

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF PENNSYLVANIA
HARRISBURG DIVISION

TAMMY KITZMILLER, et al., : CASE NO.
Plaintiffs : 4:04-CV-02688
vs. :
DOVER SCHOOL DISTRICT, : Harrisburg, PA
Defendant : 27 September 2005
.....: 9:00 a.m.

PARTIAL TRANSCRIPT OF TESTIMONY
OF DR. KENNETH MILLER, PH.D.
TRIAL DAY 2, MORNING SESSION
BEFORE THE HONORABLE JOHN E. JONES, III
UNITED STATES DISTRICT JUDGE

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P R O C E E D I N G S

THE COURT: Be seated, please. Good morning to all. We welcome you to Day 2, and we're going to continue with cross examination.

Mr. Muise, you're prepared I assume?

MR. MUISE: Thank you, Your Honor.

THE COURT: You may proceed.

CONTINUED CROSS EXAMINATION BY MR. MUISE:

Q. Good morning, Dr. Miller.

A. Good morning, Mr. Muise.

Q. Sir, is evolution random and undirected?

A. I don't think that that is an appropriate scientific question. First of all, evolution most definitely is not random. There are elements of evolutionary change that are unpredictable, but the principal force driving evolution, which is natural selection is most definitely a non-random force, and then the second part of your question, undirected, that requires a conclusion about meaning and purpose that I think is beyond the realm of science. So my answer for different reasons to both parts of your question is no. Or excuse me, perhaps more aptly put, science cannot answer the second part of the question. I think that's a more

1 accurate way to put it.

2 Q. Is a student believes that this was a
3 scientific complaint -- let me strike that.
4 If a student believes that this was a scientific
5 claim, would that be a misconception?

6 A. If a student believed that it was a
7 scientific claim that evolution was random
8 and undirected, would that be a misconception?
9 And I think my answer to that is yes, that would
10 be a misconception of what science can state
11 about evolution.

12 Q. Sir, in your 1995 edition of Biology,
13 I believe it's the Elephant Book?

14 A. That's correct. It's generally known by
15 that name.

16 Q. Did it not state in that book, "It is
17 important to keep this concept in mind.
18 Evolution is random and undirected," and the
19 part "evolution is random and undirected" was
20 in bold print?

21 A. To be perfectly honest, which of course I
22 swore to be, I don't remember if it was in bold
23 print or ordinary print, but I'm sure you have a
24 copy of that book, and I'm sure that you'll show
25 it to me and refresh my memory.

1 Q. You're very perceptive. May I approach
2 the witness, Your Honor?

3 THE COURT: You may.

4 Q. I hand you what's been previously marked
5 as Defendant's Exhibit 210.

6 A. And in response to your question, sir, I
7 note under Section 30-2 on the second page of
8 the document you gave me, the complete sentence
9 reads, "As we do so it's important to keep this
10 concept in mind," and it is indeed in boldface,
11 "Evolution is random and undirected," that's
12 correct. So yes, sir, it does say that.

13 Q. Now, isn't it true when you write your
14 textbook, a boldfaced sentence is a way of
15 telling the students that this is a key idea?

16 A. Yes, sir, it is.

17 Q. Now, you testified previously that that's
18 not a scientific concept, correct?

19 A. I did indeed, sir.

20 Q. Why was it in your book?

21 A. It was in my book because as I'm sure
22 you've also looked at, that statement was not
23 in the first edition of the book, it was not in
24 the second edition, it was not in the fourth
25 edition, it was not in the fifth edition. It

1 was not - -

2 Q. My question is why is it in this edition?

3 A. I'm trying to set the context so I can give
4 a full and complete answer to your question. So
5 the interesting thing is that this is the only
6 edition of any of the books that we have
7 published, and probably eleven different
8 editions, that contains that statement, and
9 the reason for that quite simply is that I work
10 with a co-author whose name is Joseph Levine,
11 and Joe and I work together on many of the
12 chapters in the book, but many of them we write
13 separately and individually, and this was a
14 statement that Joe inserted when we did a
15 rewrite of many sections of this book for the
16 third edition.

17 I have to say that I missed the statement
18 as I was going through Joe's chapters, and I
19 feel very badly about that. When this was first
20 pointed out to me, the third edition of this
21 book was in print, I immediately went to Joe, I
22 said Joe, I think this is a bad idea, I said I
23 think this is a non-scientific statement, I
24 think it will mislead students. Joe agreed.
25 We immediately took it out of the book, and

1 that's why I emphasized that it did not appear
2 in subsequent editions. So what you're looking
3 at, sir, is a mistake.

4 Q. Isn't it true that he put that in there
5 because he was influenced by the writings of
6 Steven J. Gould?

7 A. We had a conversation about that, and among
8 the reasons that Joe cited was that he had read
9 one of Steve Gould's books called "Wonderful
10 Life" in which Gould emphasized what Gould
11 regarded as the indeterminate character of
12 evolution, and from that I think Joe made what
13 I still think is a misinterpretation of Gould's
14 central idea in "Wonderful Life," which is to
15 say the indeterminate or the unpredictable
16 nature of evolution Joe misinterpreted to say
17 random and undirected, and I think Joe agreed
18 that he had made a mistake, and that's one of
19 the reasons why we changed it in the next
20 edition, sir.

21 Q. Now, I believe you testified that about 35
22 percent of high schools in the United States
23 use your textbook, one variation or version or
24 another?

25 A. Yes, sir, I did.

1 **Q.** Is the 1995 elephant book still being used
2 by high schools?

3 **A.** I'm sure you can find a few, but because
4 the average book is used by a high school in the
5 United States for about six to seven years, I
6 think it's fair to say that very few school
7 districts use the third edition of this book.

8 **Q.** Do you know if Prentice Hall is still
9 selling this version as a science textbook?

10 **A.** I wouldn't be at all -- I wouldn't know
11 that for a fact, sir. I wouldn't be at all
12 surprised it's on what is called the back list
13 so that people can buy additional copies of
14 older editions. So I wouldn't be at all
15 surprised that they are still selling.

16 **Q.** Do you receive royalties still for the old
17 editions?

18 **A.** Yes, sir.

19 **Q.** I believe on direct you made a reference to
20 Richard Dawkins in a statement that he made in
21 The Blind Watchmaker, "Darwin made it possible
22 to become an intellectually fulfilled atheist."
23 Are you familiar with that quote?

24 **A.** I'm certainly familiar with that quote.

25 **Q.** And who is Richard Dawkins?

1 A. Richard Dawkins is an evolutionary
2 biologist and a professor at Oxford University
3 in England.

4 Q. He's considered a prominent scientist?

5 A. Yes, sir.

6 Q. Is that claim that he made, the quote that
7 I just read to you, is that a scientific claim?

8 A. No, sir, it's not.

9 Q. I understand that you were good friends
10 with the late Steven J. Gould?

11 A. Yes, sir. Steve and I were personal
12 friends. We were both, I was briefly on the
13 faculty at Harvard and I got to know Steve
14 there.

15 Q. And he was a paleontologist from Harvard?

16 A. Yes. Steven was actually a professor of
17 geology, and his specialty was paleontology.

18 Q. Now, you have no difficulty believing that
19 he would have made a comment such as, "Before
20 Darwin we thought that a benevolent god had
21 created us"?

22 A. You're giving me a statement and asking
23 would I have trouble believing he said that.
24 It would help me to know if in fact I'm being
25 given a hypothetical quote or if this is an

1 actual quote from an actual article or book of
2 Dr. Gould.

3 Q. Well, I can represent to you it was from
4 "Ever Since Darwin," but if you have a question
5 you may want to refer to your deposition
6 testimony at page 174.

7 A. Okay. I noticed that my answer in the
8 deposition was pretty much identical to the
9 answer I gave you now, which is you asked me if
10 I was familiar with it, and I read, and I'm
11 reading from my deposition, "Answer: No, I'm
12 not. Do you know where that quote comes from?"
13 And then you said, "I don't know if it was
14 quoted out of The Blind Watchman, I may have
15 been incorrect. Are you aware that he's made
16 any statements similar to that?" So again I'm
17 still asking where that quote might have come
18 from.

19 Q. Okay, read the next answer.

20 A. Sure. "I'm perfectly willing to believe
21 that Gould might have said that, but I don't
22 know the context."

23 Q. Today are you perfectly willing to believe
24 that Gould would have made that statement?

25 A. Would have and might have are actually

1 different constructions, and what I will tell
2 you is that I'm willing to believe that Gould
3 might have made that statement, but I reiterate
4 my quest to know the context for it.

5 Q. Is that statement a scientific statement?

6 A. No, I don't think so. I think it's an
7 observation of -- it's an observation about
8 history, and it's really a comment about society
9 and popular imagination. It's certainly not a
10 scientific statement.

11 Q. Do you know who the late George Gaylord
12 Simpson was?

13 A. Yes, sir, I do.

14 Q. And who was he?

15 A. George Gaylord Simpson was a very well
16 known paleontologist and evolutionary biologist
17 and evolutionary theorist.

18 Q. Now, I'll ask you do you think this quote
19 that I'm about to state is something that you
20 believe G.G. Simpson would have said, "Man is
21 the result of a purposeless and materialistic
22 process that did not have in mind he was not
23 planned."

24 A. Now, I will once again ask you for the
25 context of that statement, and that would help

1 me to understand if G.G. Simpson might have said
2 that.

3 Q. And again I represent to you it was from a
4 book written called "The Meaning of Evolution."
5 Again if you have a question I refer you to your
6 deposition transcript at page 175.

7 A. Okay. Thank you for telling where the
8 quote comes from. I certainly am willing to
9 believe the George Gaylord Simpson might have
10 said that. You asked me would I prefer to say
11 he certainly might have said that.

12 Q. Is that a scientific claim?

13 A. No, sir, it is not.

14 Q. These three scientists that I just
15 mentioned, Richard Dawkins, Steven J. Gould,
16 and George Gaylord Simpson, are they considered
17 prominent scientists?

18 A. Two of them certainly were when they were
19 alive, and Richard Dawkins certainly is.

20 Q. In your direct testimony you gave a
21 definition of intelligent design, and I want
22 to make sure I'm clear on what your definition
23 is, and I don't have exact recall from your
24 direct testimony at this point.

25 A. Neither do I, counselor.

1 Q. But I can refer you to your answer in your
2 deposition transcript, and I want to state what
3 that answer is here and you can compare it on
4 page 93 if you'd like to, and I want to see if
5 that is the working definition that you are
6 using for the purposes of this case.

7 A. The page was 93?

8 Q. 93.

9 A. Okay.

10 Q. Here's the definition, "Intelligent design
11 is the proposition that the basic mechanism of
12 evolution does not work and that the complexity
13 of life, the changes that appear in living
14 things and natural history, and the organization
15 of living things are all best explained by the
16 actions of an intelligent, creative force,
17 acting outside, and you might say above, acting
18 outside of the natural world, and that by
19 definition that creative force lies outside of
20 scientific explanation."

21 A. I believe that you've certainly read
22 properly from the deposition. I believe that
23 in my direct testimony yesterday, having thought
24 a few months more about how to summarize things
25 briefly so as not to tax the patience of the

1 court, I used a more succinct definition, and I
2 think the definition I used is intelligent
3 design is the proposition that some aspects of
4 living things are too complex to have been
5 evolved and therefore must have been produced by
6 an outside creative intelligence force acting
7 outside the laws of nature, and I would suspect,
8 sir, that both definitions are in agreement with
9 each other, even one is a little more verbose.

10 Q. Isn't it true that you believe that there's
11 a danger with attributing natural phenomena to
12 supernatural causes, and that danger is that
13 science will stop seeking natural explanations?

14 A. I'm not sure if I would put it in exactly
15 those terms. I do think that the proposition
16 that every unsolved problem in the natural world
17 should be attributed to causes and forces which
18 lay outside the purview of science, outside the
19 natural world, into what I would call the
20 supernatural world, is a science stopper, and
21 what I mean by that is that once one says the
22 only way we can explain this or that or the
23 other is by the actions of a creator or a
24 designer working outside of nature there's no
25 point to do any more research on these problems,

1 and that's why I would characterize it as a
2 science stopper.

3 Q. And to make this point in your deposition
4 you used the example of the force that powers
5 the sun which, according to your testimony,
6 at one time was considered a supernatural
7 phenomena. Is that accurate?

8 A. It may be an accurate reflection of the
9 deposition, which I have not reread on that
10 point, but the way I would phrase it if you
11 asked me a similar question today is simply to
12 point out --

13 Q. Sir, I asked you a question.

14 A. Yes.

15 Q. And if you want to refer to your deposition
16 testimony at 229, that might help you answer
17 that question.

18 A. Sure, I appreciate that. Oh, well, now
19 that I see the deposition my answer is no,
20 I did not say that.

21 Q. Look at page 228 sir.

22 A. Uh-huh.

23 Q. You'll read from line 4 where it begins
24 with "in other words"?

25 A. Yes.

1 Q. Do you see that on line 4?

2 A. Yes, I do.

3 Q. Then read until line 3 of page 229.

4 A. Sure. I'd be glad to. "In other words,
5 they are advocating supernatural progressive
6 creation as the default explanation for anything
7 that cannot currently be explained by science,
8 and I'll give you an example, because I think
9 this is an important to make. If we were having
10 a discussion in 1880 and we were talking about
11 what is the force that powers the sun, where
12 does sunlight, heat, warmth, and so forth from
13 the sun come from, we can take the science at
14 the time and we could rule out the notion that
15 the sun was a big ball of flame made up of
16 burning oil or burning wood or burning wax or
17 any other known chemical reaction in 1880, and
18 we could do that, because we could calculate the
19 amount of energy the sun puts out, we could
20 calculate over many years the fact that the
21 sun's diameter, if it's decreasing it's
22 decreasing only very slightly, and if the sun
23 was made of any fuel that powered a known
24 chemical reaction, it's diameter should be
25 increasing much more quickly.

1 "Therefore in 1880 we could rule out the
2 possibility," okay, I think I may have said a
3 few things in this deposition that make no
4 sense, "Therefore in 1880," oh, sorry, no, I
5 didn't. "Therefore, in 1880 could we rule out
6 the possibility that the sun's actions were due
7 to some sort of divine intervention, the answer
8 is absolutely no, we could not rule that out."
9 Now, I'm sure the court reporter can correct my
10 recollection of your question, but I think your
11 question was did you state that in the 19th
12 century the actions of the sun were attributed
13 to divine intervention, and of course what I
14 just read to you didn't say that. It said we
15 couldn't rule out the possibility. That's not
16 the same thing as saying they were attributed,
17 and that's why I said no, sir, I did not say
18 that in my deposition.

19 Q. Read on from page 229, from lines 4 through
20 16.

21 A. Gladly. "As you know, 25 years later there
22 was a scientific explanation put forward for the
23 power of the sun, and that turns out to be
24 thermonuclear fusion, a force unsuspected by
25 nature," and a strange way to put it. "So if

1 at the time in 1880 science had simply thrown
2 up its hands and said the explanation lies
3 outside of nature, science would have stopped
4 and we never would have done the investigatory
5 work that was actually necessary to understand
6 where the sun's power actually came from."

7 Q. Keep reading, sir.

8 A. Oh, sorry. "That's the danger of
9 attributing natural phenomena to supernatural
10 causes, or for that matter to design, which is
11 essentially a call to say let's stop seeking
12 natural explanations." Go on or --

13 Q. I believe that covers the point.

14 A. Okay.

15 Q. You make that point in your deposition that
16 by attributing something that you might not have
17 an explanation for at the time to a supernatural
18 cause, then we just may throw up our hands and
19 then science will never have an explanation for
20 these natural phenomena, is that correct?

21 A. That's exactly the point that I made there,
22 yes, sir.

23 Q. And you used the example of the force that
24 powers the sun to demonstrate that if science
25 had just thrown up their hands, then we would

1 have never come up with this notion of
2 thermonuclear fusion.

3 A. Yes, that's correct, sir.

4 Q. But you also said thermonuclear fusion was
5 a force that was unsuspected at the time by
6 nature.

7 A. And as I read that I also said that's a
8 very strange way to put it. I'm sure the court
9 will understand the deposition went on for nine
10 and one half hours, and I may once or twice have
11 said something that doesn't quite make sense,
12 and what I should have said in that exact
13 context was a force that was unsuspected in
14 nature, not by nature.

15 Q. So there could be a force that was
16 unsuspected in nature at a time, through further
17 scientific development may actually be a natural
18 explanation such as thermonuclear fusion?

19 A. That's correct.

20 Q. And the fact back in 1880 that we didn't
21 know about thermonuclear fusion didn't mean
22 that science stopped?

23 A. It certainly did not mean that science
24 stopped precisely because physicists around the
25 world sought a natural explanation for the

1 phenomenon rather than attributing to it a force
2 outside of nature and beyond scientific
3 investigation.

4 **Q.** So, sir, is your testimony and your
5 opinions regarding intelligent design, is it
6 based on your understanding that intelligent
7 design does require the ruling out of all
8 natural causes for design?

9 **A.** I'm sorry, not to parse these questions,
10 because they're very carefully worded, and so
11 I want to think about them carefully -- I'm
12 sorry, could you repeat the question?

13 **Q.** Is your testimony and your opinions based
14 on your understanding of intelligent design is
15 that intelligent design rules out all natural
16 explanations for design?

17 **A.** The question you just asked is does
18 intelligent design rule out all natural
19 explanations? Well, the answer is of course
20 not. What intelligent design presupposes, and
21 I'll repeat the definition is that intelligent
22 design argues that some aspects of living things
23 are too complex to have been produced by
24 evolution and therefore they must be the product
25 of creative action by a designer acting outside

1 of nature.

2 Q. So the design would have to be, in your
3 understanding of intelligent design the design
4 would have to be caused by a supernatural
5 causation and no natural cause can be an
6 explanation for design?

7 A. No, sir, I would disagree with that. You
8 say no natural cause can be an explanation for
9 design. I would point out that the snow flake,
10 one of the most beautiful and intricately
11 designed if you wish to say objects in the
12 world, that any person who didn't know snow or
13 understand snow would say it had a beautiful
14 design to it, but I think any chemist, any
15 physical chemist will tell you that the
16 structure of a snow flake is due entirely to
17 natural causes such as the interactions of water
18 molecules through laws of chemistry and physics.

19 So I think you're lumping together certain
20 propositions in what you're asking me to say,
21 and again I think I have clearly stated that my
22 testimony is based on the definition that I
23 understand of intelligent design as given in
24 "Pandas and People," as explained by Dr. Behe,
25 as explained by William Dembski, as explained by

1 "The Discovery Institute, which is that some
2 feature of living things are too complex to have
3 been produced by evolution, and that means that
4 they must have been the product of creative work
5 by a natural, by an intelligent designer acting
6 outside the laws of nature and beyond
7 investigation. Snow flakes have what most of us
8 would call a design, and they are the products
9 of natural law.

10 Q. With regard to the theory of intelligent
11 design, sir, not snow flakes, the theory of
12 intelligent design, is it your testimony that
13 it requires a supernatural intervention?

14 A. My testimony is that --

15 Q. Sir, I'm asking you a question.

16 A. And I'm trying to answer that question
17 fully and completely, sir.

18 Q. It's a yes or no question. Is it your
19 understanding of the theory of intelligent
20 design that it requires the action of a
21 supernatural power?

22 A. Okay. Again, intelligent design as I
23 understand it presupposes that some features
24 of living things are too complex to have been
25 produced by evolution and therefore, and here's

1 the answer to your question, they must be the
2 product of an intelligent designer acting
3 outside of nature, exercising a creative force
4 to create the design.

5 Q. And in that answer then your view of
6 intelligent design means that it requires the
7 action of a super, it requires supernatural
8 action?

9 A. Perhaps it would be useful in giving a
10 direct answer to your question, which I'm trying
11 very hard to do, to define what supernatural
12 means. The word super means above. The word
13 natural of course means natural. The actions of
14 an intelligent designer, as they have been
15 explained to me by the advocate of intelligent
16 design, is the identity, the means of action,
17 and even the time of action of that designer
18 lies outside of scientific investigation. That
19 means to me that it lies above, super, natural
20 law, supernatural, and therefore that designer
21 is supernatural in the ordinary understanding
22 that actions that occur on nature, that occur
23 from a force which is not natural, from a place
24 which is outside of nature, and are not subject
25 to investigation, must be supernatural. To help

1 me frame my questions, because obviously you
2 don't think I'm being entirely responsive to
3 your questions, and I want very much to be
4 responsive to them, perhaps you could explain
5 to me how an intelligence designer could act
6 undetectably, outside of nature, to create order
7 that evolution and natural law cannot, and not
8 be supernatural.

9 Q. That's your definition and your straw that
10 you're creating on this definition. Here's my
11 question for you with regards to what is
12 considered supernatural. Do you know who
13 Francis Crick is?

14 A. Yes, sir, I do know who Francis Crick is.

15 Q. And who is he?

16 A. Francis Crick is a British physicist and
17 crystallographer who, together with James Watson
18 and Rosalyn Franklin, is the co-discoverer of
19 the double helical structure of DNA.

20 Q. And he received the Nobel prize?

21 A. Yes, I believe that he and Watson and
22 Wilkins received the Nobel prize for biology
23 or medicine in 1963.

24 Q. Now, he advanced a theory called directed
25 panspermia, correct?

1 A. He wrote a book in which he suggested that
2 the first appearance on life on earth might have
3 been the result of the actions of beings from
4 another planet, scattering life into our world,
5 that's correct.

6 Q. And that was a hypothesis put forward by a
7 Nobel laureate?

8 A. That's correct, sir.

9 Q. Is that a scientific claim?

10 A. Well, the specifics that Dr. Crick made
11 is a scientific claim, because although it's
12 not immediately a testable claim, it is a
13 potentially testable claim in terms of if we
14 are able to explore larger and larger fractions
15 of the known universe, we may eventually find
16 out if there is life in other places that could
17 have been directed towards us. So it's a
18 scientific claim in the sense that it's
19 potentially testable.

20 Q. Is it a supernatural claim?

21 A. That's an interesting point, and in this
22 particular case no, I would not regard that as
23 a supernatural claim.

24 Q. So the fact that life forms may have come
25 from an intelligent being from another planet

1 to this earth as I believe you have described,
2 directed panspermia, that is not a supernatural
3 explanation for a natural phenomenon?

4 A. It certainly is a farfetched claim in that
5 many scientists would point out that there's no
6 evidence for it, but as Crick framed it, it
7 certainly would be a claim as I said that is
8 potentially testable and therefore would accord
9 to natural law.

10 Q. Are you familiar with a program that NASA
11 has for, and I believe its acronym is SETI,
12 Search for Extra Terrestrial Intelligence?

13 A. I'm familiar with it only as a lay observer
14 who reads the papers and has heard about it.

15 Q. From what you have heard about it, is that
16 a scientific exploration?

17 A. Certainly my understanding of how the work
18 in SETI is being conducted is that it follows
19 the scientific methods of explanation.

20 Q. Are they seeking a supernatural
21 explanation?

22 A. No, sir, I don't think they are. I think
23 that SETI is seeking evidence of life on other
24 planets, other places in the universe.

25 (Brief pause.)

1 Q. Would you agree with this proposition that
2 because presently we may not have a plausible
3 natural explanation is not the same thing as
4 saying that we've ruled out all natural
5 explanations?

6 A. Yes.

7 Q. And the example of the power, the forces
8 that power the sun would potentially be an
9 example that fit that claim?

10 A. Yes, sir, I believe it would.

11 Q. Sir, intelligent design doesn't require
12 adherence to the six day creation event
13 described in the Book of Genesis, correct?

14 A. I certainly think that there are
15 formulations of intelligent design that
16 don't require adherence to a six-day creation
17 event described in Genesis, that is correct.

18 Q. Intelligent design is not sectarian?

19 A. Can you help me, sir, by explaining what
20 you mean by non-sectarian?

21 Q. Doesn't adhere to any particular religious
22 dogma.

23 A. I believe that intelligent design does
24 adhere to one particular religious dogma, and
25 that is that life on earth can be attributed to

1 the outside actions a designer whose actions are
2 outside and above nature.

3 Q. Well, you need not be a fundamentalist
4 Christian to be a proponent of intelligent
5 design, correct?

6 A. I certainly think that one need not adhere
7 to a particular religious point of view, but as
8 intelligent design has been explained to me as
9 it's described in "Pandas and People" and in
10 the writings of the members of The Discovery
11 Institute whom I've read and whom I regard as
12 authoritative spokesmen for intelligent design,
13 the common thread of intelligent design is
14 attribution of the complex features of living
15 organisms to the creative force of a being
16 acting outside of nature, and that is definitely
17 a theistic point of view.

18 Q. Again, sir, my question is you need not be
19 a fundamentalist Christian to be a proponent of
20 intelligent design?

21 A. That certainly is true.

22 Q. Dr. Behe for example has the same religion
23 as you, correct?

24 A. That's my understanding.

25 Q. And Dr. Behe, an intelligent design

1 proponent, does not adhere to the literal
2 reading of Genesis? Is that your understanding?

3 A. Actually I have never discussed Dr. Behe's
4 view of Genesis with him, so I'm not sure.

5 Q. Dr. Behe doesn't dispute the information
6 from geology that the earth is very old,
7 correct?

8 A. If I remember what -- and if I get this
9 slightly wrong I'm sure you'll refresh my
10 memory, I believe that Dr. Behe wrote in
11 "Darwin's Black Box" that he has no particular
12 reason to quarrel with the standard geological
13 interpretation of the earth's history. Is that
14 a fair phrasing, sir?

15 Q. Well, my question is to you, sir.

16 A. Well, my understanding then is the indirect
17 quotation which I believe comes from "Darwin's
18 Black Box" that he says he has no reason to
19 argue or to quarrel with it. Now, to my
20 standard of endorsement that's not a ringing
21 endorsement, and it certainly, it certainly
22 doesn't amount to an affirmative answer to your
23 question.

24 Q. Sir, young earth creationists are
25 completely unequivocal that the earth has

1 to be between six to ten thousand years old,
2 correct?

3 A. Most of the young earth creationists I have
4 encountered have argued that the earth is less
5 than ten thousand years old, that's correct,
6 sir.

7 Q. And that's one of tenets of young earth
8 creationism, correct?

9 A. As I understand them, sir, yes, that's
10 correct.

11 Q. Dr. Behe, again an intelligent design
12 proponent, does not adhere to the flood geology
13 point of view advanced by creationists, is that
14 correct?

15 A. I'm not sure whether Dr. Behe adheres to
16 that or not. I haven't heard him state
17 definitively. I have only read in "Darwin's
18 Black Box" that he has no problem with the
19 standard geological chronology.

20 Q. And from that statement would you infer
21 that he then has no problem with the flood
22 geology, or he has a problem with the flood
23 geology based on that statement?

24 A. You know, I suppose you could infer that,
25 but you could also infer that like most

1 biochemists he doesn't care too much about
2 geology.

3 **Q.** So that doesn't play into his scientific
4 theories or arguments regarding intelligent
5 design?

6 **A.** I have not seen Dr. Behe make an argument
7 based on the geological ages in any of his
8 writings or books, one way or another. And
9 therefore I do not wish to presume what his view
10 is of the young earth chronology, and I'm sure
11 that if you bring him to the stand he'll be able
12 to tell you himself.

13 **Q.** In terms of the arguments he's advancing he
14 does not refer to the geological record?

15 **A.** That is correct, he does not refer to it,
16 and as I said perhaps that's because like most
17 biochemists he just doesn't read geology.

18 **Q.** And so for his arguments it's not necessary
19 that the earth be six to ten thousand years old?

20 **A.** The arguments that Dr. Behe makes based
21 on the actions of an intelligent designer, to
22 assemble the complex structures within a cell
23 would be consistent with young earth creationism
24 or with special creationism spread over the
25 billions of years of the geological ages. It

1 would be consistent with either one.

2 Q. Again, sir, my question was does he rely on
3 the age of the earth being six to ten thousand
4 years old to make a scientific argument?

5 A. No, sir, he does not rely on it, and that's
6 why it would be consistent with either one.

7 Q. So it's not a necessary component of his
8 scientific arguments?

9 A. That's right, and that's why it would be
10 consistent with either one.

11 Q. Do you know what Barry Palovitz is?

12 A. Yes, I think Barry is a plant geneticist or
13 a plant physiologist at the University of
14 Georgia.

15 Q. And he wrote an article which made
16 reference to your book "Finding Darwin's God"
17 that we discussed during your deposition? Do
18 you remember that?

19 A. I do remember he wrote a review, and I will
20 tell you that I try not to take reviews of a
21 book too seriously.

22 Q. But do you recall that in the review he
23 claims that one of ideas that you entertained in
24 your book "Finding Darwin's God," which is the
25 notion that the universe may have purpose, was

1 also an idea that was embraced by what he called
2 neocreationism?

3 A. I actually don't specifically remember
4 Dr. Palovitz's review except to note that he
5 didn't like my book much, and I believe he may
6 have made comments like that. So I'm perfectly
7 willing to believe that that's exactly what he
8 said.

9 Q. If you look at your deposition, sir, on
10 page 128?

11 A. Got it.

12 Q. If you could read, if you look at line 15,
13 and after the sentence, "He calls it a pet
14 rock," and it begins with "saying," could you
15 read that sentence?

16 A. Sure. This I believe is a quotation from
17 the Palovitz review.

18 Q. No, this is your answer, sir.

19 A. I'm sorry, which page and which line again?

20 Q. Page 128, line 15, starting with the word
21 "saying"?

22 A. Okay, yes. This is my answer. I'm sorry,
23 I was on the wrong page. "Saying the two
24 schools of thought embrace a single idea does
25 not mean that those two schools of thought are

1 exactly the same thing."

2 Q. Is that a truthful statement that you made?

3 A. Yes, sir, of course.

4 Q. Sir, now, it's fair to say that one of the
5 central arguments of intelligent design is that
6 the evolutionary mechanisms are not sufficient
7 to explain the origin of complex biological
8 structures like the flagellum?

9 A. That's correct, sir.

10 Q. Now, you have already testified that you
11 wrote a book called "Finding Darwin's God."

12 A. Several times.

13 Q. And in that book you said, "If Darwinism
14 cannot explain the interlocking complexity of
15 biochemistry, then it is doomed." Do you recall
16 making that statement?

17 A. I probably wrote something like that in the
18 book, yes, sir.

19 Q. And you also quoted from Darwin in that
20 book, who acknowledged, "If it could be
21 demonstrated that any complex organ existed
22 which could not possibly have been formed by
23 numerous successive slight modifications, my
24 theory would absolutely break down." Correct?

25 A. That is correct, although it's a partial

1 quotation, because the next sentence is, "But
2 I can find no such case."

3 Q. Correct. And he wrote, and that was from
4 "On the Origins," correct?

5 A. Yes, sir, that's a quotation, I gave a more
6 complete quotation, but that's from "The Origin
7 of the Species."

8 Q. And that was written in 18 when?

9 A. I believe, sir, 1859.

10 Q. I believe you already previously testified
11 that the claim that the bacterial flagellum is
12 irreducibly complex is a scientific claim?

13 A. It is a, that is a scientific claim if
14 irreducible complexity is precisely defined, and
15 because Dr. Behe in "Darwin's Black Box" gave a
16 very precise definition that made the claim of
17 irreducible complexity a scientific claim, yes,
18 sir.

19 Q. And if irreducible complexity could be
20 demonstrated, that would present an argument
21 against Darwin's theory of evolution, correct?

22 A. If irreducible complexity could be
23 demonstrated in the exact way that Dr. Behe
24 describes, it would present an argument, not
25 a disproof, but an argument, because other

1 scientists have argued that even if one finds
2 truly irreducible complex structures, that does
3 not rule out in principle an evolutionary
4 pathway to them.

5 Q. Does it open a question?

6 A. Of course. It is phrased in the form of a
7 question, and yep, it's a question.

8 Q. Now, we're referring to Richard Dawkins,
9 and he made a statement, "Biology is the study
10 of complicated things that give the appearance
11 of having been designed for a purpose." Are you
12 familiar with that quote?

13 A. Yes, I am familiar with that quote.

14 Q. Do you agree with it?

15 A. I wouldn't put it the same way that Dawkins
16 did. I think biology is the study of a great
17 deal more. I think Dawkins was using hyperbole,
18 a figure of speech, exaggeration for the purpose
19 of emphasis to make a very good point, and that
20 is a first glance at many living organ systems,
21 organisms, compounds, makes it look as though
22 they have such a strong correlation of structure
23 with function that in the human world we would
24 say that they were designed, and that's the
25 metaphorical point that I think Dawkins made,

1 and I agree with that metaphorical point.

2 Q. And is that similar to the points which
3 you described as a metaphor in your cross
4 examination testimony yesterday about the cell
5 being a collection of protein machines?

6 A. Yes. In that case it was a different
7 metaphor by Dr. Bruce Albertson, and I think
8 it's essentially the same point.

9 Q. Is part of the nature of the controversy
10 that we're discussing in the course of this case
11 is whether the design referred to by Dawkins is
12 the apparent design that he describes or real
13 design that intelligent design proponents
14 advocate?

15 A. Well, to answer that question, sir, we're
16 going to have to break down what we mean by the
17 word design, and the word design is often used
18 in biochemistry and protein structure to simply
19 refer to in shorthand the correlation of
20 structure and function. So for example if you
21 remember I put a slide up on the screen
22 yesterday showing the hemoglobin molecule, the
23 oxygen carrying protein, the inner pocket of
24 that hemoglobin is what physical chemists call
25 hydrophobic, or water hating. It's kind of oily

1 in ordinary terms.

2 That makes it an ideal binding site for an
3 oxygen atom to slip in. The outside of the
4 molecule is strongly hydrophilic. That means
5 it's got a lot of charges on it, and if you will
6 it makes it easy for it to dissolve in water.

7 So a physical biochemist might look at the
8 structure of the molecule and say let's talk
9 about the design of the molecule, it is designed
10 to be soluble in the solution of the blood, and
11 it is designed to have four pockets in which you
12 can tuck an oxygen atom to carry them to the
13 tissue. What he really means by design is the
14 exquisite correlation of the structure of that
15 protein with its oxygen carrying function. So
16 in that respect that design is similar.

17 Q. I'm going to give you a definition of
18 irreducible complexity, which I believe is
19 slightly different than the one that you used in
20 "Darwin's Black Box" and I want to ask you if
21 you will accept this definition, "A single
22 system which is necessarily composed of several
23 well matched interacting parts that contribute
24 to the basic function, and where the removal of
25 any one of the parts causes the system to

1 effectively cease functioning."

2 A. I wouldn't agree with that, because
3 that's actually not a complete definition of
4 irreducible complexity. If I remember, the
5 quote that I showed was pretty similar to that,
6 except it went on basically to refine the
7 definition, make it more precise, make it
8 scientifically testable, and that was that one
9 cannot produce an irreducibly complex machine by
10 numerous successive slight modifications of a
11 precursor system because any precursor to an
12 irreducibly complex system that is missing a
13 part is by definition nonfunctional, and I
14 regard that as an essential element of the
15 argument, of the term irreducible complexity,
16 because without it irreducible complexity does
17 not make a strong argument against evolution.

18 Q. In your explanation, or I guess reputation
19 of the concept of irreducible complexity, is it
20 true that you argue or you define it so that if
21 a component were removed, the question is
22 whether or not that component itself could still
23 have an independent function?

24 A. I believe what I said was a little more
25 complete than that, and that is rather than a

1 component could be removed, a set of parts or
2 components could be identified within the larger
3 structure which had an independent function of
4 its own, because the central argument that comes
5 from the concept of irreducible complexity is
6 that there are no stepping stones on the way to
7 the evolution of a complex structure. In other
8 words, they have to be fully assembled to have
9 any function, and therefore if one can
10 demonstrate that partial assemblies of the
11 components in fact do have a selectable
12 function, then the argument falls apart. And
13 it does in every case that we examined, in every
14 case we talked about yesterday I should say.

15 Q. So is it that a component of the part can
16 have an independent function as opposed to the
17 essential function, that it ceases function,
18 the essential function of the main organism?

19 A. I'm going to ask you to repeat the
20 question, because the question began "is it,"
21 and I'm not sure what "it" is.

22 Q. Let's break it apart then.

23 A. Okay.

24 Q. Is your argument against irreducible
25 complexity because if you remove a component

1 from a system, that that component or a series
2 of components may itself have an independent
3 function, and therefore the system itself is not
4 irreducibly complex, is that your understanding?

5 A. That certainly is my understanding, and
6 again I would try to put it more completely, and
7 that is that once a collection of parts is
8 claimed to be irreducibly complex, the way in
9 which one analyzes that claim is to see if
10 there's any subset within this larger collection
11 of parts that could have an independent
12 function, and once you identify that you
13 suddenly discover that structure is no longer
14 irreducibly complex.

15 Q. And that can be any of the components of
16 the system?

17 A. I would certainly think so, sir. In fact,
18 I think a direct prediction of the argument
19 made from irreducible complexity is that no
20 components of the system should have independent
21 functions. So once you find one, the argument
22 is finished.

23 Q. Sir, is it not a standard scientific
24 practice for scientists, and I'll use an example
25 of Dr. Behe, and perhaps you might fit into this

1 example as well, to point to the scientific
2 literature, to point to observations and
3 experiments that have been done by other people
4 and other laboratories, have been peer reviewed,
5 have been published, and to cite to that
6 evidence, cite to those data, and cite to those
7 experiments in their arguments?

8 A. Of course it is.

9 Q. And so the question then is not whether
10 Dr. Behe or any other scientist has done
11 experiments in their own laboratory that have
12 produced evidence for a particular claim. The
13 question is whether or not the inferences that
14 they draw in their analysis from that data are
15 supported. Is that true?

16 A. Yes, sir, I certainly think that that is
17 true, and I agree with it, and the point that
18 I would wish to make is that in my testimony
19 yesterday I said that as far as I knew Dr. Behe
20 had never done any work that directly implicated
21 intelligent design. He certainly has written a
22 number of papers and made a number of arguments
23 designed to support the inference of irreducible
24 complexity.

25 Q. So there are natural phenomena that cannot

1 be fully explained by materialistic
2 observations, correct?

3 A. There are natural phenomena --

4 Q. I can give you some examples.

5 A. Please do. That would help a great deal.

6 Q. The origin of life.

7 A. Oh, okay. The answer to your question,
8 sir, is no. And the reason for that is that
9 the question was phrased is there are natural
10 phenomena that cannot be explained, and the
11 reason I said no to your question, I do not
12 agree with that, is I would agree to a question
13 that says there are natural phenomena that have
14 not yet been explained by material or natural
15 causes, and if you then said the origin of life
16 is such a question which has not yet been
17 explained, I would have said yes, sir, that is
18 correct.

19 Q. I believe my question, sir, was there are
20 natural phenomena that cannot be fully explained
21 by materialistic observation.

22 A. And again I would still say no, because I
23 hear "cannot be explained" or "cannot fully be
24 explained" to be a claim that they will never be
25 explained, that it's a problem that will never

1 be solved because of some reason and principle,
2 and all that I'm trying to do is to make sure
3 that my answer is phrased in such a way in which
4 it is clear that I, like most scientists,
5 realize that science is filled with unsolved
6 problems. The origin of life I'm quick to say
7 is one of those problems. We do not yet have a
8 complete natural explanation of that particular
9 question.

10 Q. Sir, if you'd turn to your deposition, page
11 210?

12 A. Sure.

13 Q. And reading from line 7, and to complete
14 the answer for completeness read through to
15 line 19?

16 A. Sure. "Are there natural phenomena that
17 cannot be fully explained by materialistic
18 observations? The answer is yes. You chose the
19 origin of life. I would choose gravity, I would
20 choose dark matter in the universe, and I would
21 use the way in which the vertebrate body is
22 constructed during the development of an embryo,
23 because all of these are questions which cannot
24 be completely answered by science, and to
25 paraphrase an answer I gave earlier in the day,

1 when we have complete explanations for all
2 natural phenomena, people like me, research
3 scientists, will be out of business, because
4 science will be finished. We will have
5 explained everything."

6 Q. Is that a correct answer?

7 A. It is a correct answer, but in order to
8 complete the record for the court, may I read
9 from my deposition a few lines further down,
10 just a sentence or two? It's on page 211, and
11 I'd like to start on line 4 if I may, sir.

12 Q. Was that a complete answer that you gave to
13 the question that I had asked you during the
14 deposition?

15 A. Sir, I just asked you. May I complete --

16 Q. Was that a complete --

17 A. Okay, fair enough. That was the complete
18 answer I gave then.

19 Q. Thank you.

20 A. And I note for the record that in my
21 deposition I clarified that --

22 Q. Thank you, sir.

23 A. -- the same way I've been doing here.

24 THE COURT: Wait, wait. Let him finish his
25 answer. Finish your answer.

1 THE WITNESS: Thank you, Your Honor.

2 THE COURT: But that is not necessarily a
3 license to go further than what the question
4 was, but if you want to finish that particular
5 answer that you gave, you may do so.

6 THE WITNESS: Okay, at the bottom of page
7 210 I was then asked, and this is the question,
8 "And just to clarify, there has not been, at
9 least I'll put it in terms of your satisfaction,
10 a successful materialistic explanation for the
11 origin of life? Answer: I would expand on that
12 a little bit if you'll allow me to, and the
13 answer, I'm sorry, the answer to that is yes.
14 I regard the origin of life, as I think most
15 scientists do, as an unsolved biological
16 problem.

17 "Now, to say that the problem is unsolved
18 does not say it's a problem about which we know
19 nothing. In fact, we know a great deal, and we
20 know for example that conditions similar to
21 those might have existed on the primitive earth
22 to allow the formation of, the undirected
23 formation of very, very simple building blocks
24 of compounds such as proteins and nucleic
25 acids." That's all I wanted to read. Thank

1 you, Your Honor.

2 **Q.** Are those still scientific questions?

3 **A.** By "those" you mean what is the origin of
4 life, what's the nature of gravity, how is the
5 vertebrate body put together? Yes, sir, those
6 are all scientific questions.

7 **Q.** Sir, critical thinking is a legitimate
8 pedagogical goal, correct?

9 **A.** It's a legitimate and I would argue an
10 essential pedagogical goal.

11 **Q.** And an important component of teaching
12 science?

13 **A.** I think it's a very important component
14 of teaching science.

15 **Q.** Do you agree that the purpose of high
16 school science courses should not be to train
17 scientists but to contribute to the liberal
18 education of students?

19 **A.** I think that -- I agree with you, because I
20 think contributing to the liberal education of
21 students is a great way to train scientists.

22 **Q.** If a student believes that Darwin's theory
23 of evolution was a fact, would that be a
24 misconception?

25 **A.** It would certainly be a serious

1 misconception as to the nature of the theory,
2 because theories never become facts. If a
3 student believed that atomic theory was atomic
4 fact, that would be a misconception. Atomic
5 theory is based on factual observations in the
6 same way that evolutionary theory is based on
7 factual observations.

8 Q. Is your answer to my question yes, sir?

9 A. The answer to the question is most
10 definitely yes.

11 Q. If a student believed that science has
12 answered all questions regarding evolution,
13 would that be a misconception?

14 A. It would be a terrible misconception, sir.

15 Q. If a student believed that science has
16 solved the origin of life question, would that
17 be a misconception?

18 A. It would be a terrible misconception.

19 Q. You teach a biology course at Brown
20 University, Biology 20, correct?

21 A. I believe I do, that's correct.

22 Q. And that's an introductory course?

23 A. Yes, sir.

24 Q. And I believe it's for concentrators and
25 non-concentrators? Is that the term you use at

1 Brown?

2 A. Yes, that is the term we use, and for the
3 benefit of the court that means that students
4 who are going to major in science, students who
5 might be pre-med in their studies, or students
6 who are thinking of going into some other field
7 entirely will still take that course.

8 Q. Now, your description of the course, and I
9 believe it's in the 2005 syllabus, you state,
10 "In the same way that students of the sciences
11 could not consider themselves fully educated
12 without a knowledge of art, social theory, and
13 literature, students in the humanities and
14 social sciences should approach courses in the
15 sciences as part of their overall educational
16 experience." Is that an accurate statement?

17 A. Yes, sir, it is.

18 Q. And in the syllabus you also state, "The
19 intention of this course," meaning the Biology
20 course, "is to establish links between
21 biology and other disciplines and to briefly
22 explore some of the ways in which science is
23 related to popular culture." Is that true of
24 your course?

25 A. Yes, sir, it is true of my course, one of

1 my goals.

2 Q. Now, in your biology course you provide
3 supplemental materials for when you give
4 lectures on evolution, is that correct?

5 A. When I teach the course I provide internet
6 links of all sorts that will help students
7 research questions in a variety of ways.

8 Q. And some of those internet links are to
9 your web site with some of those articles, "The
10 Flagellum Unspun," the biochemical, I believe
11 there's one about the biochemical challenge to
12 evolution?

13 A. I actually don't think that I, and I'm sure
14 you'll refresh my memory if I'm wrong, I don't
15 think I provided a direct link to those
16 particular essays. I did provide a direct link
17 to a web page that I have, "On Matters
18 Evolution," and on that page there was then
19 links to some articles that I had written about
20 evolution, including the two that you mentioned.

21 Q. And those were articles regarding
22 intelligent design?

23 A. Yes, sir, I believe they are articles
24 critical of intelligent design, that's correct.

25 Q. And there was also a PBS film clip called

1 "Why is Evolution Controversial?" that you list
2 as supplemental material?

3 A. Yes. That one I think I did link directly
4 from the web page in my course.

5 Q. And these supplemental materials allow
6 students to explore supplemental information
7 related to the lecture topic?

8 A. That's certainly my intent.

9 Q. And in this case it would be the lecture
10 topic of evolution?

11 A. That's right. Students of course always
12 want to know is it going to be on the test, and
13 supplemental materials are not on the test.
14 They're out there in case they get interested
15 in something.

16 Q. And is it true you believe that these
17 materials promote the goal of giving students
18 an opportunity to explore other aspects of
19 evolution and evolutionary theory?

20 A. The best way to answer your question is
21 that I started doing this simply because so many
22 students would say, I talk about RNA, could you
23 give us some links to some other things in case
24 we get interested here and there, and the links
25 I put up on evolution fall into that general

1 category of anticipating student questions.

2 Q. Does it also give them a better
3 understanding of the way in which evolution
4 is regarded in the larger society?

5 A. I hope so.

6 Q. If you look in your deposition, page 78,
7 please?

8 A. Okay.

9 Q. And the question I asked you beginning on
10 line 22 was, "What goal does that promote?" And
11 that's referring to your previous answer, "The
12 way in which evolution is regarded in the larger
13 society" for example was your answer, and then
14 my question was, "What goal does that promote?"
15 And then could you read us your answer starting
16 at line 23 on page 78, continuing through line 7
17 on page 79?

18 A. Sure. Gladly. "I think I've already
19 answered the question, which is to give students
20 an opportunity to explore the implications of
21 some of the material that we cover in lecture
22 and, you know, the generalization that I would
23 apply to any education is, the goal is not to
24 define a set of material to be mastered, but to
25 open a door. And this is one way to open the

1 door and say if you want to walk through that
2 door, take a look, there it is."

3 Q. Is that a truthful answer?

4 A. Oh, of course, it's a truthful answer, sir.

5 Q. I just want to be accurate that that web
6 page on evolution you had at Brown University
7 included the article "The Flagellum Unspun,"
8 correct?

9 A. Yes, sir, I believe it did.

10 Q. And the other article, I believe I
11 misspoke, I believe the title of it is
12 "Answering the Biochemical Argument from
13 Design," is that correct?

14 A. Sounds right, yep.

15 Q. Now, your biology course consists of
16 approximately 38 to 40 lectures, is that
17 correct?

18 A. In some years a couple here, but that's in
19 the neighborhood. We have a few exams as well.

20 Q. I believe you testified in your deposition
21 approximately three out of those 38 to 40
22 lectures are specifically dedicated to
23 evolution?

24 A. I think that's about right, yes. About
25 10 percent.

1 Q. I think we already established you're the
2 co-author of "Biology" by Prentice Hall, and
3 your co-author is Joseph Levine, is that correct?

4 A. That's correct, sir.

5 Q. And it's your understanding that the Dover
6 Area School District selected and purchased your
7 2004 edition of "biology" to be used as their
8 textbook for the ninth grade biology class?

9 A. That's my understanding, too.

10 Q. And you consider that to be a ringing
11 endorsement of your book I believe is the term
12 you used in your deposition, correct?

13 A. Did I?

14 Q. If you'd like to look, page 21 and 22.

15 A. Sure.

16 Q. Line 24, starting on page --

17 A. Sorry, the clip is in the way. Yes, okay.
18 I'll just rephrase it so I can explain the
19 context to the court. "Question: I'm assuming
20 you don't have any objections with the school
21 board making that decision," which was to pick
22 out book. Answer, my answer, "No, I was quite
23 pleased. I considered it to be a ringing
24 endorsement of our book," and I have to say that
25 when I said that I was engaging in a bit of flip

1 hyperbole, exaggeration for just the purpose of
2 emphasis. I was very pleased.

3 Q. You think that was a good choice?

4 A. A good choice by to engage in flip
5 hyperbole or for the Dover board of education?

6 Q. Probably the latter.

7 A. Okay. Yes, I think it was a good choice.
8 Joe and I worked very hard on this book. We
9 think we've written the best possible book.
10 We regard our mission as to turn students on
11 to science, and we think our book does that and
12 we're very happy that the Dover board selected
13 it for the students.

14 Q. Does your textbook provide comprehensive
15 coverage of the theory of evolution?

16 A. Yes, sir, I believe it does.

17 Q. And you write your textbooks to comport
18 with the academic standards for each of the
19 states, correct?

20 A. Yes, sir, we do. The textbook used in
21 Dover is a national edition, but we routinely
22 consult the science education standards in the
23 various states, including Pennsylvania, to make
24 sure they fit those standards.

25 Q. Is it your understanding that your biology

1 book, the 2004 version, comports with the
2 Pennsylvania state academic standards?

3 A. Yes, sir, I believe it does.

4 Q. In your opinion does your textbook
5 represent science in a manner that comports
6 with good science pedagogue?

7 A. Yes, sir, I believe it does.

8 Q. And it presents science in a way that is
9 proper for a ninth grade biology student?

10 A. Yes, I think that.

11 Q. Now, this book, the biology book, includes
12 a section entitled "Strengths and Weaknesses of
13 the Evolutionary Theory," correct?

14 A. Yes, it does include such a section.

15 Q. And this section has not appeared in your
16 prior versions of the biology book, is that
17 correct?

18 A. You know, the answer to that is -- not
19 appeared in previous version. Not exactly.
20 It's not exactly a yes or no. That particular
21 heading is new, but some of the statements made
22 under it do appear in earlier printings of the
23 book. But certainly the section exactly as it
24 appears in 2004 I do agree did not appear in the
25 2003 or the 2002 copyright.

1 Q. Did you have prior sections that were set
2 out strengths and weaknesses that were under
3 the section on evolution?

4 A. We certainly did describe the strengths and
5 weaknesses of evolutionary theory, but we had
6 not placed them under a heading so they couldn't
7 be missed.

8 Q. So this was the first time it was placed
9 under that sort of a heading?

10 A. That is correct, sir.

11 Q. If you can turn to page 386 in the biology
12 book, and that's Exhibit 214, defendant's
13 exhibit, could you read the paragraph that
14 begins with "like," the second full paragraph?

15 A. Sure, I'd be glad to. "Like any scientific
16 theory, evolutionary theory continues to change
17 as new data are gathered and new ways of
18 thinking arise. As we shall see shortly,
19 researchers still debate such important
20 questions as precisely how new species arise
21 and why species become extinct. There is also
22 uncertainty about how life began."

23 Q. And the caption of that where that section
24 falls is Strengths and Weaknesses of
25 Evolutionary Theory," correct?

1 A. It's actually a heading, but yeah, that's
2 correct.

3 Q. And that statement, that paragraph that you
4 just read, is that an accurate statement?

5 A. I certainly hope so. I believed it when
6 Joe and I wrote it.

7 Q. Now, that section, that heading, "Strengths
8 and Weaknesses of Evolutionary Theory" was added
9 to your book because of the state requirements
10 of the state of Texas, correct?

11 A. Yes, sir, it was.

12 Q. And those standards required students to
13 analyze and critique specific scientific
14 theories?

15 A. The curriculum guidelines in the state of
16 Texas, which are known as the TEKS, which stands
17 for Texas Essential Knowledge and Skills, have
18 very specific wording in fifteen or twenty
19 different curricular areas, and when we prepared
20 our book for the Texas adoption we thought it
21 best to use the exact wording that was used in
22 the Texas standard in a variety of places so it
23 couldn't be missed that we were conforming to
24 Texas standard, and this is one of those places,
25 that is correct.

1 Q. Now, is it true when you submitted your
2 textbook to the state of Texas it was clear that
3 there was only one scientific theory that any
4 member of the state board of education was
5 interested in, and that was the theory of
6 evolution?

7 A. No, sir, it was not clear. Would you like
8 me to explain why I gave --

9 Q. I want you to go to your deposition, sir,
10 page 285 and 286.

11 A. Okay.

12 Q. And if you start, the question begins on
13 line 24 of page 285. If you could read that
14 through your answer of page 286, line 19.

15 A. Sorry, you want me to start on 285?

16 Q. 285, line 24 is where the question begins.

17 A. Sure. "Question: What was the purpose for
18 putting that in the 2004 version?" Answer --

19 Q. I'm sorry, let me -- I'm sorry to interrupt
20 you, but that is that heading, that section that
21 we were just --

22 A. Yes, correct.

23 Q. Continue with your answer, I'm sorry.

24 A. "The purpose for putting that in the 2004
25 version was the state requirements for the state

1 of Texas specifically required students to
2 analyze and critique the strengths of scientific
3 theories and hypotheses. Now, that standard,
4 which is known as TEKS 3-A in Texas, applied to
5 scientific theories in general, but as we
6 submitted our textbook to the state of Texas it
7 was clear that there was only one scientific
8 theory or hypothesis that any member of the
9 state board of education was interested in, that
10 was interested in seeing strengths and
11 weaknesses for, and that one theory was the
12 theory of evolution."

13 Now, the reason, sir, I said no to your
14 question was, and I'm sure the court reporter
15 can correct me if I got this wrong is because
16 your question was, was that the only theory that
17 any member of the state board was interested in,
18 and the reason I said no is because many members
19 of the state board were interested in many other
20 aspect of the book. The deposition statement
21 was it was the only theory that anyone was
22 interested in seeing strengths and weaknesses
23 for, and that's what I said in my deposition.

24 So my no answer is based on very carefully
25 listening to your question and trying to say

1 that no, I don't want to slur the entire board
2 of education of the great state of Texas by
3 saying that's the only theory they were
4 interested in. It is true that that's the only
5 theory that they wanted to hear strengths and
6 weaknesses for. I hope that clarifies my answer
7 in the court vis-a-vis the deposition.

8 Q. And so in that regard your deposition
9 answer that you read is a correct answer?

10 A. My answer in court was correct, sir,
11 based on your question, and my answer in the
12 deposition was correct based on the question,
13 which was different, that you asked me at the
14 deposition.

15 Q. Sir, when you write your textbooks, and
16 this is I guess a general post to textbook
17 writing, is it true that when you use qualifying
18 language such as "some biologists propose" that
19 that is a way of conveying sort of a sense in
20 the community that there might be a tentative
21 nature or disagreement about the proposition?

22 A. I'd want to see the particular context you
23 have in mind, but in general I think that's a
24 fair statement.

25 Q. Sir, in the ordinary meaning of the word a

1 creationist is simply any person who believes in
2 an act of creation, correct?

3 A. Yes, I think I would also regard that as
4 the ordinary meaning of the word creationist.

5 Q. And you believe that the universe was
6 created by God?

7 A. I believe that God is the author of all
8 things seen and unseen. So the answer to that,
9 sir, is yes.

10 Q. In a sense that would make you a
11 creationist using the definition --

12 A. In the, as I think you and I discussed
13 during the deposition, in that sense any person
14 who is a theist, any person who accepts a
15 supreme being, is a creationist in the ordinary
16 meaning of the word because they believe in some
17 sort of a creation event.

18 Q. And that would include yourself?

19 A. That would certainly include me.

20 Q. And you believe that God coined the laws
21 of physics and chemistry?

22 A. Well, I have to say that I'm not on the
23 stand as you pointed out yourself, sir, as an
24 expert witness in theology. I can certainly
25 tell you what I believe. And that is as I said

1 before, God is the author of all things seen and
2 unseen, and that would certainly include the
3 laws of physics and chemistry.

4 Q. And you believe that evolution is a way in
5 which God can bring about His divine plan in
6 this universe?

7 A. I certainly believe that evolution is a
8 natural process that occurs in our universe, and
9 as such it and all other natural processes fall
10 in -- again I don't want to pretend to be a
11 theologian, but I think it would fall under the
12 purview of what a theologian would call divine
13 providence.

14 Q. But in terms of your personal beliefs you
15 believe that that is consistent with God's
16 overall plan the way evolution operates?

17 A. I believe that God is the author of nature,
18 and therefore I believe that things that happen
19 in nature are consistent with God's overall
20 plan, and evolution is a natural process.

21 Q. And you see evolution as being consistent
22 with your religious beliefs?

23 A. Yes, sir, I do.

24 Q. Sir, you believe that faith and reason are
25 compatible?

1 A. I believe not only that they are
2 compatible, but they are complementary.

3 Q. You agree that if we apply faith and reason
4 correctly as objective and reliable tools for
5 the nature of the world around us, ultimately
6 the conclusions of both should be compatible?

7 A. One would certainly hope is. If God
8 exists, and both faith and reason are gifts
9 from God, they should complement each other.

10 Q. You agree then that the rational world of
11 science can be included in faith world of
12 religion, that the two are entirely compatible?

13 A. Well, actually you phrased that question in
14 sort of a contradictory way. You said, I think
15 you said can one be included within the other,
16 and then you said are they compatible. I'm not
17 sure that neither faith or reason are included
18 within each other. I do very much agree they
19 are compatible.

20 Q. If you look at your deposition, page 201?

21 A. Yes, sir.

22 Q. Beginning at the end you make reference to
23 a document written by John Paul II, and I
24 believe that was the encyclical *Fides et Ratio*,
25 "Faith and Reason?"

1 A. Sir, this is on page 201?

2 Q. If you read on to page 202, beginning of
3 page 202.

4 A. Okay. No wonder I couldn't find it. Yes.
5 Oh, okay. In the deposition, I'm not sure if
6 you want me to read it, but I can paraphrase
7 it --

8 Q. I'd like you to read it --

9 A. Sure. I'll simply begin on page 202 if
10 that's all right with you.

11 Q. Yes.

12 A. "Guiding the relationships between these is
13 pretty well exemplified in that document written
14 by John Paul II that I mentioned earlier called
15 *Fides et Ratio*, which is to say that the
16 rational world of science can be included in
17 faith world of religion, and that the two are
18 entirely compatible," and I have to say that I
19 don't quite like with the way that I put it in
20 the deposition, which is one of the reasons that
21 I rephrased it, and, you know, in terms of
22 including when one world is included in another
23 it carries the implication that one is
24 subordinate to the other, and I regard as I
25 said in the second part of that is the two as

1 compatible, consistent, and complementary. I
2 don't regard one as included with the other, and
3 therefore I don't actually quite agree with what
4 I said in the deposition. I hope I haven't
5 caused you any trouble.

6 Q. So you don't ascribe to philosophical
7 naturalism, correct?

8 A. As I understand philosophical naturalism,
9 it is a doctrine that says that the physical
10 world is all there is, and the only way we have
11 of learning anything about the nature of
12 existence is the scientific way, and if that is
13 what philosophical naturalism means, no, sir, I
14 am not a philosophical naturalist.

15 Q. Now, when you read the Book of Genesis, you
16 take that to be a spiritually correct account of
17 the origins of our species, correct?

18 A. I take all of the Bible, including the Book
19 of Job, the Book of Psalms, New Testament, and
20 Genesis to be spiritually correct.

21 Q. And you find repeatedly verses that say
22 that God commanded the waters of the earth and
23 the soil of the earth to bring forth life, and
24 from an evolutionary point of view you believe
25 that's exactly what happened?

1 A. Well, I just don't find them. They're
2 there. And the way in which I look at Genesis
3 is that Genesis as I read it, and unfortunately
4 I don't read Hebrew, my co-author does, and he's
5 frequently discussed Genesis with me, but as I
6 read English translations of Genesis I see a
7 series of commands of the Creator to the earth
8 and its waters to bring forth life and, you
9 know, without requiring, my church certainly
10 doesn't, without requiring Genesis to be a
11 literal history, you know, that's pretty much
12 what happens, which is that the earth and its
13 waters and so forth brought forth life.

14 Q. And that's consistent with evolutionary
15 theory?

16 A. In the broad figurative poetic sense it is
17 consistent with natural history, which underlies
18 evolutionary theory.

19 (Brief pause.)

20 Q. I believe you indicated in your direct
21 testimony that you gave testimony down in
22 Georgia in the Sellman vs. De Kalb County case?

23 A. Yes, sir, I did.

24 Q. May I approach the witness, Your Honor?

25 THE COURT: Yes you may.

1 Q. I'm handing you what's been marked as
2 Defense Exhibit 211.

3 A. Thank you, sir.

4 Q. And you'll note from the label on the front
5 cover it appears to be Exhibit 11 from your
6 deposition. Do you recall seeing this in your
7 deposition?

8 A. Yes, I do recall seeing it in my
9 deposition.

10 Q. If you turn to page 138, please?

11 A. Okay.

12 Q. And starting at line 3 the question was
13 asked, "When you were writing material on
14 evolution, did you add any information on
15 creationism? And then your answer begins at
16 line 5. Would you please read your answer from
17 line 5 down to line 24, please?

18 A. Okay. "Answer: No, we did not, and the
19 reason that once again is that there is no
20 scientific evidence that supports the idea of
21 creationism. Now, it's very important to define
22 what one means by creationism. I'm a Roman
23 Catholic for example, so I believe the universe
24 was created, and you could always say that means
25 you're a creationist. But in the modern usage

1 of that language in the United States the word
2 creationist means something quite different,
3 other than a person who simply believes in a
4 supreme being and thinks that there is meaning
5 and order and purpose to the universe.

6 "In the current usage in the United States
7 creationist is taken to mean someone who thinks
8 that the earth is six to ten thousand years old,
9 that all living organisms were simultaneously
10 created during a very brief period of time,
11 perhaps six days, and that the entire geologic
12 record is an illusion, a column of flood
13 deposition from the single forty day flood that
14 has been misinterpreted for 250 years by the
15 geological sciences as a series, a system of
16 geological ages."

17 Q. When you gave that answer you were
18 testifying under oath, sir?

19 A. Yes, sir, I was testifying under oath.

20 MR. MUISE: Your Honor, this might be a good
21 time to take a break, I don't know, if the court
22 is inclined to do so. I'm going to be moving
23 into some new material, so it's sort of a
24 natural break from my perspective.

25 THE COURT: All right. Why don't we take

1 our morning break at this time, and we'll as
2 yesterday break for at least twenty minutes to
3 give everybody an opportunity to do what they
4 need to do. We'll return in twenty minutes.
5 We'll be in recess.

6 (Recess taken at 10:16 a.m. Trial
7 proceedings resumed at 10:47 a.m.)

8 THE COURT: Be seated, please. All right,
9 we're back on the record, and Mr. Muise, we are
10 continuing with cross examination.

11 CONTINUED CROSS EXAMINATION BY MR. MUISE:

12 Q. Thank you, Your Honor. Dr. Miller, the
13 concept of complex specified information, that's
14 a component of intelligent design theory?

15 A. I suppose it is. I don't normally hear
16 it when intelligent design theory is explained.
17 I didn't see that exact term in "Pandas and
18 People," I may have missed it, perhaps you
19 pointed out to me, but I do know that there is a
20 person who is generally regarded as part of the
21 intelligent design community named William
22 Dembski who has written about complex specified
23 information, and I can't think of anyone else
24 who has written about it other than Dr. Dembski.

25 Q. When you testified on direct and you

1 referred to the section on "Pandas" with
2 the writing in the sand, John loves Mary?

3 A. Yes, sir, I did.

4 Q. Is it your understanding that that's the
5 sort of concept that Dr. Dembski is trying to
6 convey with the notion of complex specified
7 information?

8 A. Well, you know, I'm not entirely sure,
9 and we could always ask Dr. Dembski, but it's
10 entirely possible that that's what he refers to.

11 Q. And you said this is a concept argued by
12 Dr. William Dembski, is that correct?

13 A. That's my understanding.

14 Q. And he has a Ph.D. in mathematics?

15 A. That's what I've been told.

16 Q. And his ideas and concepts were published
17 in a book called "The Design Inference," are
18 you familiar with that?

19 A. I've heard of the book.

20 Q. Do you know that the book was published by
21 Cambridge University Press?

22 A. I have heard that, too.

23 Q. Is Cambridge University Press an academic
24 press?

25 A. It is a press that I understand is owned by

1 Cambridge University in England.

2 Q. A prestigious university would you agree?

3 A. Oh, absolutely, no question about that.

4 Q. I may want to forewarn the court reporter
5 I have some phyla questions coming up here.

6 Dr. Miller, the octopus belongs to the phylum
7 mollusca, M-O-L-L-U-S-C-A, is that correct?

8 A. Yes, sir, I believe that's correct. Is
9 this going to be a little bit of a biology quiz
10 here, sir?

11 Q. I think you'll be prepared for it.

12 A. Okay, I'm ready to go.

13 Q. It's not a pop quiz, put it that way.

14 A. Okay.

15 Q. The starfish belongs to the phylum --

16 A. Echinodermata. I can help you with these.

17 Q. E-C-H-I-N-O-D-E-R-M-A-T-A?

18 A. Right, and that is pronounced
19 echinodermata.

20 Q. And an insect belongs to the phylum
21 anthropoda?

22 A. No, sir, arthropoda. That's an R.

23 Q. Sorry. A-R-T-H-R-O-P-O-D-A?

24 A. That's correct.

25 Q. And a fish, in the example we used a

1 minnow, belongs to the phylum chordata?

2 A. Chordata, that is correct.

3 Q. C-H-O-R-D-A-T-A?

4 A. That is correct.

5 Q. It's true that there's no fossil evidence
6 that show that these phyla share a common
7 ancestor?

8 A. Let me think about that just for a second.

9 (Brief pause.)

10 A. Within the last year a number of small
11 bilateran fossils have indeed been discovered
12 in fossil formations in China, and these --
13 by bilateran, B-I-L-A-T-E-R-A-N, we mean an
14 organism has an axis of symmetry that goes
15 right down the middle just like we do, and has
16 parts of the body on both sides, hands on both
17 sides, these small bilateran fossils exist in a
18 time period preceding the Cambrian, and they may
19 well turn out to be the ancestors of several of
20 the phyla that you mentioned, and these would
21 include arthropoda and chordata. It's a little
22 more difficult to see how they could be the
23 ancestors of echinodermata, which display
24 radial, or five-fold symmetry.

25 Q. If you could go to your deposition at page

1 267?

2 A. Yes, sir.

3 Q. In the question beginning on line 12, "Is
4 there fossil evidence that shows that each share
5 a common ancestor," and we're referring to those
6 four phyla that I just asked you about, could
7 you please read your answer?

8 A. Sure, I'd be glad to. The question you
9 asked, is there a fossil evidence that shows
10 these share a common ancestor, the answer is
11 that, "No, we don't have evidence yet of a
12 common ancestor for these four different," I
13 said phylum, but it should be phyla, "we do,
14 however, have molecular evidence from organisms
15 living today, As I mentioned several times, that
16 all these organisms share a common molecular
17 tool kit which is strong evidence on a molecular
18 evidence, and many people would argue that
19 molecular evidence is more important than fossil
20 evidence, that they do share a common ancestor
21 in molecular terms."

22 Now, I would point out, because I'm sure
23 you're about to ask me about the difference
24 between my statement in the deposition, which
25 was taken in May, and my testimony here today,

1 which is in the month of September, and the
2 difference is I've read the paper on these small
3 fossils. This is a new development in science,
4 and that's why my answer today is somewhat
5 different.

6 Q. Is the point you make about many people
7 would argue that molecular evidence is more
8 important than fossil evidence, when you say
9 the many people, are you referring to
10 scientists?

11 A. Yes, sir, I am.

12 Q. Sir, you testified about the Dover
13 statement in your direct, correct?

14 A. Yes, that's right. I do believe I did
15 testify about the Dover statement.

16 Q. And you never spoke to a board member from
17 Dover, is that correct?

18 A. Let me think hard about this.

19 Q. Let me rephrase the question. You never
20 spoke to a board member about the statement?

21 A. I don't believe I have spoken to any
22 members of the Dover board of education about
23 any matter. I was just trying to make sure
24 that was correct.

25 Q. And you never spoke to any administrator

1 at the Dover area school district about the
2 statement?

3 A. Sir, I believe that's correct, and I also
4 believe that when I became aware that Dover
5 was a community that was discussing this
6 contentious matter of how to teach evolution --

7 Q. Sir, did you speak to an administrator
8 from Dover?

9 A. Well, I'm trying to give you an answer.
10 I can't give you yes or no because I did e-mail
11 a number of people in Dover, and I suspect,
12 these are people whose names I got off of the
13 Dover area school district web site, and I don't
14 want to answer yes or no because, you know, one
15 of those people might have been like an
16 assistant superintendent, I can't remember if
17 it was a principal or a department chair, I did
18 send e-mails to a couple of people.

19 Q. Were they --

20 A. Sorry, and I'm not being evasive, it's just
21 the question is not being able to recollect who
22 they were, but I want to make sure that the
23 record and the court does reflect that I did
24 indeed send a couple of e-mails to people in
25 Dover saying I would support them, I would be

1 happy to answer their questions about evolution,
2 and you know, one of them might have been an
3 administrator. So that's why I'm being a little
4 fuzzy on this.

5 Q. My question was did you speak to any
6 administrator about that statement, the Dover
7 statement that you testified about on direct.

8 A. Under the qualifications that I've just
9 given you, which is, you know, I might have
10 sent an e-mail to somebody who happened to be
11 an administrator, I believe the answer to that
12 is no to the best of my recollection.

13 Q. Do you recall if that e-mail discussed this
14 statement in any fashion?

15 A. I don't believe it did, but I can't, I
16 don't have a copy of it and I can't be positive.

17 Q. If you turn to your deposition at page 321?

18 A. Okay.

19 Q. Starting with the question at line 4, can
20 you read the question and read your answer down
21 through line 12?

22 A. Well, the question is, it presupposes
23 something before it, it says, "Whereas the
24 theory of evolution is not a fact."

25 Q. Your answer?

1 A. No. Sorry, my answer is, "No scientific
2 theory is a fact, and the Dover statement is
3 very clear that it uses the theory of evolution
4 in the second sense, because when the statement
5 says Darwin's theory is a theory, and when you
6 talk about Darwin's theory, you are specifically
7 talking about the descent with modification and
8 natural selection." I think it's very difficult
9 to make sense of that answer without the context
10 of the question that precedes it.

11 Q. Did you correctly read your answer in the
12 deposition?

13 A. Yes, sir, I did.

14 Q. Now, in this statement it says, the Dover
15 statement, "a theory defined as a well tested
16 explanation that unifies a broad range of
17 observations," do you recall this statement
18 has that definition of theory in it?

19 A. Yes.

20 Q. And that is a correct and proper definition
21 of theory?

22 A. Yes, and I believe that in my direct
23 testimony I testified that yes, that was
24 I thought a pretty good definition of the word
25 theory.

1 **Q.** And it properly defined the theory of
2 evolution?

3 **A.** It properly defines a scientific theory,
4 and because the theory of evolution is a
5 scientific theory, yes, it fits the theory of
6 evolution.

7 **Q.** I just want to revisit that question from
8 page 321. Within the context of the preceding
9 question that was addressing the different
10 meanings of evolution that I believe you
11 testified to on direct and that I had asked you
12 on cross whereas evolution can mean change over
13 time or it can also mean evolution as a theory,
14 the processes of how that evolution may have
15 occurred, the first may, is more akin to a
16 historical fact, the second sense is a theory
17 which not a fact, is that the correct context of
18 your answer?

19 **A.** The correct context of the area, the first
20 part is perfectly fine, you said a theory which
21 is not a fact, and again theories are a higher
22 order of explanation than fact, and in that
23 sense that was correct, right.

24 **Q.** And that's the context for the answer that
25 you gave on page 321 of your deposition?

1 A. Yes, yes, that is right. The reason I
2 wanted to point that out is because my answer
3 begins the second sense, and of course if I just
4 read that into the court record, one has no idea
5 as to what is meant by the second sense without
6 the preceding question.

7 Q. And that second sense is the theory sense
8 of the meaning of evolution that we just
9 discussed?

10 A. That's right, which is a coherent testable
11 scientific explanation as to how the process
12 of change over time has taken place.

13 Q. If you go to your deposition page 329?

14 A. Sure.

15 Q. Again these are more questions I've asked
16 you about that, the Dover statement. If you
17 look at, read the question beginning at line 15,
18 and then your answer that follows?

19 A. Okay. Question, the next sentence, "The
20 reference book 'Of Pandas and People' is
21 available for students who might be interested
22 in gaining an understanding of what intelligent
23 design actually involves. Do you have any
24 problems with that statement? Answer: No, I
25 think the fact that the board has provided that

1 book, made it available to students, and that
2 they have characterized it as a book on
3 intelligent design, that's all a fair statement.
4 So I think that particular statement is
5 something that effectively communicates the
6 reality of the situation to students, which is
7 why we got this book, it's available for you and
8 this book describes intelligent design."

9 Q. And just a correction, I believe which is
10 "we got this book," not "which is why we got
11 this book," correct?

12 A. I'm sorry. If I read it wrong I apologize.
13 "Which is we got this book, it's available for
14 you, and the book describes intelligent design."

15 Q. Is that a truthful answer?

16 A. Of course it's a truthful answer.

17 Q. Sir, would you open up your textbook,
18 Exhibit 214?

19 A. Sure.

20 Q. Turn to page 15 for me, please. If you
21 read the paragraph that begins with the words
22 "A useful"?

23 A. Sure. "A useful theory may become the
24 dominant view among the majority of scientists,
25 but no theory is considered absolute truth.

1 Scientists analyze, review, and critique the
2 strengths and weaknesses of theories. As new
3 evidence is uncovered a theory may be revised
4 or replaced by a more useful explanation.
5 Sometimes scientists resist a new way of looking
6 at nature, but over time new evidence determines
7 which ideas survive and which are replaced.
8 Thus, science is characterized by both
9 continuity and change."

10 Q. Is that correct with regard to all
11 scientific theories?

12 A. Yes, I believe it was. This is a chapter
13 on the nature of science, and Joe and I wanted
14 to emphasize to the students to scientific views
15 may change over time in light of evidence.

16 Q. And that includes the Darwin theory of
17 evolution?

18 A. Darwin's theory is a scientific theory.
19 All theories are characterized by continuity
20 and change, yes.

21 MR. MUISE: No further questions, Your
22 Honor.

23 THE COURT: Thank you, Mr. Muise.
24 Mr. Walczak, do you have any redirect?

25 MR. WALCZAK: Yes, Your Honor.

1 (Brief pause.)

2 REDIRECT BY MR. WALCZAK:

3 Q. Good morning, Dr. Miller?

4 A. Good morning.

5 Q. I want to cover six or seven points that
6 were raised by Mr. Muise. First of all, if we
7 could put Exhibit 124 on the screen? Is this
8 the four paragraph statement that I asked you
9 to comment on in your direct exam?

10 A. Yes, sir, it is.

11 Q. And as Mr. Muise pointed out, this
12 statement was read in January. What I'd like
13 to do now is put up I believe it's Exhibit 131,
14 which is a statement that was read to the
15 students in May or June that was revised
16 slightly. Are you able to highlight, Matt, the
17 four paragraphs? Let me represent to you, and
18 if I'm in error I please would invite an
19 objection, but I believe the only paragraph that
20 is changed in any way is the third one. If you
21 could please read that to yourself?

22 (Brief pause.)

23 A. I have read it, thank you.

24 Q. Can you identify what the change would be?

25 A. You're not playing fair. You should have

1 told me to pay attention to the other one and
2 read this one, but I have to tell you I don't
3 see the change right there, I'm sorry.

4 Q. Let me see if we can put both --

5 A. I thought Mr. Muise's phylum quiz was going
6 to be tough.

7 Q. Just wait until you get my grades. So the
8 one on top is the one from May or June.

9 A. Oh, okay. Now, sir, I see the difference.

10 Q. And so what is the difference?

11 A. Well, they left out an apostrophe in the
12 possessive on Darwin's in the June one, and --

13 THE COURT: We've lapsed into English there.

14 A. Your Honor, I'm sorry. It's the teacher in
15 me, I can't help it, and I noticed that as far
16 as I can tell the only other thing is that is
17 the phrase "along with other resources," I think
18 that's correct. Am I missing anything else,
19 Mr. Walczak?

20 Q. That's what I can see as well.

21 A. Okay. I don't see any other grammatical
22 mistakes either.

23 Q. Besides "Pandas" do they mention what those
24 specific resources are?

25 A. No. The only book I see mentioned in

1 "Pandas," the only book I see mentioned is
2 "Pandas," and other resources unnamed.

3 Q. Does this change in the May or June reading
4 of the statement, does this in any way change
5 the opinion which you gave to the court about
6 whether the statement promotes student
7 understanding of science and evolution? Does
8 this change your opinion in any way?

9 A. No, sir, it does not. It's still very
10 clear that in contrast to the second paragraph,
11 which is designed to specifically undermine
12 Darwin's theory of evolution, or the theory of
13 evolution in general, the third paragraph has no
14 such undermining language with respect to
15 "Pandas and People," and that's the only book
16 that it specifically mentions. I think the
17 effect is pretty much the same.

18 Q. There's a term that has been used
19 throughout the testimony thus far, and it
20 is "origin of life," and is that term used
21 in a scientific way? Is there a way that
22 scientists use the term origin of life?

23 A. Yes, sir. That term is used in a
24 scientific way.

25 Q. And how is that term defined?

1 A. Well, I think the definition is reasonably
2 straightforward, and that is origins of life
3 research is research on, research concerning the
4 conditions on this planet before life first
5 appeared about three and a half billion years
6 ago, and it involves research designed to reveal
7 the pre-biological chemical processes that may
8 have given rise first to self copying or
9 self-replicating molecules, and eventually to
10 the first living cells.

11 Q. And is that how you have used the term
12 whenever it's employed in your book?

13 A. I believe it is. It's not something, it's
14 not a question I have thought about in detail,
15 but I believe that's exactly how we used it.

16 Q. And when you have testified using that
17 term, either in response to a question, that is,
18 has been your interpretation of origins of life?

19 A. Yes, sir, that is absolutely correct, that
20 origins of life refers to in every sense in
21 which I have used it and Joe Levine has used it
22 in our book and I think in my testimony as to
23 the origin of the first self-replicating
24 molecules and the first living cells on this
25 planet.

1 Q. When you use origin of life, you're not
2 talking about origin of man?

3 A. No, absolutely not, sir. I think I've been
4 very careful to use origin of species in terms
5 of referring to that, and human origins or human
6 evolutionary descent is quite a distinct topic
7 from origin of life.

8 Q. Mr. Muise asked you a fair bit about your
9 personal religious views.

10 A. Yes, I think he did.

11 Q. And he also asked you about religious
12 and philosophical statements made by other
13 scientists.

14 A. Yes, he did, and he I think named probably
15 three of them in particular.

16 Q. Professor Dawkins was one?

17 A. Correct.

18 Q. Are statements, are these scientific
19 statements?

20 A. No, sir. As I believe I answered for
21 Mr. Muise, none of those statements are
22 scientific in any sense.

23 Q. And do scientists make say religious
24 statements?

25 A. Of course they do.

1 Q. And philosophical statements?

2 A. Yes, sir, they do. They even make
3 statements about baseball, as Steven J. Gould
4 did frequently, and those are not scientific
5 statements.

6 Q. Just because a scientist said something
7 doesn't make it scientific?

8 A. Of course not.

9 Q. And are you obviously have strong religious
10 views you published in "Finding Darwin's God?
11 Are these views published anywhere in your
12 biology textbook?

13 A. No, sir, of course not.

14 Q. Are they published in any of your
15 scientific journals?

16 A. They are not published in any of my
17 scientific papers.

18 Q. Why not?

19 A. Because they aren't science. It's very
20 simple.

21 Q. I want to direct your attention to your
22 testimony in the Sellman case about which
23 Mr. Muise asked you, and I believe that's
24 Defendant's Exhibit 211. And Mr. Muise asked
25 you about your testimony there where you were

1 asked about the modern usage of creationism.

2 A. Yes, he did.

3 Q. And as I recall your answer was essentially
4 the definition of what would be called young
5 earth creationism.

6 A. Yes. In fact, I don't recall Mr. Muise
7 asking me a question. I recall him asking me
8 to read my testimony, and he did not ask me any
9 questions about the nature of that testimony,
10 and he did not ask for any clarifications.

11 Q. It might appear that your testimony in
12 Sellman is inconsistent with what you may have
13 testified yesterday. Can you reconcile the
14 testimony?

15 A. Yes. It's very easy to reconcile that
16 testimony, and that is that in Sellman I should
17 have been much more specific than I was when I
18 said what is generally meant by creationism.
19 And in particular the definition I give to
20 creationism is one that in this trial in order
21 to distinguish it from intelligent design I gave
22 to scientific creationism or young earth
23 creationism.

24 Now, my testimony in Sellman I think could
25 probably be construed if one does not appreciate

1 the sort of general way in which I used the word
2 creationism as to exclude intelligent design as
3 a creationist theory simply because it doesn't
4 make the scientific predictions that young earth
5 creationism does about the geological record and
6 the age of the earth, but in the most general
7 sense it is a form of, it is a form of special
8 creation or special creationism. Again this
9 term was not at issue in the trial in Atlanta,
10 and that's one of the reasons why I did not
11 carefully define that term as I should have in
12 my testimony in Sellman.

13 Q. But, Dr. Miller, in Sellman you were in
14 fact asked about intelligent design, were you
15 not?

16 A. My recollection is that I was.

17 Q. I'd like you to turn to page 139.

18 A. This is my testimony in Sellman?

19 Q. Yes. This would be Defendant's Exhibit
20 211.

21 A. Sir, I'm going to need a copy of it.
22 Mr. Muise gave me one, but then he took it back.

23 Q. You don't remember it, sir?

24 A. I've got 138 down pretty well, but 139 I'm
25 having trouble with.

1 Q. May I approach the witness?

2 THE COURT: You may.

3 A. Thank you.

4 Q. Now, the questions Mr. Muise asked you
5 about your answer to I believe as you put it
6 in the modern usage of creationism was on page
7 138 --

8 A. That's correct, sir.

9 Q. -- of the transcript? So now on page 139
10 I'd like you to read for the court line 7
11 through 11, please, beginning with the question
12 there.

13 A. Sure. Line 7 begins, "Question: When you
14 were writing your material on evolution, did you
15 add any information on intelligent design?" The
16 answer is, "No, I did not, and the reason once
17 again is because we have been unable to find
18 scientific evidence supporting the idea of
19 intelligent design."

20 Q. Now, let me ask you to turn to the next
21 page and read from line 4 to line 14 on 141,
22 and I'll note that the first question there is
23 by Judge Cooper in that case.

24 A. Perhaps it would help if I read that part
25 to make clear. So I'll begin on line 4 as you

1 requested. "THE COURT: Is it religious based?"

2 Q. I'm sorry, excuse me. And did you know
3 what the court was referring to when it says
4 "it" there?

5 A. Oh, excuse me, let me go back to the
6 context. The court is, the term "it" is
7 referring to intelligent design.

8 Q. Thank you.

9 A. So with reference to the intelligent
10 design, the transcript begins, "COURT: Is it
11 religious based? WITNESS: The advocates, Your
12 Honor, of intelligent design would argue very
13 strongly that their ideas are not religious
14 based. They would say it is a straightforward
15 conclusion of analysis of information theory and
16 what they regard as the deficiencies of
17 evolutionary theory.

18 "But I think it's also clear that the
19 people who embrace intelligent design in the
20 United States argue very strongly that they have
21 a religious, argue very strongly that if
22 intelligent design is not included, then their
23 own religious beliefs will suffer. So they
24 certainly in my experience many of them have
25 religious motivations for embracing this

1 particular idea.

2 "COURT: How do you see it? WITNESS: Pardon
3 me sir? COURT: How do you see it? WITNESS:
4 How do I see it? I'm a -- if I had to describe
5 myself philosophically, I'd describe myself as a
6 pragmatist, which if it works it's good enough
7 for me. And with respect to intelligent design,
8 I'm still waiting, and I've been waiting for
9 about ten years for intelligent design theory
10 to provide a single testable scientific
11 explanation that holds up under peer review,
12 under scientific analysis, and it simply hasn't.

13 "To put that in terms that my family in
14 southern Indiana, mostly a farming familhy,
15 would understand, this dog don't hunt. And in
16 the case of intelligent design, I think that's a
17 very good way to describe it."

18 Q. Could you, I'm sorry, read on through
19 line 14?

20 A. Yes, sir. "Question by Attorney Michael
21 Minnaeli: Maybe part of what His Honor is asking
22 you about is how you see it in terms of a
23 religion. Intelligent design, positing a
24 designer, a creator Answer: Well, by definition
25 any explanation that requires a creator, an

1 intelligent designer, is religious on its, is
2 certainly religious on its face, and therefore
3 the very fact that intelligent design
4 presupposes a creator makes it so."

5 Q. I want to shift focus here a little bit.
6 In the passage you just read, near the end you
7 testified that you're still waiting for a single
8 testable scientific explanation about
9 intelligent design. Mr. Muise asked you a
10 number of questions about whether irreducible
11 complexity was scientifically testable, and I
12 believe you testified in fact that it was,
13 that tests have been done. Is irreducible
14 complexity subject to scientific testing?

15 A. As irreducible, if irreducible complexity
16 is carefully framed the way that Dr. Behe did
17 in his book "Darwin's Black Box," it makes a
18 testable prediction, and that testable
19 prediction is that the parts, the individual
20 components of irreducibly complex machines
21 should have no functions on their own, and that
22 is testable, and as I indicated in my testimony
23 yesterday we can actually carry that test out in
24 many of the systems that Dr. Behe cites, and in
25 every case it fails that test.

1 Now, the test of irreducible complexity
2 as a scientific statement is not a test of
3 intelligent design, and the reason for that is
4 irreducible complexity by itself makes no
5 argument for design. It makes an argument
6 against evolution. And it's that argument,
7 the argument of evolution not working, that we
8 can subject to a scientific test. But that's
9 not proof of design.

10 That's not even an argument for design.
11 That is simply a scientific statement made
12 against evolution that is testable. As I
13 indicated it fails that test, but even if it
14 passed the test, that wouldn't be an argument
15 for design.

16 **Q.** And when you say Dr. Behe and intelligent
17 design have made predictions, would that be the
18 same as hypotheses?

19 **A.** Yes. I regard certain of the statements
20 that Dr. Behe has made as hypotheses that make
21 testable predictions. For example, he looked at
22 the blood clotting cascade, drew the inference
23 that all the parts of the cascade had to be
24 present for clotting to occur, and used that as
25 an argument from irreducible complexity that the

1 cascade could not have evolved. "Pandas" makes
2 exactly the same argument, and that argument can
3 be subjected to a test. And that is if we find
4 organisms in nature that are missing parts of
5 that cascade, if that prediction is right, their
6 blood should not clot.

7 And I brought into court yesterday two
8 examples, documented examples by science and
9 peer reviewed journals that showed that that
10 prediction was wrong. The blood of whales and
11 dolphins clots, and the blood of the puffer fish
12 clots, and had that prediction been right,
13 neither organism should have been able to clot
14 its blood.

15 Q. So one of the hypotheses that's been
16 advanced to support irreducible complexity both
17 in "Pandas" and by Dr. Behe has been refuted?
18 Is that the appropriate scientific term?

19 A. I think refuted, falsified, showed to be
20 incorrect, found out to be wrong are all
21 appropriate scientific terms in this case.

22 Q. And would you say the same thing about the
23 prediction that the bacterial flagellum is
24 irreducibly complex?

25 A. Yes, sir, I would. And the reason for that

1 once again is the prediction is that all of the
2 parts are necessary for function. In the
3 absence of any of the parts there is no function
4 that can be favored by natural selection. Once
5 we discover that ten of those parts in a
6 different context have a selectable function,
7 in other words they work, they do something else
8 that's useful to the cell, the hypothesis is
9 tested and found to be wanting. It's falsified.

10 Q. And the immune system was another
11 hypotheses used by intelligent design
12 proponents?

13 A. That's correct, sir.

14 Q. I believe you pointed to ten or eleven peer
15 reviewed scientific papers and studies that have
16 refuted that hypothesis?

17 A. In the interests in the case of the immune
18 system Dr. Behe made a different prediction.
19 Because the immune system has so many different
20 parts and so many different cells and so many
21 interacting systems that he could not point to a
22 single biochemical cascade like the blood
23 clotting, or a single structure like the
24 flagellum, but instead he pointed to the
25 complexity of the system that shuffles genetic

1 information, makes it possible for us to make
2 antibodies against just about any foreign
3 invader, and he said that system, because it
4 required multiple parts, could never be
5 explained in evolutionary terms. I think he
6 said something to the effect that Darwinian
7 explanations are doomed to failure, and it
8 turns out that ten years of research have proven
9 that Darwinian explanations of that system have
10 been abundantly successful. So in that case
11 that prediction, too, has not borne out.

12 Q. So the hypotheses advanced by the
13 proponents of your irreducible complexity
14 have been invalidated?

15 A. They've been invalidated in every case that
16 they've been examined.

17 Q. Now, but I'm trying to distinguish
18 irreducible complexity from intelligent design.

19 A. Correct.

20 Q. Let's assume that in fact there was support
21 for irreducible complexity. Let's say that all
22 of the scientific studies and literature had
23 come out differently and you had not found an
24 evolutionary pathway. Is that support for
25 intelligent design?

1 A. No, sir, it is not.

2 Q. Why not?

3 A. It's not support for intelligent design
4 because intelligent design presupposes a
5 mechanism that exists outside of nature, can't
6 be tested, can't be subjected to natural
7 examination. If irreducible complexity held
8 up, if we couldn't find subsets that were
9 useful, it might mean that these systems had to
10 be assembled by a pathway that was different
11 from the Darwinian pathway, from the
12 evolutionary pathway, and we might then look
13 for another pathway or other evidence in favor
14 of that.

15 Intelligent design would be a possibility,
16 but intelligent design is always a possibility
17 for everything. It's entirely possible that
18 this universe was intelligently designed ten
19 seconds ago, and each of us was put here with
20 false memories and false childhoods. That's not
21 a testable hypothesis. Is it possible? Yeah,
22 sure. The problem with intelligent design as a
23 scientific explanation is that it can be used
24 to explain in non-scientific terms literally
25 anything, and that's why it is not science.

1 Q. If you could recap, what are, you talked at
2 the very beginning of your testimony you talked
3 about the ground rules of science, what are
4 those ground rules?

5 A. Well, I have to think very hard, because if
6 I don't replicate my testimony exactly I'm sure
7 Mr. Muise will have something to say about it,
8 but I think the ground rules of science in the
9 most general sense are that science is limited
10 to the natural world. We do science based on
11 what we can see, what we can observe, what we
12 can test. Experiments we can carry out,
13 control, and watch.

14 We then look at the results of those
15 experiments, we try to make inferences based
16 on them, and we try to formulate testable
17 hypotheses on the basis of that evidence. Then
18 go out in the world and carry out those tests.
19 The explanations that we put forward as testable
20 hypothesis qualifies as science only if they are
21 natural explanations, because if they are not
22 natural explanations they can't be tested, and
23 that would render them outside of science.

24 And then finally the other ground rules
25 that I'm sure I mentioned in one context or

1 another is that science and scientific methods
2 have to be open, they have to be made freely
3 available for the criticism of other scientists.
4 We often call that peer review in the formal
5 sense, and they have to be repeatable in the
6 sense that other scientists can carry out the
7 same experiments, the same investigations, make
8 similar observations, and either confirm or deny
9 the results that we have gotten.

10 Q. So taking those ground rules of science and
11 applying them to the inference for design, not
12 the irreducible complexity.

13 A. Yes, sir.

14 Q. The inference for design, does that
15 inference lead to rules of science?

16 A. No, sir, not by any sense.

17 Q. And why not?

18 A. It does not meet it because the idea of
19 design is that forces acting outside of a
20 natural world that we cannot see, cannot
21 replicate, cannot control, and cannot test
22 have produced changes inside the natural world.
23 Now, they may well have. You remember my tongue
24 in cheek explanation of the success of the Red
25 Sox. They may well have, but that explanation

1 is not testable by science, and therefore it
2 cannot qualify as part of the scientific process
3 or as the scientific theory hypothesis or idea.

4 Q. Does that make it wrong?

5 A. No, sir, it does not make it wrong.

6 Explanations based on the supernatural could
7 always be corrected, but since they lie outside
8 the mechanisms of science to investigate, they
9 are simply not part of science.

10 Q. Are there any peer reviewed publications,
11 or scientific papers as you put it, on your
12 curriculum vitae to support this inference for
13 design?

14 A. I have not found a single peer reviewed
15 paper anywhere in the scientific literature
16 that supports the idea of intelligent design.

17 Q. I want to cover one more area that
18 Mr. Muise raised. Unanswered questions, there
19 are unanswered questions in evolution.

20 A. I certainly hope so. Or evolutionary
21 researchers are out of business as of today.

22 Q. You testified in fact there are unanswered
23 questions in every scientific theory?

24 A. Yes, sir, there are.

25 Q. Do we know everything there is to know in

1 other areas of study, let's say history?

2 A. Certainly not. My daughter, my younger
3 daughter is a history teacher, majored in
4 history, specialized in studying the American
5 Revolution. There are unanswered questions in
6 the history of our own republic. So the answer
7 is yes.

8 Q. Do we know everything there is to know
9 about the battle of Gettysburg?

10 A. Well, we know who won. At least we're
11 pretty sure who won. And we know where it took
12 place, we know when it took place. We know the
13 generals on both sides. We know some of the
14 troop deployments. But if you were for example
15 to say let's take a particular soldier from a
16 Rhode Island regiment who wrote home to his
17 family on day two of the battle of Gettysburg,
18 we might know something about that, but you
19 know, we might not know where he was or what he
20 was on day one or where he was or what he did on
21 day three.

22 Now, I dare to say that there are thousands
23 of examples in which we do not know exactly
24 what happened in a particular place on that
25 battlefield at a particular time. Another way

1 of putting it is that there are gaps in the
2 historical record. But those gaps, they're
3 worth filling, they're interesting, because we'd
4 like to know what every soldier did on both
5 sides in this pivotal battle in American
6 history. So those gaps are unacceptable, and
7 historians try to fill them.

8 If you discovered the unknown diary of a
9 soldier who had been at Gettysburg, that would
10 be great stuff. Give it to a historian, they'd
11 write papers about it, they'd thank you. But
12 none of this changes the conclusions that we can
13 make from the abundant historical record that
14 already exists as to where, when, and how the
15 battle took place, or what the ultimate outcome
16 was. So we can make accurate and even profound
17 historical conclusions without having a complete
18 historical record.

19 **Q.** You're talking about history here. Does
20 that analogy apply to science?

21 **A.** Of course it does, because natural history
22 is part of scientific investigation. Much of
23 geology is historical in the sense that it tries
24 to understand the processes that made up our
25 earth. Much of cosmology and astronomy is

1 historical in the sense that it tries to
2 understand what has put together our universe,
3 our solar system, and other things out there in
4 the universe, and a great deal of biology is
5 historical in that paleontology and even through
6 molecular genetics we try to reconstruct what
7 happened in the past.

8 Q. And does the fact that we don't know all
9 the details undermine the soundness of
10 evolutionary theory?

11 A. No, sir, it certainly does not.

12 MR. WALCZAK: May I have just one moment,
13 Your Honor?

14 THE COURT: You may.

15 MR. WALCZAK: I have no further questions.

16 THE COURT: We'll give Mr. Muise the last
17 shot. Any recross?

18 MR. MUISE: No further questions.

19 THE COURT: You may step down.

20 (Partial transcript concluded at 11:28
21 a.m.)
22
23
24
25

1 Kitzmiller, et al. vs. Dover School District

2 4:04-CV-02688

3 Civil Bench Trial, Day 2, Volume 1

4 Testimony of Dr. Kenneth Miller, Ph.D.

5 27 September 2005

6
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