority

opinions are not you just to be tolerated, they are to be encouraged. As a history major, I am amazed at the unbridled efforts to sensor minority reports in evolution. When molecular geneticist, Michael Denton says, neither of the two fundamental axioms of Darwin's macroevolutionary theory have been validated by one single empirical discovery or scientific advance since 1859, students should have an opportunity to objectively evaluate this weakness and others in macroevolution through their textbooks. Such true objectivity allow students to be the jury in the courtroom of the classroom.

Just as a jury hears witnesses, examined and cross-examined, to accurately determine the strengths and weaknesses of their testimony, so too should students as the jury in biology classroom have the opportunity to hear strengths and weaknesses to render a proper and unbiased verdict.

An attorney who has a witness with indisputable, rock-solid evidence is not afraid of cross-examination, only the attorney whose witness is weak in evidence. While ABCs in math are static subjects, sciences, by the State's acknowledgment, are subject to change and, therefore, need objective assessment of both strengths and weaknesses.

Our Texas students deserve the right to put the strengths and weaknesses of evolution on trial through the use of sound critical thinking skills and thereby allow teachers to ignite a passion, challenge future Nobel prizewinners, and as Ms. Liz Carpenter said, "Give children the room to think" without censorship.

Thank you.

CHAIR MILLER: Thank you.

MR. RIOS: David Mixon, followed by Carl E. Schlaepfer.

MR. SCHLAEPFER: Good evening. I don't see Mr. Mixon, so I think I'm on. These are my handouts here.

My name is Carl Schlaepfer. I have a masters degree in electrical engineering from Stanford University. Use lots of physics, very little biology except for how much current it takes to get you killed.

The -- I actually -- also I feel kind of out of character here, because I also did not read any of the textbooks. But I do have an interest in education. And I would like to draw your attention to something which I believe is very important. You know, we've heard a lot tonight

about diluting theories. And you know, it's kind of hard for me to visualize that, because if you plant a tree in a forest, I mean, you're not diluting the forest. You know, it's -- anyway, it's one of those things that I've kind of had a hot button for and that is diversity.

What I mean to say by this is that you have theories and hypotheses and viewpoints and everything like that. Why should they not all be part of education? I don't understand that. I think the -- if you have a diversity of ideas, particularly if they're overlapping or competing with each other, they do have a -- an affect on the capability of students, I think, to evaluate theories, appreciate the diversity of theories, the interesting history of science, and you know, what -- how the various theories were developed. That is fascinating. And I think that should be included.

So I'm a little bit out of character because I'm really not anti-anything or anti-everybody tonight. I'm for everything.

So what I'd just like to say, too, is the various theories that I've come across here are the Darwinian, LaMarkian, spontaneous generation,

panspermia, intelligent design and, actually, any other nonreligious theory, I think, would be acceptable. I have no expertise in intelligent design. I read one book on it. It included evolution. So I don't know what the problem is.

Anyway, the point I would like to make in summary is that I think that diversity promotes inquiry and simulates discussions and allows students to appreciate history with its past thought processes. And I think we ought to make sure that textbooks used in schools remain as unbiased and as inclusive as possible and to open inquiry and discussion among the students, because then they're interested in what they are learning.

Thank you very much. Any questions?

CHAIR MILLER: Thank you.

MR. RIOS: Michele Bubnis, followed by Damon Waitt.

Damon Waitt, followed by Anita Gordon.

DR. WAITT: Hi. Good evening, my name is Dr. Damon Waitt. I'm the senior botanist at the Lady Bird Johnson Wildflower Center. I have a BS in biology from Tulane University, an MS in botany from LSU in Baton Rouge and then I was smart

enough to come to Texas and get my Ph.D. in botany at the University of Texas.

As the beneficiary of a Texas education, it has been my privilege to devote my professional career to the scientific education of Texas citizens. For the past decade, I have served the Texas public as both a scientist and educator, serving on the faculty of St. Edward's University in Austin and Southwestern University in Georgetown and currently as the senior botanist at the Wildflower Center. I also serve as the vice-president of the Texas Academy of Science.

As someone who takes their responsibility for public science education seriously and as a parent of two children in the Texas public school system, I feel it is incumbent upon me to testify before this Board on behalf of the contemporary theory of biological evolution. I also sought and received approval from the Botanical Society of America with its 1,637 members to represent them at this meeting. Seventy-four of those members are Texans. At the same time, I represent the Texas Academy of Sciences, which was formed here in Austin in 1880 and represents 616 scientists throughout the State of Texas. The Texas

Academy of Sciences is an affiliate of the American Association for the Advancement of Science. You're probably familiar with that association as Journal Science, which reports nearly 140,000 individual and institutional subscribers and 272 affiliated organizations.

I had planned to read to you some of the policy statements that have been adopted by the Texas Academy of Science, based on their affiliation with AAAS. Let me just read a short excerpt. "The counsel of the Association" -- and this is the AAAS -- "affirms that so far as the scientific evidences of evolution of plants and animals and man are concerned, there is no ground whatever for the assertion that these evidence constitute a mere guess. No scientific generalization is more strongly supported by thoroughly tested evidence than is that of organic evolution." December 26, 1922.

Well, I could read you more testimonies and more policies, but I think you've heard enough of that. And actually, I'd like to relate you to an experience I had earlier today. In preparation for the meeting, I went to go see Jane. And Jane is a proprietor of a barber shop on Burnet

Road in Austin, Texas. Jane's been cutting my hair for 15 years. She's a true-blue Texan. And if it weren't for her two X chromosomes, she'd be a good ol' boy. She's in her mid '60s, with a bouffant hairdo that's died, fried and on the side, we like to say.

Despite our long friendship, I knew that broaching the subject of evolution in science education would hold some risk. She's been shaved once and baptized twice. To complicate matters, Jane is old school and still wields a straight razor to get at that hair on the back of your neck.

May I finish my story? One more minute.

CHAIR MILLER: Yeah. Go ahead.

DR. WAITT: My life was literally in her hands. I spent about an hour in that chair. And as you can see, I don't have a hour's worth of hair to cut. And we spent most of the time in discussion, each of us expressing our views on everything from the origin of man to skin color variation, along latitudinal gradients, to the age of the Earth. And there was very little we could agree on.

Yet, near the end, with shaving cream

on my neck and a six-inch blade in her hand, we found a few points of consensus. And here they are: That even though we have different views or theories, we decided that disproving the other person's views or pointing out weaknesses in it did not constitute proof for their own view. And secondly, we decided that scientists base their theories on facts and evidence because facts can be tested and faith cannot. Although I'm sure there are some people here who feel their faith is being tested tonight.

As long as science education belongs in the realm of scientists like myself and those I represent, I hope the Board will support the unadulterated teaching of evolution to explain the diversity of life on Earth.

Thank you.

CHAIR MILLER: Thank you very much.

MR. RIOS: Anita Gordon, followed by MerryLynn Gerstenschlager.

MS. GORDON: Hello. I'm Anita Gordon. I'm a biology teacher. I'm presently also the science specialist for Round Rock Independent School District. But I come not as a representative of the district, nor as a

representative of the Texas Association of Biology Teachers, of which I'm a member, but I'm not their representative. I'm speaking for myself as a teacher of biology for 31 years.

I have been amazed at the controversy that surrounds the adoption of biology textbooks for use in public schools every time they're presented for adoption. During these years, various hypotheses have come under attack for their supposed weaknesses by those attempting to discredit scientific research that supports evolutionary theory. It would seems that these critics who operate outside the scientific community and have not published research that supports their point of views, think that theirs are the only critical opinions. Yet science itself requires that hypotheses be rigorously tested and defended, while opposing viewpoints are constantly being challenged within the scientific community.

This is the nature of science. It applies to all hypotheses and theories, including evolutionary theory. While details of evolutionary theory are debated among scientists, the consensus is that theories of biological evolution explain both the unity and diversity of life.

Over the years that I have been both a student and teacher of biology, I have seen textbooks change to reflect current understandings of scientific concepts. Much of the research of the past 30 years has given additional support to evolutionary theory. This is particularly true in the field of genetics and of developmental biology. As our understanding of the relatedness of organisms at the level of molecular genetics has increased scientists have modified the taxa to reflect these changes in evolutionary theory. The current textbooks under consideration reflect that change.

In science we typically refrain from saying that science has proven something to be true. Instead, we say evidence supports a given conclusion. The Miller-Urey experiment, in concluding that production of organic molecules was possible under prebiotic conditions has been questioned, due to the gases that were used. However, additional experiments with improved designs have supported the conclusion, if not the methodology. The inclusion in textbooks of this experiment is important for its role in illustrating how hypotheses in science can be tested and later revised as new thinking and tools for investigation

are developed.

The processes of science will continue to modify our understanding of the natural world. It is this investigative process that we want to model for our students, to spur their curiosity and to engage them in the quest for understanding. The textbooks reflect the scholarship and consensus of the science community. It is imperative to the development of scientifically literate citizens that we maintain these standards.

And I would like to add, I've heard tonight you ask questions of the speakers that focus on being sure that the text meet the criteria for evaluating hypotheses and theories for strengths and weaknesses. These books meet that criteria. They do not need to be changed.

CHAIR MILLER: Thank you.

MR. RIOS: MerryLynn Gerstenschlager, followed by Edward Ed Vinson.

CHAIR MILLER: Dr. Vinson left his testimony here.

MS. GERSTENSCHLAGER: Good evening. I am MerryLynn Gerstenschlager, education liaison for Texas Eagle Forum. And I am here to request

that the biology textbooks conform to the TEKS 3A by requiring students to study the strengths and weaknesses of scientific theories. I'd like to comment on the Santorum Amendment referenced at the July 9th hearing.

On July 8th, U.S. Senator Santorum's staffer wrote to me and said that, "Senator Santorum's Amendment was included in the conference report of HR1," that's the No Child Left Behind Act. "It is not in the bill itself and does not have the force of law. It does express the sense of Congress concerning the teaching of science education and is legally significant, although nonbinding."

The Senate approved his amendment by a vote of 91 to 8. In support of the amendment, Senator Kennedy said, and I quote, "It talks about using good science to consider the teaching of biological evolution. I think the way the Senator described it, as well as the language itself, is completely consistent with what represents the central values of this body. We want children to be able to speak and examine various scientific theories on the basis of all of the information that is available to them so they can talk about the

different concepts and do it intelligently, with the best information that is before them. I think the Senator has expressed his views in support of the amendment and the reasons for it. I think they make imminently good sense. I intend to support that proposal."

Senator Robert Berg said that, "Students be exposed not only to the Theory of Evolution, but also to the context in which it is viewed in our society. I think too often we limit the best of our educators by directing them to avoid controversy and to try to remain politically correct. If students cannot learn to debate different viewpoints and to explore a range of theories in the classroom, what hope have we for debate beyond the schoolhouse doors? If education is truly a vehicle to broaden horizons and enhance thinking, varying viewpoints should be welcome as part of the school experience."

In conclusion, Texas Eagle Forum agrees with an August Zogby poll. Most Texans surveyed want biology textbooks to teach the strengths and weaknesses of scientific theories, including evolution. Thank you very much.

CHAIR MILLER: Thank you, MerryLynn.

MR. RIOS: Janis Lariviere, followed by James R. Campbell.

MS. LARIVIERE: It's very nice to get to stand up. Chairman Miller and board members, I'm Janis Lariviere. Thank you for allowing me to speak today. I was a high school biology teacher for 24 years, 17 years here in Austin. I've been recognized as a successful biology teacher. I was outstanding biology teacher -- I won the outstanding biology teacher award for the State of Texas in '88, the State finalist for Presidential Awards for Excellence in Science and Math in that same year, Austin High School Teacher of the Year in '91 and the Texas Excellence Award for Outstanding High School Teachers in '92. I am currently serving on the State Board for Environmental Education, having been appointed to that board by then Governor George Bush in '99.

I am no longer a classroom teacher. I am now part of the UTeach program at UT Austin. This fall we have 400 students preparing to be the next generation of science and math teachers. I'm here today to urge you to adopt the biology textbooks as now written with no changes in the coverage of evolution.

These textbooks reflect the consensus view of the scientific community. The National Science Teachers Association, which is 55,000 members strong has published a position paper on evolution. There are two points from that paper that are important in this discussion today. One, and I quote, "Policymakers and administrators should not mandate policies requiring the teaching of creation science or related concepts, such as intelligent design, abrupt appearance and arguments against evolution."

No. 2, from that same position paper, "Science teachers should not advocate any religious view about creation nor advocate the converse. Teachers should be nonjudgmental about the personal beliefs of students." Science teachers should teach science. Our student's faith is personal and private and a discussion of it does not belong in science classroom.

On a personal note, as I am not in the science classroom right now, you may find it interesting to note that I am a practicing Christian, ELC Lutheran. There are five million of us in the United States. The official position of my church is that accepting evolution as a unifying

concept of science does not contradict our faith.

Please adopt biology textbooks as they are now written.

Thank you.

DR. McLEROY: She took us up to 12:00.

CHAIR MILLER: Huh?

DR. McLEROY: She took us up to midnight.

CHAIR MILLER: I'll be darn.

MS. LARIVIERE: Good morning.

DR. McLEROY: Thank you.

MR. RIOS: James R. Campbell, followed by Marvin Olasky.

Marvin Olasky, followed by Brady Mayo.

Brady Mayo, followed by Mary Long.

Mary Long, followed by Mary Catherine.

MS. LONG: I have some stage props. They were heavy, so I've got to show them to make it worth bringing.

I'm here today to urge -- or I should say -- well, yeah, I'm here this morning to urge you to adopt all of the biology books under

consideration. I have been heavily involved in science education in the public schools of Texas since 1968. In 1986, I was selected Texas State Teacher of the Year. And of course, I'm very proud of that award.

After teaching biology for many years, I became curriculum coordinator and then director of the Science Academy of Austin, a magnet high school. You heard one of the current students awhile ago. And, of course, I was very proud of him.

In 1997, I began working at the University of Texas in the UTeach program. This is the one that we've heard mentioned tonight that prepares future teachers of science, math and computer science. UT Austin has become a major source of new teachers in these high-need areas for Texas schools.

I collect old biology books. And that's what my stage props are about. All of the ones I've brought are published by Holt, Rinehart Winston. And this is not a plug for the company or the book as it exists today, to be clear. The oldest one I have is 1921. And this one's fascinating because it has a section on evolution.

And it makes an opening point that the idea of the interrelatedness and connectiveness of all life originated 2000 years before with Aristotle.

And then this book is a 1947 book. I hate to tell you, but that may have been my high school biology book. I'm older than I look.

In 19 -- let's see, 1950 -- wait a sec? I have too check that. The next one was 1951 and I was in college when this one came out. And then in 1985, that many of my friends teaching in Texas taught from. And here's the newest one. The only reason I'll show you that one is because you can see the difference in the size from the oldest to the current.

Point of all of this. All of these books contain evidences for evolution. They are very similar to each other. It's surprising how from one generation of book to the next, the evidences were essentially the same that they pointed. They just became more refined. You know, things like embryo development and so on.

Since I've been out of school and since these books have been published, though, the evidences for evolution have literally exploded. What hits me tonight as I've heard various

testimony, we could shoot down aspects of some of these evidences, but that doesn't shoot down the Theory of Evolution. For every one of the evidences that are talked about in the books, if they were discredited, if they should be, there are hundreds of other evidences that would fill in the gap.

Stick to -- I hope you will adopt all of the books. Do it without delay because biology changes so quickly that I don't want our students to get books that are even more out of date than what they'll get if they get an immediate approval of these books.

Thank you.

CHAIR MILLER: Thank you. I appreciate your time and your commitment.

MR. RIOS: Mary Kathryn Caubele, followed by Kristin Sullivan.

Kristin Sullivan.

CHAIR MILLER: Okay. That's it. That concludes our public testimony today and -- or this morning. And now, the hearing is officially closed.

DR. McLEROY: Excuse me. Are there any -- the late registers they haven't been --

CHAIR MILLER: No. Dr. McLeroy --

DR. McLEROY: I just was asking.

CHAIR MILLER: -- I made that very clear earlier.

DR. McLEROY: I must have been sound asleep.

CHAIR MILLER: And I made it very clear weeks ago to Dr. Leos. So -- that I'm, you know.

All right. Robert.

COMMISSIONER SCOTT: Now that the official meeting is closed, we are here to listen to the viewpoints of those folks who were from out of state who wish to come and address us. This is an informal meeting, willing to listen to you-all.

And we'll go in order here with John West.

MS. KNIGHT: We're still observing the three-minute time limit, right?

CHAIR MILLER: Yes.

COMMISSIONER SCOTT: We are not required to, but I think in the interest of time obviously, I think. And also, the fact that there is not a quorum here is important. In the instance that we did have a quorum, we might have to reevaluate continuation of that.

MR. WEST: I want to thank you for being willing to hear us. I know it's very late and this is very kind of you and I know it's been a long day.

My name is John West. I'm associate director of the Center for Science and Culture at Discovery Institute. Discovery has more than 40 research fellows in the sciences and humanities, many of whom have associations with major American universities.

Contrary to what you've been hearing for several hours, we actually support the teaching of evolution. In fact, we want students to learn more about the theory. And we also agree, at least I do, what's taught about evolution should be consistent with what's in the peer-reviewed science literature.

Now, there have been a lot of false charges put out about what we're actually recommending. And I can't possibly respond to all of them, although I would love to answer specific things that you have. I heard that when I stepped out briefly to finally get a piece of dinner at 10:00 that Samantha Smoot was even accusing us of violence against people. That was a new one.

And I guess I understand that. You know, attack of the characters of people if you really don't want to focus on the evidence. But I -- and I'd be happy to talk about that more.

But the two things that I want to get in first. We're not advocating the inclusion of intelligence design into the textbooks. And if you've read our materials that we've sent you, you would know that. This is another attempt to divert the attention from the real issue, which is, whether what's in the textbooks will be accurate.

Now, the second thing I want to say is that there's been this charge that these textbook problems are imaginary or they're nonexistent or based on fringe science, non-peer reviewed. If what we are recommending in actual reports we've given you is fringe science, then why are some textbooks already adopting or getting things right. In fact, each of the textbooks on each of the things that we have told you about at least get some of the things right. But they get different things right.

Take the issue of peppered moths. You've been assured by several people that the criticisms we've made are bogus. Yet one textbook -- and I have the citation. One textbook

now actually includes some of the very scientific criticisms that you're being insured are bogus.

Take the issue of Haeckel's embryos. Since Jonathan Wells' book came out, a number of textbooks have removed these drawings, including by an author who signed something saying the textbooks were fine. He was embarrassed by that after Wells' book came out and he took it out afterwards. And one of your textbooks -- proposed textbooks actually includes a diagram that now accurately shows the earliest stages of embryological development. Just like one of the things advocating.

Or take the issue of microevolution in the size of finch beaks in the Galapagus island. Some texts now do tell students that finch beak size returned to normal as soon as the rains came back, showing some of the limits of natural selection. So there was no evolution. Others don't. If some texts can get these facts right, why not all?

I also want to stress that we have cited peer-reviewed science literature for every one of the things that we've identified. We're not talking about intelligent design. I'd be happy to talk about it some other time. But what we are talking about in the textbooks, we've now actually

given you five binders. You don't have to trust what Jonathan Wells says. You don't have to trust what I say. You can read it through for yourself. We have no fear of more information. And I encourage you to do that.

So thank you.

DR. McLEROY: To clarify those five binders, what are in those five binders?

MR. WEST: They include the things on the issues that we've raised, like the Cambrian explosion, like the vertebrate embryos, like the micro/macro evolutionary distinction.

DR. McLEROY: But you're talking about even the quotes -- the quotes that you have used, they're documented; is that right?

MR. WEST: Yes.

DR. McLEROY: Okay. Because that seems to be one of the greatest ones. Does it give the peer-reviewed information?

MR. WEST: Yes. The selections are all from the peer-reviewed articles, which we would love for people to read.

DR. McLEROY: Thank you.

DR. BERNAL: So are you saying that the purpose for all your activities with Discovery

is just simply to get some of the wrongs righted, some of the things that you think are wrong, some of the things that you have written about that you feel are wrongly cited in the textbooks?

MR. WEST: We want --

DR. BERNAL: Is that your purpose?

MR. WEST: We want -- yes, we want the factual errors corrected. And those scientific weakness that are identified in the peer-reviewed science literature. The main one we've identified of the weakness is the micro to macro evolutionary extrapolation, which is a legitimate controversy, even among evolutionary biologists. We think that should be in there. But we are not proposing that you insert intelligent design.

As you know, for those of you how actually looked at the textbook, there are actually two textbooks that do insert intelligent design. And we would prefer that those be removed. We think the discussions are inaccurate. And maybe that's something we can agree on with all the people who said, "Don't insert intelligent design." I don't think they read the two textbooks that actually mention intelligent design by name and discuss it in order to attack it in a way that we think is

inaccurate.

So -- we're focusing on factual errors -- you're right. Factual errors and then things that are in the peer-reviewed science literature.

DR. BERNAL: So all of the areas that you've depicted, if they were corrected, you would go out of existence; is that it? I mean, that's your purpose, you say. The purpose is for them -- for you to cite the mistakes that they've committed. And if they correct them, you would be out -- you would be out of business; is that correct?

MR. WEST: We would be happy. No, we wouldn't be out of business, because, as I note in the longer version of my remarks but I had to cut them, we do support the work of people working on intelligent design. And that is in the written testimony and that's -- we've made no bones about that.

But that's a different -- as people have said, intelligent design is an emerging scientific theory, unlike some of the people said that it's not pure. They're actually wrong, and in fact, we will document and send that. But it is an

emerging minority scientific theory. And so at this point, we don't think that that's something that we're recommending that be included in textbooks or be mandated from on high.

And we've been consistent on that. Some people have talked about Ohio. That's very interesting. I urge you, write some of the members of the Board of Education in Ohio. The construction, what we advocate there was not intelligent design. It was, that they make sure that people study the existing scientific, not religious, not intelligent design -- well, intelligent design really isn't religious. Not be the scientific criticisms of evolutionary theory. And the Ohio State Board of Education endorsed that and actually issued a science standard that requires every student in the State of Ohio, as part of their State science assessment, has to learn how and be able to describe how scientists continue to critically analyze aspects of evolutionary theory. And that was almost directly what we actually proposed to them.

And so it's actually not true that, say, Ohio rejected what we were suggesting or that somehow we're changing our tune. This is what we

advocated in Ohio, not just in Texas.

DR. BERNAL: Somebody identified the work that you-all do in Discovery as a political movement. In a political movement, the first thrust or one of the first thrusts was for you to attack the weaknesses, supposedly, or the things that you perceive to be the mistakes or the errors of evolution. After you complete that, then you come in with intelligent design and try to impose that as a science.

MR. WEST: Well --

DR. BERNAL: Is that part of your program?

MR. WEST: Part of your program is to support scholars like Phil Dembski, Michael Behe, who you'll be hearing from in a couple of minutes, who are working on intelligent design. And if that theory continues to develop and flourish and go into the peer-reviewed science literature, then some day maybe it should be in textbooks. That's not what we're advocating now. But that's the normal progress of the scientific theory.

What we're focusing on how is that what's already in the peer-reviewed science literature ought to be reflected in the textbooks.

And the -- as far as the political movement and stuff, that is very interesting. Of course, this is a highly-charged issue. There's no question about that. But let's -- if you really want to be honest -- I mean, I listened, just like you did, for eight, nine, ten hours, people stigmatize my motives, make all sorts of charges and say motives are important. Well, then, let's really -- if you -- let's be fair about that. I encourage you all to go to a web-site called www.darwinday.org.

If you think that only the motives on this side -- you know, there's these people are motivated by religion who just can't stand evolution and there's no sort of science in it. Some of the people that you're hearing from are what I would call evangelist really for Darwinism. And I encourage you, go to -- many of their names, not some of the people here. Actually, some of the people who do do darwinday dot activities.

There's this international movement to replace February 12, which is Lincoln's birthday, instead of celebrating that, they want to celebrate Darwin's birthday. I encourage you to go to this web-site and see how they talk about Darwin. It's almost like a saint. I mean, it really is. And

worshipful. And so they want every school to celebrate Darwin Day instead of Lincoln's birthday. And has many evolutionary scientists, some of the names of the people who were cited here today. And in fact, the National Center for Science Education is one of the groups that have co-sponsored Darwin Day activities.

And so, you know, there are agendas on all sides. And -- but what should be in the textbooks is what is provable science.

MR. BERNAL: When I first talked to you -- when I first asked you, it seemed like the beginning and the end was just to be a critic about the mistakes made by the people that believe in evolution. And now, you've kind of gone into -- into political mode that you do have another design. And that is, after you weaken the whole program of evolution, you're going to come in with ID, with intelligent design, and try to impose that.

MR. WEST: No, I didn't intend to say that. I don't think I said that. What I said --

MR. BERNAL: I think you implied it, though.

MR. WEST: What I -- well, I'm sorry,

I didn't mean to. What I said in my written testimony, which I excised when I was reading it. But what's before you I said, while we do support scientists who work on intelligent design -- and that's true. We've never made any apologies for that fact. But that is an emerging theory. And so there are legitimate questions about how well-established does a theory have to be as an alternative before you put in textbooks?

MR. BERNAL: Okay. But give me a direct, honest answer. Would you want to impose ID as a science into the textbooks?

MR. WEST: Impose it? I --

DR. BERNAL: Yeah, put it in. Include it. Is that your position, personally?

MR. WEST: Personally, my -- no, personally my position --

DR. BERNAL: You're saying that you want to aid and abet and help scientists -- people that believe in ID to -- that you're going to help promote it. Promote it, right?

MR. WEST: To do their research, because we think it's an exciting research.

DR. BERNAL: Would you personally believe that you would want to put that in a science

book.

MR. WEST: If it continues to go and get more into the peer-reviewed science literature, some day.

DR. BERNAL: You would be supporting it now, you would be working towards that or do you believe that it should be in a science textbooks?

MR. WEST: I think that's putting the cart before the horse. I mean, that --

DR. BERNAL: No, no, I'm asking you -- forget about the cart and the horse. I'm asking your opinion. Is that where you're going?

MR. WEST: If it continues to develop as a scientific theory and so that it gets in the peer-reviewed science literature, more than it is already, then at some point, yes. I mean, at some point it would be an appropriate thing.

DR. BERNAL: Okay. That's what I wanted to get, yes.

MR. WEST: But that's not --

DR. BERNAL: Just be honest about it.

COMMISSIONER SCOTT: Ms. Leo, you had a question.

DR. LEO: Yes, I was just going to say that, you know, you support that ongoing work of

scientists who support ID theories, not all of who are Christians, not all of who have the same beliefs, but you also support separation of church and State and have funded and given seminars on that very thing, because it has nothing to do -- I mean, there is no hidden agenda here. There are Christian scientists, there are agnostics, there are Jewish scientists that believe in ID theory.

MR. WEST: Intelligent -- again, I love -- I mean, I'd like to talk more about design, but that really is not what we're recommending to -- again, I would agree with some of the people who kept saying what should be in the science textbooks is reflective of the peer-reviewed science. And that's exactly right.

The problem is, you have three textbooks who still, for example, use almost directly the pictures from Haeckel's embryos. They have been taken out of many textbooks because they know that it's wrong. Why is it there? Some of the people are saying, well, the -- that evidence doesn't matter because we just can have -- there are hundreds of other better evidence. Well then, why not put it there? I mean, if that's the case then fine, that's great. Put in the better evidence.

But why perpetuate things that have been left around or for a long time.

There's something strange. Haeckel's embryos I keep harping on because it is still in some of the textbooks, despite the fact that even people like Stephen J. Gould lampooned it. Despite the fact, for decades, people knew about it. So why do they keep it in there? Well, it happened to seem to provide really good support for a certain theory -- Darwinian theory so they just -- it was too good to give up.

I mean, that was also the case of the peppered moths. No one disputes microevolution in peppered moths. And we haven't said that it shouldn't be in the textbooks. But at least make it accurate, as one textbook actually does, to give students the problems with it.

And so that's all we're asking for. And in the case of the peppered moths, you know, I think it was in that case or maybe it was Haeckel's embryos who one scientist when they heard that it wasn't -- that -- what he thought it was, you know, it was like learning they didn't have Santa Claus. So we have some sort of emotional attachment to it. And that's one reason some of these things that even

evolutionary scientists question in the peer-reviewed literature why they get stuck in the textbooks for years is because of this emotional attachment. Because there are emotions on both sides. And all we're asking is, look at evidence. You don't have to trust what we say, because I know probably after today, after hours of all sorts of assertions, you probably wouldn't. So look at the peer-reviewed evidence.

DR. LEO: What about those assertions that Discovery Institute fellows are not legitimate scientists that we've heard over and over again?

MR. WEST: Well, we sent to you-all -- I mean, that's an interesting story. I've actually read Dr. Schafersman's testimony when he posted on his web-site. And I found it interesting that he admitted, actually, that -- that Michael Behe was a legitimate scientist until he started to question Darwin. And so it's sort of by definition.

Look, it's clear Darwinian theory is the majority theory. There's no question about that. But we just issued a statement last week that was signed by more than 250 scientists from around the world, including people at places like the

Smithsonian and Princeton, including at least 60 who had special biological specialties and many others that were in related like chemistry and things that were related to origin of life who say that they are skeptical of the central claim of neo-Darwinism, which is that you can get all this complexity from natural selection acting on random variation.

So it's just false, just empirically false that there are no scientists are who are legitimate scientists who question that aspect of Darwinian theory. They are a minority. Make no bones about that. But the blanket assertion that no one is credible who does that is sort of a truism. You define it as soon as someone questions Darwin, then they can't be credible because we know that neo-Darwinism is this grand theory that everything is fact.

COMMISSIONER SCOTT: Thank you, Dr. West.

Members, our court reporter needs a break. She has battled mightily tonight and could use a break really quickly.

(Brief break.)

COMMISSIONER SCOTT: I think the court reporter can -- would like to continue

transcribing or when she leaves, we'll still have a tape of tonight's discussion that we can transcribe later.

So if we can get Dr. Nancy Bryson.

DR. BRYSON: I am an associate professor of chemistry at Mississippi University for Women. I wish to comment on the facet of evolution termed chemical evolution or prebiotic chemistry.

This area concerns possible mechanisms of synthesis of the DNA basis called purines and pyrimidines and deals with questions such as how amino acids could have come together to form polypeptides. All this long before the first cell appeared.

I believe that chemical evolution presents extreme problems for evolution and that these problems are finessed away in some biology textbooks. For example Starr and Taggert. A book entitled Biochemical Predestination, written by Origin of Life researcher Dean Kenyan in the late 1960s argued for the spontaneous synthesis of the DNA basis and for the ability of amino acids to self-organize into polypeptides.

However, a careful analysis made by three researchers a decade and a half later,

severely criticized all existing chemical evolution scenarios in a book entitled The Mystery of Life's Origin. It is very significant that Dean Kenyan himself wrote the forward to this later book, stating that he had developed, "Growing doubts that life on Earth could have begun spontaneously by purely chemical and physical means."

To give just one of many specific problems cited by Kenyan and the three researchers with whom he came to agree, none of the simulation experiments which purportedly show self-organization of amino acids into polypeptides include the contamination -- excuse me, include the presence of contaminating sugars and aldehydes. Such contaminates would make inevitable interfering cross-reactions which would yield chemical junk products, rather than the highly specific biomolecules required by living things.

Honorable board members, I traveled here to Texas because I believe all students should learn about both the weaknesses and the strengths of Darwinian theory in an atmosphere free from intimidation. I know firsthand how intolerant some Darwinist can be. After making a presentation last spring about the specific weaknesses of Darwinism to

honor students at my university, I was harshly attacked by Darwinist colleagues and ultimately removed from my post as head of the science and math division at my university. Students at my college got the message very clearly, do not ask any questions about Darwinism. The chilling affects of that episode linger on now into the current academic year.

Please do not allow such an anti-intellectual climate into the high school classrooms in your state.

COMMISSIONER SCOTT: Questions of Dr. Bryson?

MS. LOWE: Earlier I believe we were told that those sugars and formaldehyde things in there were necessary for amino acids. And now you're telling us that they're not, that they were junk DNA. Could you elaborate on that?

DR. BRYSON: Well, I'm saying that when -- that there have been experiments that purport to show that amino acids self-organize into polypeptides, which are just chains of amino acids. But you know, in any synthetic scenario that would occur naturally, you can have all kinds of stuff. And those other reactants would interfere with the

production of a pure polypeptides.

COMMISSIONER SCOTT: Further questions?

Thank you.

DR. McLEROY: Thanks for coming from Mississippi.

COMMISSIONER SCOTT: Michael Behe.

MR. BEHE: Good morning. My name is Michael Behe and I'm a professor of biology at Lehigh University in Pennsylvania. I would like to thank the Committee for allowing me to testify today. Since time is limited, let me get right to the point.

I am told that Texas law demands that textbooks discuss both the strengths and the weaknesses of scientific theories. The most glaring weakness of Darwin's Theory of Evolution is its failure to account for complex biological features. For example, in my book, Darwin's Black Box, I argue that natural selection can't explain the hugely complicated molecular machines found in cells, such as the bacterial flagella I'm showing on the monitor, which is quite literally an outboard motor that some bacteria use to swim.

In response, as science text -- or a

science book published by Oxford University Press admitted, "We must concede that there are presently no detailed Darwinian accounts of the evolution of any biochemical system. Only a variety of wishful speculations."

Let me drive home this point. Some scientists are willing to admit that Darwin's theory has not explained the amazing complexity of the cell, the very foundation of life. Students have a right to know about this weakness.

But if there is no solid experimental evidence for it, why do many textbooks restrict discussion to mindless random forces? The answer, shown on the monitor, is not due to science, but to philosophy. As the Oxford University book bluntly states, "We should reject, as a matter of principle, the substitution of intelligent design for chance and necessity." The United States National Academy of Sciences agrees, shown on the monitor, stating, "Most scientists assume that there is historical and causal continuity among all phenomena in the material universe." The Nobel Laureate, Christian De Duve, bluntly warns of an overriding rule that life must be treated as a natural process whose evolution is governed by the same laws as

nonliving processes.

My point is this: Many leading scientists, science organizations and textbooks regard it as a philosophical premise, not as something to be questioned or substantiated that chance and natural law are sufficient to explain biology.

Students have a right to know that Darwinism is being propped up by philosophical premises that they and their families may not share.

Thank you.

COMMISSIONER SCOTT: Thank you. Any questions?

DR. McLEROY: I'd just like to say how much I enjoyed reading your book and the fact of all the controversy is raised. I really appreciate it.

MR. BEHE: Thank you.

COMMISSIONER SCOTT:

Dr. Eugenie Scott.

DR. SCOTT: I'm Eugenie C. Scott, executive director of the National Center for Science Education. I really don't have any horns or spiky tail or sharp teeth.

NCSE is a national nonprofit

organization of scientists, teachers and other citizens that defends the teaching of evolution in public schools. The Texas proclamation of 1989 required evolution to be included in biology textbooks. We reviewed that cohort of textbooks in biology textbooks 1990, the new generation. That is showing. And found that evolution had returned to textbooks for the first time in decades.

Subsequently, during the 1990s, Texas teachers and scientists joined their colleagues from other states to ensure that evolution was properly included in State science education standards. Because of Texas and the standards movement, evolution is now commonplace in textbooks.

I have examined the coverage of evolution in all but two of the current books. The college level books considered for AP biology, obviously, are much more detailed and accurate than books written for 9-12 biology. But the 9-12 biology textbooks, by and large, do an age and level-appropriate job. And we are pleased to see that evolution is gradually being presented as the organizing principle of biology.

There still is room for improvement. Evolution is still given far less attention in 9-12

textbooks than its importance in biology warrants. We applaud the textbook publishers for taking steps in the right direction and encourage them to continue working with their scientific advisors to improve the coverage of evolution in schools -- in the books.

I encourage you to ignore recommendations to alter the textbooks by correcting alleged errors that are not recognized as errors by the scientific community. You have heard plenty of agreement on this point from scientists and teachers testifying today. Don't mess with textbooks.

Publishers, of course, are likely to produce Texas editions of these books with these scientifically invalid "corrections" and produce standard textbooks for use in other states. Texas students would be then less prepared for college vis-a-vis students from other states and overall less scientifically literate.

Board members who are concerned about excellence in education will reject changes in evolution content rejected by evolutionary biologists. Teachers, scientists and authors of the textbooks are united in their support of an unqualified presentation of evolution in these

books.

I present a statement signed by authors of biology textbooks, including authors representing all but one of the books submitted for adoption this year, which calls upon textbook adopters like yourselves to treat evolution as a "normal part of science" and not to disclaim it or treat it as "somehow less reliable or less accepted by scientists."

Thank you for letting me express my opinions on these matters. I wish you luck in your important deliberations. And I'm happy to expand on any aspect of my testimony.

COMMISSIONER SCOTT: Thank you, Dr. Scott.

Are there questions?

I appreciate you being here.

Dr. Alan Gishlick.

DR. GISHLICK: Well, it's good to finally be up here on this fine Texas morning, though I do have the advantage that in California, it's still yesterday. So I'm not too far behind.

My name is Dr. Alan Gishlick. I have a Ph.D. in vertebrate paleontology from Yale University. Generally, people who do paleontology

end up with a rather wide-ranging training in comparative anatomy, organismal biology, geology in order to answer a lot of the questions we work on.

I have served as a textbook content advisor for three publishers and I have also served as a content advisor for a number of museum exhibits and evolution and science education based web-sites.

I'm coming here to urge you to adopt the textbooks as they've been submitted to Texas in their current form. Overall, these textbooks are fine examples that present the consensus view of scientist in their field. And you don't have to trust me or the textbooks. You can trust the fact that they are all these scientists who came from Texas A&M to tell you about how they think the textbooks are good and they think the textbooks accurately represent their own field. And they didn't come here to say this because they were emotionally attached to these examples, because they had unique and fascinated by these examples. That they find fulfillment in their research careers by doing it.

Now, this is not say that these textbooks are perfect. And I can find, by going

through them -- I have looked at all the textbooks in some version in nine of the 11 textbooks in the actual versions that have been submitted to textbooks (sic). And I can tell you that I can find errors. I can find very simple errors of fact. Biggs, Kapicka, Lundgren, et cetera, et cetera, includes a picture of a Devonian trilobite, which they misidentify as Cambrian.

I, as a paleontologist, get quite concerned about such things. But in terms of the students who read this textbook's ability to understand evolutionary theory or the current consensus view of science about this, this really doesn't have an effect.

Other textbooks contain errors of concept. I've notice a number of textbooks contain rather garbled discussions of phylogenetic reconstruction, which as a trained systematist, I find a bit disturbing. But I'm not sure this would greatly hinder student's understanding of evolution, because many of them are -- I don't think have the level of knowledge of anatomy, sadly -- I wish they did -- in order to really realize where this is going. And these things should be corrected in further versions. But it's important to look at the

versions they have. Do they get what generally scientists think? And I think they are accurate.

If these examples that have been -- we've talked about endlessly tonight are as flawed as some critics have claimed, then why aren't they asking to be removed? Instead, they are asking you to leave them in and then criticize them. This would have the effect of teachers saying, "Well, we just made you learn this and now we're going to tell you it's wrong."

This would actually have a far worse affect on student's understanding of biology as we in the field understand it, because it would leave them with the impression that we really are in doubt about many of these objects, which we are not.

Now, there may be discussions about the degree to which certain of these examples are not presented perfectly. And we always hope that textbooks improve them. I have certainly made my effort when I work with textbooks to continue to improve many of the things that I see as mistakes.

And for that, I thank you for letting me come and speak to you from out of state and so late in the day. It's pretty amazing that you're all are here, including the court reporter who, wow,

what a stud.

COMMISSIONER SCOTT: Thank you.

Any questions?

Thank you for being here.

Robert Pennock.

DR. PENNOCK: I am Dr. Robert Pennock, associate professor of science and technology studies at Michigan State University. I also serve on the faculty of the ecology, evolutionary biology and behavior program. I also speak as a member of the education committee of the International Society for the Study of Evolution. I'm also on the editorial board of the Journal of Science and Education. I'm also the co-author of a recent paper that actually demonstrates the step-by-step evolution of an irreducibly complex system. Although I no longer live in Texas, my nephew attends Westwood High School.

For the past dozen years, I've been researching the activities of the neo-creationist movement. I published two books and numerous academic articles showing the many flaws in the arguments of the so-called intelligent design theorists. Because they have no positive evidence

for their view, ID advocates actually rely upon negative argumentation, claiming that there are insurmountable weaknesses with evolution and that's how they're trying to insert their view here, through the back door by improperly appropriating the language of TEKS.

Intelligent design has actually been a total failure scientifically. They talk big, but they produce no results. And I miss the Texas way of saying this: "When it comes to science, the intelligent design movement is all hat and no cattle."

For a review article, I published in this month's issue of the Annual Review of Genetics and Human Genomics and Human Genetics, I surveyed the scientific and scholarly reviews of the intelligent design theorists. Their most significant works, particularly including Jonathan Wells' book, upon which many of the criticisms here have been based.

The response has been universally negative. I have several quotes of this in my written testimony here. I'll just mention one of them. That this is built upon a shaky scaffolding of special pleading, deceptive use of quotations.

One could go on. This is representative. The scientific community has strongly rejected these sorts of claims. They do not represent good science.

With regard to TEKS 3A, students cannot analyze and review the strengths and weaknesses if they're misled about the scientific assessment of the evidence as achieved by long accumulation of observation and experiment vetted by peer-reviewed journals. To properly fulfill the mandate of TEKS 3A, the discussions of evolution ought to be supplemented to accurately reflect its scientific centrality and its abundant scientific empirical support. Sections that discuss evolution should emphasize how it's one of the strongest of all scientific discoveries. And by way of comparison, ought to note that we have even more and better evidence for Darwin's discovery than we do for a view that the earth goes around the sun.

Thank you.

DR. McLEROY: For real?

COMMISSIONER SCOTT: Thank you. Any questions?

DR. McLEROY: Well, since he just -- you say it's stronger than the heliocentric theory?

DR. PENNOCK: I said, we have more and better evidence for this, that's right.

UNIDENTIFIED SPEAKER: You're not going to ask him --

DR. McLEROY: He said it's stronger. I don't need to ask anything. Thanks.

DR. PENNOCK: Thanks for having me.

CHAIR MILLER: Bruce Chapman.

MR. CHAPMAN: Thank you all. Again, I'm glad you're all here at this late hour. I wish I had had a chance to answer people making wild charges as the day wore on.

Earlier today, someone requested a copy of the letter that was received today -- actually yesterday from two members of Congress who had -- who were central in the development of the No Child Left Behind Act of 2001. As of later this afternoon, we got a new copy of it which is now signed not only by the chairman of the House Education Committee, but also by the chairman of the Senate Education Committee, as well as Senator Santorum. And as you know, the legislation -- the legislation in the report language says, "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." And then they go on to say that the kinds of criticisms that the National Center for Science Education and others have had of this are tending that it was watered down, that it was taken out and that it was defeated and so forth are wrong. That that is not the case, as they point out clearly.

The Santorum language clarifies that public school students are entitled to learn that there are differing scientific views on issues such as biological evolution. The No Child Left Behind Act calls for the enactment of state standards in the field of science. It is important that the implementation of these science standards not be used to sensor debate on controversial issues in science. I don't know how they could have made it any clearer.

There is no money, no penalty attached to this. This is guidance. This is not a mandate. The people who wrote this act were clear that they did not want to impose federal standards on the -- on the writing of bills in textbooks and so forth at the State level. But they also did want to have a spirit attached.

We've given you a list of scientists in this area and around the country who agree with this. You know about the poll of Texas residents where they show overwhelming 75 percent support for this idea.

And I'd like to conclude with Dr. Giuseppe Sermonti, a biologist and who is the editor of a peer-reviewed journal. This past week, I got from Dr. Sermonti not only an agreement that he, along with some evolutionary biologists who have changed their minds, are now supporting our list -- our statement. But he has published, now, a book -- or is publishing a book called Della mente la cate Darwin. He's the editor of a peer-reviewed European Journal of Science, a biology review called Revista Biologia. That is a highly critical book on the Darwinian theory. And he says in conclusion on it that Darwinism is the politically correct of science. And we certainly have seen that here today.

Thank you very much.

DR. McLEROY: I have --

COMMISSIONER SCOTT: Dr. McLeroy.

DR. McLEROY: Well, you didn't identify yourself. Could you quickly just tell what

your role is with Discovery Institute and also what the programs are and all this religious talk? Can you quickly address that and then I'm quiet and I'm through.

MR. CHAPMAN: Well, those are different subjects, but I'll do my best.

I'm Bruce Chapman. I'm the president of Discovery Institute. My background is that I was in State government once. I was the State -- Secretary of State in Washington State. I was the director of the U.S. Census Bureau in the 1980s and I was the U.S. ambassador to the United Nations organizations in Vienna, Austria.

After that I founded Discovery Institute. We study a lot of issues. For the gentleman who was asking about what other things we're doing, the Center for Science and Culture itself deals with a great many other issues. We're a think tank. We study the interface of science and culture. That has to do with bioethics, has to do with artificial intelligence, the implications of various kinds of science, not just this theory and not just this aspect of how education transpires.

We have a major transportation program. In fact, our biggest program is on

transportation policy. We have work on economics, on technology in society and so forth. So we're dealing with a lot of different issues. It's a think tank. It's been represented as something else, but that's what it is. And you're welcome to look it up on the web-site and see where -- everything we do and what we say.

The religion is -- actually, it's very interesting that one of the reasons we got involved in this issue was as a matter of academic freedom. And we saw that people were being accused of religious motivations simply because they have a differing scientific view on an important subject that does have implications. Yes, it has implications. We all know that. It has implications for religion. It has implications for sociological issues. It has implications for politics and a number of other things. But it is a scientific issue and should be judged on that basis.

We heard from Nancy Bryson here today, who has really been given a hard time over at the University of Mississippi for Women. That's happened in many places. It happened to Dean Kenyan at San Francisco State. But it's not right and it's

not -- when people today say, well, you know, I'm a Christian and I'm for Darwin's theory, well, so what? Of course you're -- it's fine to be a Christian for Darwin's theory or Jewish or Muslim or anything else. But the same thing is true in the other direction. There are a number of people who are Christians who are against it or Jews or not religious at all.

And that's the important thing. It is not about religion. It has implications on all sides. But your job, I hope, is to look at the evidence and where it's leading. And it's simply not going to do for people to be dismissed as creationist or whatever, creationists in the skies, as Mr. -- Dr. Pennock says.

COMMISSIONER SCOTT: Ms. Leo, you had your hand up right after Dr. McLeroy. And then Ms. Knight.

DR. LEO: Yes. I wanted to ask you to repeat your statement again that scientists sign on to -- you know, can you just tell us -- I know you mentioned that before. The statement that the scientists sign on to -- at Discovery Institute.

MR. CHAPMAN: Well, the actual -- I don't have the actual text. It's on our web-site.

But it says that they are skeptical of the power of Darwin's theory to explain origin of new life forms. And it goes on more extensively than that. But it is a consensus statement of these individuals. And as I said, they represent themselves a wide variety of backgrounds.

DR. LEO: It's not a religious statement?

MR. CHAPMAN: Of course not. No, absolutely not.

MS. KNIGHT: I'd like to know how many Texans were surveyed and who conducted the survey poll.

MR. CHAPMAN: Thank you. The survey was conducted by the Zogby International Organization and it was conducted of about 600 representative sample of all the different areas. By the way, we have copies of that we'll give to the Board. You might be interested in how your region came out on it. Also, it was strongly supported in every economic group, ethnic group, age group, men as well as women. It was a very strong statement of support. And it's very close to what the Congress has asked you to consider seriously.

COMMISSIONER SCOTT: Thank you. Any

further questions?

MR. CHAPMAN: Thank you very much. I'll provide the copy of the letter with all three signatures.

COMMISSIONER SCOTT: Thank you. Dr. Jonathan Wells.

DR. WELLS: Hello, my name is Jonathan Wells. I have a Ph.D. in molecular and cell biology from the University of California at Berkeley where I also did postdoctoral research. I have published articles in peer-reviewed scientific journals and I have taught embryology at California State University. Currently, I am a senior fellow at the Discovery Institute in Seattle.

Thank you for allowing me to speak tonight.

I am not here to propose that biology textbooks include discussions of intelligent design or biblical creationism, nor am I here to propose that textbooks water down or remove discussions of evolution.

I am here to help ensure that on the topic of evolution textbooks are free from factual errors and that they enable students to analyze, review and critique scientific explanations,

including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information.

I have reviewed the coverage of evolution in all 11 biology textbooks being considered here for adoption. I have found that most of them contain serious factual errors from the viewpoint of peer-reviewed scientific literature. And all of them to varying degrees, fall short, in my opinion, of enabling students to critique evolutionary theory using scientific evidence and information.

Since time is short, however, I will deal with only one topic which happens to be my area of research specialty -- my specialty, vertebrate embryos and evolution. In their coverage of this topic, six of the 11 textbooks contain serious factual errors.

Now, I don't know if you can see this clearly. Charles Darwin thought that the embryos of vertebrates, animals with backbones are most similar in their earliest stages and become different only as they develop toward their adult forms. Darwin considered this, by far, the strongest single class of facts in favor of this theory. And these

drawings were made by a fellow Darwinist, Ernst Haeckel, to illustrate the point. As you can see, the embryos in the top row are very similar as they develop down here to fish or amphibians or turtles or so on, humans, they become different.

The problem is these drawings were faked a century ago. The embryos don't actually look like that. Here is a comparison of Haeckel's top row with drawings from actual embryos. They're quite different, recognizably different. Yet, several textbooks being considered here contain Haeckel's fake drawings. This one is from Starr and Taggert. The same drawing occurs in the Raver book. A similar drawing occurs in Raven and Johnson. One book, Biggs, et al, slightly improves on these drawings.

Sorry, that's time. Anyway, this is clearly a factual error that I think should be removed.

Thank you.

COMMISSIONER SCOTT: Thank you, Dr. Wells.

Any questions?

DR. McLEROY: Is this the last one?

COMMISSIONER SCOTT: I believe that

concludes --

DR. McLEROY: If we -- well, I just want to say how much I appreciate it. Your name's been mentioned more than any -- more than Charles Darwin, so you must be having an impact in this society.

COMMISSIONER SCOTT: I want to say thank you to the Board members who stayed late. And thank you all for everybody who participated today for a thoughtful discussion and civil discourse. And appreciated it and I'm sure it's appreciated by all.

(Proceedings concluded.)

THE STATE OF TEXAS)

COUNTY OF TRAVIS)

I, CAROLINE CHAPMAN, Certified Shorthand Reporter in and for the County of Travis, State of Texas, do hereby certify that the above and foregoing contains a true and correct transcription of all portions of the State Board of Education Public Hearing requested to be included in this volume of the Reporter's Record, all of which occurred in open hearing and were reported by me.

WITNESS MY OFFICIAL HAND this the 23rd day of September, 2003.

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