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I N D E X

WITNESS

MICHAEL BEHE

Examination

By Mr. Rothschild

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1 Q. Have you ever served as an expert witness before in
2 litigation?

3 A. No, I haven't.

4 Q. Have you ever been deposed before?

5 A. No, I haven't.

6 Q. Have you testified at a trial before?

7 A. Once a long time ago in college when my car was stolen,
8 I did.

9 Q. I am sure you are aware that there are proceedings going
10 on in front of the State of Kansas School Board.

11 Do you have any involvement with that?

12 A. Yes. I testified before them last week.

13 Q. Did you testify under oath?

14 A. No.

15 Q. Have you ever given any testimony similar to that where
16 you are in front of a School Board or a State Standards
17 Board?

18 A. A few years back, I testified in front of the
19 Pennsylvania -- I think it was the State Senate's
20 Subcommittee on Education or something. They were
21 considering science standards. I gave a five-minute or
22 so statement.

23 Q. Do you have a copy of that statement?

24 A. Not with me. I think I have got it somewhere. Maybe on
25 my computer somewhere.

1 MR. ROTHSCHILD: Counsel, I would request that
2 that be produced.

3 MR. WHITE: Tell me exactly what you want.

4 MR. ROTHSCHILD: What Michael just described,
5 which is any written record of his testimony before the
6 Pennsylvania Legislature about state science standards.

7 A. I think it is on the Internet somewhere, too. Virtually
8 I've ever said is on the Internet.

9 BY MR. ROTHSCHILD:

10 Q. I know you have done a fair amount of public speaking
11 and also have been involved in quite a few debates
12 relating to the issues that are in dispute in this
13 litigation. The deposition process is a little
14 different than those kind of proceedings.

15 What is going to happen is I am going to ask you
16 questions, and you are going to answer verbally --
17 answer my questions verbally. Things that would suffice
18 in ordinary conversation like nods of the head or
19 expressions that are not true words won't make a clear
20 record in the transcript. So I would ask that you
21 answer all of my questions verbally.

22 Do you understand that?

23 A. Sure.

24 Q. Good start. The other thing that we need to keep in
25 mind for the benefit of the court reporter, as well as

1 creating a clear record, is that you need to wait until
2 I finish my questions before you answer. Often you will
3 be able to anticipate where I am going and be eager to
4 answer, which in normal conversation we do all the time,
5 but in this process I need you to wait until my question
6 is done and then answer.

7 Do you understand that?

8 A. Sure.

9 Q. Similarly, I will endeavor to do the same for you, not
10 cut off your answers in order to go on to my question.
11 If I should ever fail to do it and you have more to say,
12 please let me know, and I will, of course, let you
13 finish.

14 A. Okay.

15 Q. The other thing that is going to probably occur in this
16 deposition is that we are going to be using a lot of big
17 words and sometimes be reading out of passages in your
18 report or your one of your writings. When that happens,
19 a couple of things are going to happen.

20 We are going to have a lot of big words flying
21 around, and also when we read from writings, we tend to
22 speed up. Vicki knows that that is one of my major
23 shortcomings as a deposing attorney.

24 For the benefit of the court reporter and the
25 clarity of the transcript, let's try and take our time

1 getting our questions and answers out so she can get a
2 clear record. And I am sure she will admonish at least
3 me if I fail to do so.

4 A. Okay.

5 Q. I will be honest with you. This is going to be a long
6 day. We have a lot of ground to cover. Mr. White is
7 going to have to work hard paying attention. Everybody
8 else will primarily will be sitting and watching, but
9 you and I are going to be working hard.

10 At any time during the proceedings if you need a
11 break just to clear your head, use the facilities, to
12 talk to Mr. White, please go ahead and let me know, and
13 I'm happy to take a break. I may initiate some myself.

14 A. Okay.

15 Q. Do I understand correctly that you are represented by
16 counsel at this deposition?

17 A. I am not quite sure actually. Are you my counsel?

18 MR. WHITE: Based on the stipulation, yes.

19 BY MR. ROTHSCHILD:

20 Q. Did you do anything to prepare for this deposition?

21 A. I read over my expert report. I read over the rebuttal
22 analysis that I submitted to for Kevin Padian and his
23 report and Ken Miller's report as well. That is pretty
24 much it.

25 Q. When were you retained by defendants to be an expert in

1 this litigation?

2 A. I think it was earlier in the year. Maybe January,
3 February. I am not quite sure to tell you the truth.

4 Q. What were you asked to do?

5 A. I was asked -- initially, they just called me and spoke
6 with me about the case and got -- asked me some
7 questions. Again, I forget exactly what they were.

8 Then I was asked if I would be an expert witness
9 and prepare a statement on a couple of questions that
10 Mr. Richard Thompson of the Thomas More Law Center asked
11 me to address. And then they said that I would probably
12 be a witness at trial and so on.

13 Q. What were the questions you were asked to answer?

14 MR. WHITE: I object. Just clarify for me the
15 stipulation you have with Pat Gillen regarding what you
16 are allowed to inquire into between conversations with
17 Professor Behe and the Thomas More Law Center.

18 MR. ROTHSCHILD: The only stipulation we had was
19 we were not going to require the production of draft
20 reports or e-mails, written communications to counsel.

21 There is no stipulation other than that. Just so
22 you understand, Ed, I am not going to be asking about
23 every communication with counsel. I just want Mike's
24 understanding of what he was supposed to do as part of
25 his expert retention.

1 MR. WHITE: My understanding from Pat Gillen is
2 that this agreement with you and Pat dealt also with
3 communications with counsel.

4 MR. ROTHSCHILD: That is not part of the
5 stipulation. I think it is clear I am entitled to know
6 what Professor Behe understood he was supposed to do as
7 an expert here. I am not going to be asking the back
8 and forth of what did they ask you to change in your
9 report and the like.

10 I think I am entitled to understand as part of
11 what he did in his report what he understood he was
12 supposed to be doing.

13 MR. WHITE: I am just trying to understand what
14 the parameters are. I will go with what you just told
15 me.

16 A. If I could see my own expert report there, essentially
17 what he asked me to address are the headings of the
18 sections.

19 BY MR. ROTHSCHILD:

20 Q. I am going to mark as Behe Exhibit 1 your expert report
21 -- your initial expert report in the matter along with
22 its exhibits. Our legal assistant has put that in a
23 nice binder so it will be easy to hold today.

24 MR. ROTHSCHILD: Ed, I have a could for you, too.
25 (Behe Exhibit 1 was marked.)

1 BY MR. ROTHSCHILD:

2 Q. Professor Behe, do you recognize the document we have
3 marked as Exhibit 1 as a bound version of the expert
4 report you filed in this matter along with the exhibits?

5 A. Yes. That is what it looks like.

6 Q. That includes at the front of the report your curriculum
7 vitae?

8 A. That's correct. He asked me to address a couple of
9 points. Section one is how theory is used in the
10 scientific community. And whether or not Intelligent
11 design is a scientific theory, he asked me to address
12 that question.

13 And section three, whether it is Creationism or
14 not, he asked me to address that question. And section
15 three, what are the gaps and problems with Darwin's
16 Theory of Evolution, he asked me to address that.

17 The origin of life, he asked me to talk about
18 that. The scientific controversy over Intelligent
19 Design, he asked me to address that, which is section
20 five in the report. And the utility of design, he asked
21 to address something like that as a scientific theory.

22 Q. When you completed this report, did you understand that
23 it would include all the subject matter that you would
24 testify about at trial?

25 A. Yes, he told me that.

1 Q. Is there any subject matter that is not included in your
2 expert report that you now expect to testify about at
3 trial?

4 A. Yeah. Well, I expect -- although, I don't know how such
5 things work -- that I would be asked about my rebuttal
6 analysis of Kenneth Miller and Kevin Padian and stuff
7 that is in there. There are some things in there that
8 aren't in the expert report.

9 Q. Have you read the expert reports of the other experts
10 retained by defendants, meaning your side in the case?

11 A. Yes, I did.

12 Q. All of them?

13 A. Yes.

14 Q. And did you read any of them in draft form?

15 A. No.

16 Q. Have you read the rebuttal reports prepared by other
17 experts for defendants in this case?

18 A. The rebuttal reports to the people on our side?

19 Q. No, rebuttals by experts for defendants to the experts
20 for plaintiffs. Similar to what you did with Padian and
21 Miller.

22 A. No, I have read no rebuttal reports of anybody.

23 Q. Is there anything stated in the reports by defendants'
24 experts -- and again, that is your side --

25 A. That is me, okay.

1 Q. -- that you disagreed with?

2 A. Well, to tell you the truth, I just skimmed them and did
3 not go over them in sufficient detail that I would say
4 that I agreed with everything. I didn't see any large
5 red flags, but I wouldn't make a blanket statement that
6 I agreed with everything.

7 Q. In the process of preparing your own expert report,
8 either the initial report or the rebuttals, did you ever
9 speak to anybody in the Dover community?

10 A. No.

11 Q. You have made a presentation to a large group of people
12 in the Dover community; correct?

13 A. That's correct.

14 Q. Other than that presentation, have you had any
15 interactions with individuals in the Dover community?

16 A. Well, one time, I sent a letter -- faxed a letter to
17 Richard Nilsen, who is the Superintendent I suppose of
18 the District. I did so at the request of folks at the
19 Discovery Institute essentially advising Richard Nilsen
20 to listen to the folks at Discovery and follow their
21 advice.

22 Q. When did you send that letter?

23 A. I'm not quite sure. This is May. A couple of months
24 ago I guess before. It might have been in January. I
25 would have to check.

1 Q. Do you have a copy of that letter?

2 A. It is probably on my computer.

3 MR. ROTHSCHILD: Ed, this is something we haven't
4 received, and I think it's extremely relevant. I am
5 surprised I haven't -- this is the first time I am
6 hearing about it. I am requesting immediate production
7 of that document.

8 A. I haven't told anybody else about that. Nobody asked me
9 about it.

10 BY MR. ROTHSCHILD:

11 Q. To the best of your recollection, what was stated in
12 that letter?

13 A. Well, essentially that Discovery Institute has
14 experience in handling controversies about the teaching
15 of evolution, and they might have good advice for him to
16 follow. Essentially saying he should listen to what
17 they have to say.

18 Q. Do you recall whether this letter you sent was sent
19 before or after the lawsuit was filed? I can tell you
20 that was in mid December, December I think 14th.

21 A. I do not know. I am afraid I don't remember.

22 Q. Was there any particular kind of advice you were urging
23 Dr. Nilsen to consider from the Discovery Institute?

24 A. No. As I recall -- and I am 53 now so I don't recall so
25 well -- but I was actually contacted by folks in the

1 Discovery who said that Dr. Nilsen respected my work and
2 that would I contact them, and would I contact him and
3 ask him to listen to what they had to say.

4 And if I recall again correctly -- I'm not sure --
5 I said something like well, you know, I don't like to
6 contact people who haven't asked me for advice. But I
7 said if you want to draft a letter in my name, I will
8 send it over to him.

9 So I believe somebody at Discovery -- again, I am
10 not sure who -- whether it was Jay Richards or John West
11 or somebody actually composed the letter, and I simply
12 faxed it to him.

13 Q. Who was the person who contacted you asking you to
14 contact Dr. Nilsen?

15 A. Again, I am not quite sure. It was probably either Jay
16 Richards or John West. It might have been a guy named
17 Rob Crowther, who is their press person, but I am not
18 sure at this point.

19 Q. At the time that this request was made, did you have an
20 understanding about what the Discovery Institute's
21 position was about the actions that the Dover School
22 District was taking?

23 A. Well, we will start by saying I'm not entirely sure. I
24 don't keep straight in my head the sequence of when
25 various impressions were made. But it has been

1 Discovery's position for a while I believe that once you
2 emphasize teaching the difficulties and controversies
3 with Darwinian Theory and not emphasizing or trying to
4 teach Intelligent Design in the schools. So it was
5 something like that.

6 Q. You have the understanding that that was their position
7 when they made this request?

8 A. I believe I did, yes.

9 Q. Do you have an understanding of why that is Discovery
10 Institute's position?

11 A. Well, I think I have read a few things. I am not sure I
12 agree with it. But I believe somebody said somewhere
13 once that they think Intelligent Design is not
14 sufficiently far along enough to discuss in schools.

15 Q. And you disagree with that proposition?

16 A. Yeah. I do. I think an idea does not necessarily have
17 to be very far along at all to discuss in a school.

18 Q. What is your understanding of what the Discovery
19 Institute means by not very far along?

20 A. I'm not quite sure to tell you the truth.

21 Q. Do you understand it to be a statement about how far --
22 how much it has been developed scientifically?

23 A. That may be it. It may be -- there's a number of people
24 who work at Discovery, and I am not quite sure anybody
25 has ever sat down -- and nobody has ever sat down with

1 me and told me what their reasoning was behind it. So I
2 am not quite sure.

3 It may be that somebody thinks is not well
4 developed scientifically. It might be that they think
5 it's a good scientific idea, but that it has not
6 commanded enough support within official scientific
7 circles or some other reason.

8 Q. When you use the expression official scientific circles,
9 what are you referring to?

10 A. Mostly bodies which issue statements on things like
11 this. The governing councils of the American
12 Association for the Advancement of Science, the people
13 who write official reports for the National Academy of
14 Sciences and so on.

15 Q. You used the word Darwinian Evolution I think in one of
16 your prior answers or maybe the Darwinian Theory. I
17 just want to make sure that we have an understanding of
18 what you mean by that.

19 Can you explain what that term refers to?

20 A. Darwinian Evolution?

21 Q. Yes.

22 A. All right. First, by Darwinian Evolution, I understand
23 that not only did life develop by a process of descent
24 with modification, not only are all creatures related
25 through descents to ancestors in the past, but that that

1 process occurred by random changes, random mutations in
2 the organisms followed predominantly by a process of
3 natural selection.

4 And the neo Darwinian Theory, which I kind of I
5 often use both interchangeably, the neo Darwinian Theory
6 includes a modern understanding of genetics in that mix
7 and therefore designates the random changes as changes
8 in the DNA structure of the organisms.

9 There are various types of changes that can occur,
10 but I think that is secondary. It is the process of
11 natural selection, of working on the random variation
12 that is the Darwinian idea.

13 Q. When we are talking about the Darwinian idea, you are
14 not talking about just what Darwin said frozen in time
15 in the late 19th Century; you are talking about also
16 what has been developed in science since that time?

17 A. Well, I am not going to endorse everything for the past
18 hundred years in a blanket fashion, but sure, I
19 certainly include modern ideas on that as well.

20 Q. I am not asking you to agree that everything is right,
21 but just that when you use the term Darwin Evolution,
22 you are not frozen in time in 1860?

23 A. No. I include gene duplications and whole geno
24 duplications and transposons and all sorts of things,
25 things that Darwin knew nothing of.

- 1 Q. What was the result of your -- you did send a letter to
2 Dr. Nilsen; correct?
- 3 A. Yes, I did.
- 4 Q. What happened after that?
- 5 A. Nothing. I received no response at all. He never -- I
6 did meet him then subsequently two times, once at the
7 Elizabethtown College forum where Victor Walczak from
8 your side was there, too. And Richard Nilsen was there,
9 and I said hi. And also at the seminar I gave at the
10 Dover School District. I spoke with him. But at no
11 point did he ever mention that letter.
- 12 Q. Other than these sort of casual meetings, did you ever
13 sort of interview or gather information from Dr. Nilsen?
- 14 A. No.
- 15 Q. And anybody else at Dover?
- 16 A. No.
- 17 Q. No members of the School Board?
- 18 A. No.
- 19 Q. Have you ever read any depositions that have been taken
20 in this case?
- 21 A. No.
- 22 Q. Were you provided a copy of the Complaint that was filed
23 in the case by plaintiffs?
- 24 A. Yes.
- 25 Q. Were you provided a copy of the Answer that was filed by

1 defendants?

2 A. Yes.

3 Q. Have you seen any documentation of the change to the
4 biology curriculum in Dover that is the subject of this
5 lawsuit?

6 A. Yes, I saw the statement that they made and so on.

7 Q. Let me just distinguish sort of between two slightly
8 different items. One is the change to the curriculum
9 that was the product of a resolution passed by the
10 School Board.

11 A. Yes.

12 Q. And the second is the actual statement that has been
13 read to students in the classroom. Distinguishing it
14 that way, have you seen either or both?

15 A. I have seen both of those, yes.

16 Q. There was also a newsletter that was sent to members of
17 the Dover community relating to this controversy. Have
18 you seen that?

19 A. No.

20 Q. Am I correct that you made a presentation to the Dover
21 community about the subject of Intelligent Design?

22 A. Yes.

23 Q. Who asked you to do that?

24 A. Initially, it was Richard Thompson of the Thomas More
25 Law Center. He set it up. And only late -- within with

1 a week or so before the presentation, was I contacted by
2 anybody at Dover, a secretary or somebody there, who
3 asked me what sort of audio visual equipment I would
4 need.

5 Q. And that is Power Point in your case; right?

6 A. Yes, indeed. Never go anywhere without Power Point.

7 Q. I'm just learning. What was your understanding of the
8 purpose in your making that presentation -- of the
9 District's purpose? I'm sorry.

10 MR. WHITE: Objection. You set the question out,
11 and you changed it.

12 BY MR. ROTHSCHILD:

13 Q. I will reask it. What was your understanding of the
14 School District's purpose of having you come and make
15 this presentation?

16 A. I am not -- at this point, I am not quite certain of
17 what I understood.

18 MR. WHITE: I object. This is calling him to
19 speculate.

20 MR. ROTHSCHILD: I am just asking for his
21 understanding.

22 BY MR. ROTHSCHILD:

23 Q. You can answer.

24 A. Okay. My thought -- my own personal thought, although I
25 am not sure that anybody ever said this to me, was that

1 I thought the District wanted to show people that
2 Intelligent Design was a reasonable idea. Maybe I am
3 flattering myself. That is what I thought.

4 Q. Anything else?

5 A. That's it.

6 MR. ROTHSCHILD: Can we mark this as Behe 2?

7 (Behe Exhibit 2 was marked.)

8 BY MR. ROTHSCHILD:

9 Q. The document I have just marked as Behe Exhibit 2 and
10 handed to you is what looks to be a Power Point
11 presentation entitled The Argument for Intelligent
12 Design in Biology with your name below it.

13 Do you recognize this as the slides from the Power
14 Point that you presented to the Dover community in April
15 of this year?

16 A. It seems to be, yes.

17 Q. Do you consider yourself an expert on any of the issues
18 that are in dispute in this case?

19 MR. WHITE: Objection. You can clarify which
20 issues you are talking about.

21 BY MR. ROTHSCHILD:

22 Q. Do you consider yourself an expert in anything that is
23 going on in this case, Professor Behe?

24 A. I am not quite sure exactly what the issues are, whether
25 it is a legal issue of what is to be taught, or the

1 science involved or such things.

2 So yeah, I guess I would like -- I am not quite
3 sure how to respond.

4 Q. What areas do you hold yourself out as an expert in that
5 you think are relevant to this case?

6 A. I wrote a book arguing for Intelligent Design and
7 explaining why I think Darwinian Evolution is an
8 inadequate explanation for what we found in biology. So
9 I have experience in thinking about questions like that.

10 Q. Do you hold yourself as an expert in the area of
11 biochemistry?

12 A. Yes.

13 Q. Does that expertise in biochemistry have any relevance
14 to the issue of Intelligent Design that is in dispute in
15 this litigation?

16 A. Yes.

17 Q. Do you hold yourself out as an expert in evolutionary
18 biology?

19 A. Evolutionary biology is a very, very large field. And
20 so I would say I am very well acquainted with such
21 issues as they impinge on biochemistry.

22 Q. So you consider yourself an expert in evolutionary
23 biology as it relates to biochemistry?

24 A. In aspects which relate to the question of whether the
25 Darwinian mechanism of random mutation and natural

1 selection can build complex biochemical structures.

2 Q. Do you consider yourself an expert in evolutionary
3 biology in any other respect?

4 A. I consider myself quite knowledgeable about other
5 aspects of evolutionary biology, but I do not claim
6 expertise in the field.

7 Q. Fair enough. Are there any other areas of biology other
8 than what you have just described which you would hold
9 yourself out as an expert in?

10 A. Well, I'm knowledgeable about areas of nucleic acid
11 structure and function and protein structure and
12 function.

13 Q. Do you consider yourself an expert in those topics?

14 A. It depends upon what you mean by the word expert. I
15 have published in those areas, and I have a Ph.D. and
16 post doctoral experience in those areas.

17 If that's what you consider to be an expert, then
18 I am.

19 Q. You answered that you did consider yourself an expert in
20 the area of biochemistry?

21 A. Yes.

22 Q. Using that same standard that you set out for yourself,
23 do you also consider yourself an expert in the area you
24 just described?

25 A. Yes.

- 1 Q. Have you ever studied biology at the organism level
2 after your undergraduate education?
- 3 A. No.
- 4 Q. Have you ever done any research in biology at the
5 organism level?
- 6 A. No.
- 7 Q. Have you ever studied comparative biology or comparative
8 anatomy?
- 9 A. No.
- 10 Q. Have you ever done any research in those areas?
- 11 A. No.
- 12 Q. Do you consider yourself an expert in paleontology?
- 13 A. No.
- 14 Q. Have you studied paleontology in any respect since your
15 undergraduate education?
- 16 A. No.
- 17 Q. Do you consider yourself an expert in the area of gene
18 sequence comparison?
- 19 A. No.
- 20 Q. Do you consider yourself an expert in the area of
21 information theory?
- 22 A. No.
- 23 Q. Do you consider yourself an expert on the subject of the
24 evolution of sexual reproduction?
- 25 A. That's a difficult question to answer.

1 Q. These questions always are. I know you have a lot of
2 children.

3 A. I do okay there.

4 Q. I meant in teaching them about it.

5 A. Let me just say that because the origin of sexual
6 reproduction is so little understood, it confuses me as
7 to what an expert would in fact be. I have certainly
8 read on the topic and discerned that people who think of
9 these questions for a living continue to be confused and
10 tentative in the area.

11 But I do not do work on this area myself.

12 Q. And don't hold yourself out as an expert in that field?

13 A. No.

14 Q. You have made the claim in your report that the Theory
15 of Evolution has not explained the advantage of sex?

16 A. That's correct.

17 Q. Can you describe how Intelligent Design accounts for the
18 origin of sexual reproduction in organisms?

19 A. No.

20 Q. Do you have an area of specialty within the field of
21 biochemistry?

22 A. Yes, I work or worked for a long time on nucleic acid
23 structure.

24 Q. And you amended your answer to say worked for a long
25 time. Do I understand you to mean you don't work in

1 that field anymore?

2 A. Well, in the past eight years I have become very
3 involved with the issues surrounding those I discussed
4 in my book in 1996, Darwin's Black Box, on the ability
5 of biochemical systems to develop by random mutation and
6 natural selection. So I have not been involved as much
7 with that field since, yes.

8 Q. As much or not at all?

9 A. Well, as much. I still keep tabs on it and read in it.
10 I have not published in it for a while.

11 Q. Not done research in that area for a while?

12 A. That's correct.

13 Q. But prior to the publication of Darwin's Black Box, you
14 did do original research in the area of nucleic acid
15 structure?

16 A. Yes.

17 Q. And you did publish in that area?

18 A. Yes.

19 Q. And when you published, did you publish in peer reviewed
20 scientific journals?

21 A. Yes.

22 Q. And for how long a period of time were you doing
23 research in this area?

24 A. It was from about '82 to '97, '98.

25 Q. And in that time period, how many articles would you

1 estimate you published on the area of nucleic acid
2 structure?

3 A. I would have to count them up. Probably fifteen or so.

4 Q. And when you wrote these articles you submitted them to
5 peer reviewed journals; correct?

6 A. Yes.

7 Q. Why did you do that?

8 A. Because I wanted them to be published in those journals
9 because the people who were most interested in those
10 topics were people who were reading those journals.

11 Q. Can you give me examples of the journals that you
12 submitted your papers to and that published them?

13 A. There was "Nature, Proceedings of the National Academy
14 of Sciences," "Journal of Molecular Biology," "Nucleic
15 Acids Research." There may have been a few others.

16 Q. Of those journals, were there any ones in particular
17 that you were particularly pleased when they would
18 publish your paper?

19 A. Yeah. There are journals which are more difficult to
20 get one's research published in. So one is always happy
21 to get a paper in those.

22 Q. "Nature?"

23 A. "Nature, Proceedings of National Academy."

24 Q. "Journal of Molecular Biology?"

25 A. Yes, that's a good one, too.

1 Q. Did you ever submit an article on the topic of nucleic
2 acid structure that was not -- that was ultimately
3 rejected by a peer reviewed journal?

4 A. Ultimately rejected, yes.

5 Q. Did that happen often?

6 A. Not so often.

7 Q. Describe for me the process that you went through when
8 you submitted an article to a journal and peer review
9 took place. Describe what happened from the time you
10 first submitted the article to its publication.

11 A. Well, one would put it in an envelope and mail it out,
12 wait a while. Often times, you would get back within a
13 week a notice from the journal that the paper had
14 reached their office and that they would be sending it
15 out to other people for their comments -- other
16 scientists for their comments and reviews.

17 After a month, two months, depending on how prompt
18 the reviewers were, you would get a notice back from the
19 journal which would contain their -- usually contain
20 their comments and a statement by the editor saying that
21 either it was accepted, accepted but you needed to make
22 revisions in the manuscript or conduct other
23 experiments, or else that it was rejected.

24 Q. When you said it contained their comments, are you
25 referring to the journal or the peer reviewers?

- 1 A. I'm sorry?
- 2 Q. You made the statement you would get a notice back from
3 the journal which would contain their comments.
- 4 A. It would contain both. It would contain often times
5 copies of the statements made by the scientists
6 reviewing the document, as well as the statements of the
7 editor of the journal or associate editor.
- 8 Q. It was sometimes the case that the reviewers or the
9 journal came to the conclusion that further experiments
10 were needed?
- 11 A. Sometimes, yes.
- 12 Q. When that happened in your case, did you do further
13 experiments?
- 14 A. Often times, I did. Sometimes I would send it to a
15 different journal, and sometimes they would accept it as
16 is.
- 17 Q. Would you know the identities of the peer reviewers that
18 reviewed your article?
- 19 A. Usually not. They are generally done anonymously unless
20 there's some special reason. On rare occasions, the
21 reviewer would reveal himself to me because it might be
22 somebody that I had known earlier, and they were
23 interested in the topic, or some other reason.
- 24 Q. What was your understanding of the purpose of this
25 process of having other scientists look at your

1 experimental work before it could be published in the
2 journal?

3 A. To make sure there weren't any gross conceptual or
4 errors of -- so that the experiment seemed to be well
5 done, that there weren't any obvious areas within the
6 immediate area that you were trying to investigate that
7 could be explored which might upset your conclusions.
8 And essentially to check for the reasonableness of the
9 claims.

10 Q. Have you ever served as a reviewer for any peer review
11 journals?

12 A. Yes, I have.

13 Q. And sort of during your academic career -- let me ask
14 you post 1996, did you continue to serve as a reviewer
15 in journals relating to biochemistry?

16 A. Yes.

17 Q. You had been doing that for some time before?

18 A. Yes.

19 Q. Give me a sense how many articles would you review a
20 year?

21 A. Maybe two or three.

22 Q. What did you understand your responsibility was when you
23 were serving as a reviewer?

24 A. It was to look at the experiments, see if the
25 experimental results -- if the techniques and so on

1 seemed to be well done, well chosen, that the
2 conclusions were followed from the data, that there
3 weren't any gaps or problems in the experiments left
4 unexplored.

5 Q. In your capacity as a peer reviewer, were there ever
6 occasions where you did find faults that you felt needed
7 to be called to the attention of the author?

8 A. Yes.

9 Q. And you communicated those?

10 A. Sure.

11 Q. During your academic career when you were working in the
12 area of nucleic acid structure, did you ever present
13 papers at academic conferences?

14 A. Yes. I gave a couple of poster sessions and occasional
15 talks.

16 Q. And what kind of bodies would you appear before when you
17 were studying in the area of nucleic acid structure?

18 A. What would I appear before? Often times one would go to
19 a large meeting, and they would have poster sessions. A
20 poster session is where you make a large -- get a piece
21 of large poster board and tape or affix to it a
22 description of your research that you want to
23 communicate.

24 Generally, these are held in a rather large hall,
25 and other people kind of walk by and sometimes just kind

1 of stare and read your poster on their own. Sometimes,
2 they would stop and chat with you for a while. That is
3 pretty much it.

4 Q. Who were gatherings comprised of? It wasn't the
5 Philadelphia Flower Show. It was a gathering of
6 scientists?

7 A. Sometimes it was, yes. It was meetings of scientists,
8 the American Society for Biochemistry, Molecular
9 Biology, Protein Society and so on.

10 Q. What did you do that? Why did you make those
11 presentations?

12 A. Well, because I had results that I thought were
13 important that I wanted to communicate. These people
14 were the ones that I thought would be most interested in
15 hearing of the results that I had.

16 The results that I had I thought might help them
17 in their own work to understand topics related to what I
18 was discussing.

19 Q. Would you also attend those conferences and walk around
20 and ask people questions about their poster boards?

21 A. I would, yes.

22 Q. You understand that part of controversy in this
23 litigation involves the textbook Of Pandas and People,
24 the central question of biological origins?

25 A. Yes.

1 Q. Did you have any involvement in the development of Of
2 Pandas?

3 A. For the second edition, I was asked to write a section
4 on blood clotting, and I think that it is in that book
5 there.

6 Q. How were you retained to write that? I take it you did
7 write that section?

8 A. I did.

9 Q. And who retained you to do that?

10 A. A man named John Buell, who is the head of something
11 called the Foundation for Thought and Ethics near
12 Dallas, Texas.

13 Q. What was the Foundation or Thought and Ethics'
14 relationship to Pandas?

15 A. I think they are the publishers. He retained people to
16 write the book.

17 Q. I have the textbook here. Unfortunately, I have only
18 one copy so we will have to share. I notice that you
19 are not listed as an author or an editor and
20 contributor.

21 Is that consistent with your memory?

22 A. I don't remember how I was listed, if at all.

23 MR. WHITE: Excuse me, Eric. Which edition?

24 BY MR. ROTHSCHILD:

25 Q. I have the 1993 edition. You are listed as a critical

1 reviewer on the acknowledgements page. I am happy to
2 show you what I am working from.

3 A. I just want to check to see. Okay.

4 Q. We will probably be passing this back and forth.

5 MR. WHITE: Also for the record, that is the
6 second edition?

7 MR. ROTHSCHILD: Yes.

8 BY MR. ROTHSCHILD:

9 Q. Was the section on the blood clotting cascade the only
10 section you wrote for this edition?

11 A. I believe so, yes.

12 Q. Just return to that again. If you could just tell me
13 the chapter, or pages, if that is a better way to
14 differentiate that include the section you wrote.

15 A. Okay.

16 Q. I think if you look around page 145, you are going to
17 get in the ballpark.

18 A. I think it begins on the middle of page 141 and goes to
19 the middle of page 144, yes.

20 Q. I directed you to page 145, and the reason I picked that
21 page is there is continued text that reads creeping
22 toward clotting.

23 A. I see. Let me take that back again. Yeah. That's
24 right. Okay. I didn't notice that. Okay. I likely
25 wrote that as well.

- 1 Q. I am sorry to go through the process this way. Just to
2 make sure the record is clear, you start at page 141.
3 Is there a point that your section ends and that is
4 inclusive of all of the pages in between? In other
5 words, does it go to the end of the chapter 148? Can
6 you just be a little more precise?
- 7 A. Okay. I recognize some of my arguments on pages 146 and
8 147. I don't know about the conclusion here. I don't
9 think I wrote the conclusion.
- 10 I would say it likely starts from middle of page
11 141 to the middle of page 147.
- 12 Q. All the way up to the conclusion?
- 13 A. Yeah, but not including the conclusion.
- 14 Q. Understood. You have employed the term irreducible
15 complexity in your writings; correct?
- 16 A. That's right.
- 17 Q. Does the concept of irreducible complexity appear in Of
18 Pandas?
- 19 A. To tell you the truth, I don't remember.
- 20 Q. And when I ask that question I believe I am correct in
21 saying that the term does not appear?
- 22 A. Okay.
- 23 Q. But does the concept that you would talk about in
24 Darwin's Black Box of irreducible complexity, was that
25 employed in any way to write the section about the blood

1 clotting cascade?

2 A. I don't think so. I don't mean to be picky, but these
3 concepts are often very complex. And the more one
4 thinks about them, the more one appreciates the need to
5 be as precise as possible.

6 So I am not quite sure that I would say that the
7 exact same concept that I later talked about of
8 irreducible complexity is what I was thinking about
9 here.

10 Q. In your discussion of the blood clotting -- let me
11 strike that for a moment. Your discussion of the blood
12 clotting cascade in that section, is that the system of
13 any particular organism or set of organisms?

14 A. It is pretty common to most vertebrates.

15 Q. So when you are discussing the development of the blood
16 clotting cascade in this chapter, that is a discussion
17 of the blood clotting system found in vertebrates?

18 A. That's correct.

19 Q. On page 145 -- and I will show it to you after I read
20 from the book -- it is stated only when all the
21 components of the system are present and in good working
22 order does the system function properly. And I will
23 show you that in the text right there.

24 A. Okay.

25 Q. Is that a correct assertion of your position on the

1 blood clotting system?

2 A. Well, that's correct for a blood clotting system. One
3 has to be very careful because there are differences in
4 clotting systems with different organisms. But for any
5 particular clotting system, that is correct.

6 Q. So, for example, the mammalian blood clotting system, it
7 would be your position that only when all of the
8 components of that system are present and in good
9 working order does the mammalian blood clotting system
10 function properly?

11 A. Well, you have to be careful about what you consider to
12 be a component of the system. Some components are
13 helpful, but not necessary. But some are necessary.

14 Q. So it would be an overstatement to say all the
15 components of the system must be present for the system
16 to function properly?

17 A. No. It depends on how you define the system. If you
18 define the system as the proteins which are needed for
19 the system to function, then it is pretty much by
20 definition saying that if one of the proteins is
21 missing, then the system won't function.

22 Q. That is almost tautological, isn't it; if everything
23 isn't there, everything isn't there?

24 A. In a sense it is, and in a sense it isn't. One can talk
25 about components which are required, but other

1 components which can modify different activities of the
2 blood clotting system, but which when removed the system
3 will go faster or slower or some such thing. So one has
4 to be careful about exactly what activity, what function
5 you are trying to focus on.

6 Q. Is it fair to say that some vertebrates have blood
7 clotting systems that contain some, but not all of the
8 components that are found in the mammalian blood
9 clotting system?

10 A. I am sorry. Say that again.

11 Q. Is it fair to say that some vertebrates have some, but
12 not all of the components that are found in the
13 mammalian blood clotting system?

14 A. I would need to hear about what you are talking about.
15 It gets to be a bit difficult because some animals might
16 have clotting components which are not yet recognized to
17 be such. And the system which has been most thoroughly
18 studied is the human system followed by creatures more
19 or less closely related to us.

20 I know that fish have a number of components very
21 closely related to mammalian ones, but it is not certain
22 that ones that have not yet been discovered, whether
23 they are in fact there or not.

24 Q. From what we have discovered in fish clotting systems,
25 they don't contain all of the same components as the

1 human system?

2 A. Well, unfortunately, you don't -- it's not easy to say
3 because when one doesn't find a factor that you think
4 might be there, that is not necessarily a conclusive
5 evidence that it is not there. It might just have a
6 structure which is considerably different from a human
7 or a mammalian factor.

8 The other organism might use a different factor or
9 some such thing which plays a similar role and so on.

10 Q. You would agree that there are organisms that have blood
11 clotting systems that do not have all of the components
12 of all of the identical components of the human blood
13 clotting systems?

14 A. There are organisms that have blood clotting systems
15 that don't have any of the components that humans have,
16 but they work on different principles.

17 Q. So when you make the statement that all of the
18 components of the system are present and in good working
19 order, the system functions properly, you are really
20 referring to how it functions properly in humans;
21 correct?

22 A. Well, humans and organisms that have systems similar to
23 humans, yes.

24 Q. Then there are organisms that have systems different
25 than humans?

- 1 A. That's correct.
- 2 Q. And they work too; right?
- 3 A. They work on different principles.
- 4 Q. But they work?
- 5 A. Yes.
- 6 Q. They clot blood?
- 7 A. That's correct. There are many ways to clot things.
- 8 Q. I noted before that you are identified as a critical
9 reviewer for this version of Of Pandas, this edition?
- 10 A. Okay. I don't remember that, but that's fine.
- 11 Q. Do you remember that you did review versions of Of
12 Pandas before it was published?
- 13 A. I did not. The only thing I reviewed was what I wrote.
14 I didn't have anything to do with the rest of the book.
- 15 Q. In your experience as a scientist, is it typical to be
16 described as a reviewer of your own work?
- 17 A. No.
- 18 Q. So using your own terminology describing you as a
19 critical reviewer of the textbook Of Pandas and People
20 isn't really an accurate representation; is it?
- 21 MR. WHITE: Eric, can you please show him the page
22 you are referring to?
- 23 BY MR. ROTHSCHILD:
- 24 Q. This is on the acknowledgment page, small roman numeral
25 three and you are in the first column because of your

1 place in the alphabet I believe?

2 A. No, this is in order of importance I believe.

3 Q. Okay. So you were an important, critical reviewer?

4 A. I was the sixth most important.

5 MR. WHITE: Just for the record, he is joking.

6 A. Put a smiley face there. Yes, I see that. Okay. Well,

7 you know, I'm not quite sure how that is to be taken in

8 that context.

9 I guess during my contribution of my section, I
10 reviewed the science related to what I was writing
11 about. So perhaps the people publishing the book had
12 that in mind.

13 BY MR. ROTHSCHILD:

14 Q. Did you have any critical reviewers of your book

15 Darwin's Black Box?

16 A. Yes.

17 Q. Can you give me an example of a couple of people?

18 A. They were anonymous. The publisher of Free Press sent
19 out the manuscripts to a number of people before it was
20 accepted. I don't know who they are.

21 But yeah, I don't know who they are. Actually, I
22 do know one. It comes to mind because he told me about
23 it later. It's a guy named Robert Shapiro at NYU who is
24 a Professor of Chemistry there and worker on the origin
25 of life. He has a blurb on the back of the book you

1 might notice.

2 Q. I see. Have you subsequently read the second edition of
3 Pandas and People in its entirety?

4 A. No.

5 Q. Have you read any of it?

6 A. Not in a long time.

7 Q. When did you read it?

8 A. I probably read it in the early 90's, early to mid 90's.

9 Q. Do you have any recollection of its contents?

10 A. A couple of things, yes. Yes, I do have a couple of
11 things.

12 Q. Based on your recollection, do you believe it is a valid
13 presentation of the concept of Intelligent Design?

14 A. There are things I agree with and things I disagree
15 with. I think it is a provocative and interesting book.

16 Q. Stipulated.

17 A. It provokes a lot of people.

18 Q. What aspects of the book do you disagree with?

19 A. Well, I would have to read it a little. I don't want to
20 say offhandedly after not having read it for 15 years or
21 maybe 12 years or so. But I think they make some
22 conclusions I would not make, that they jump over
23 distinctions that I wouldn't in fact make.

24 So I am afraid -- without reading it through
25 again, I am afraid I wouldn't be able to give anything

1 specific.

2 Q. Are there any assertions that you recall -- and I
3 appreciate the passage of time. Are there any
4 assertions you recall that you think are inconsistent
5 with what you understand Intelligent Design to mean?

6 A. Inconsistent? Well, again, I do not have anything
7 readily coming to mind. They talk about the fossil
8 record quite a bit, and it is my contention that that is
9 not a good place to look. It is not the best place
10 perhaps to look for the effects of Intelligent Design.

11 I am known for arguing that the best place is to
12 look at the molecular level. I am a biochemist after
13 all.

14 Again, I don't want to say more than that without
15 having to look at it again.

16 Q. Have you reviewed the section you wrote in the last ten
17 years?

18 A. I am afraid I haven't even done that, no. I have had
19 other things to worry about.

20 Q. You couldn't say right now one way or the other whether
21 that is a valid description of the blood clotting
22 cascade and how it might have been developed?

23 A. Well, it is my recollection that the clotting cascade
24 has not, you know, changed in 15 years. So I assume if
25 it is the same one I talked about in Darwin's Black Box,

1 then it is likely to be correct.

2 Q. Maybe a better way to phrase that is you can't say right
3 now whether your analysis of the blood clotting cascade
4 and how it was developed is a valid analysis?

5 A. In the book Of Pandas and People?

6 Q. Right.

7 A. Not without reading it again.

8 Q. Do you expect to testify in support of the District's
9 use of Of Pandas as a reference textbook?

10 A. Clarify for me, if you would, what do you mean by
11 reference textbook?

12 Q. Do you understand how the book Pandas is being used in
13 the Dover School District?

14 A. It is my understanding that an announcement is simply
15 being made that it is available in the library.

16 Q. Using that understanding of how it is going to be
17 employed, do you expect to testify in support of how the
18 District is using Pandas?

19 A. I would be happy to testify that I think it would be a
20 great book to have in the library, yes.

21 Q. Would you be happy to testify that it is a great book
22 for students to be directed to if they want to
23 understand more about Intelligent Design?

24 A. Yes.

25 Q. You can say that even though you have not read it in the

1 last 12 years?

2 A. I can say that because I know it broaches the topic of
3 Intelligent Design. I know it discusses how we can come
4 to conclusions of Intelligent Design. It talks about
5 concepts that do not occur in normal biology textbooks
6 which I think are important and which I think would
7 broaden a student's view of what sorts of ideas can be
8 brought to bear on these topics.

9 Q. Are you aware of a new textbook under development called
10 Design of Life?

11 A. Vaguely, I'm afraid. I have heard -- I have heard talk
12 of it in the past just month or so I think. And I think
13 -- well, I think it is under development by Foundation
14 of Thought and Ethics. I think Bill Dembski is supposed
15 to be putting it together. More than that, I really
16 don't know.

17 Q. Has the Foundation of Thought and Ethics asked you to
18 participate in the development of that book in any way?

19 A. I think a year or two ago, Bill Dembski himself asked if
20 I would be a coauthor of the book. After hemming and
21 hawing, I said I don't really have time. And so that's
22 pretty much it.

23 Q. Other than that conversation with Mr. Dembski, have you
24 been involved in any way with the development of Design
25 of Life?

1 A. No.

2 Q. Have you had any interaction with Mr. Dembski about the
3 contents that would appear in Design of Life?

4 A. No.

5 Q. Other than what you described, do you know anything else
6 about the Design of Life?

7 A. The book, no.

8 MR. ROTHSCHILD: I think this would be a good time
9 to take a break.

10 AFTER RECESS

11 BY MR. ROTHSCHILD:

12 Q. Mike, as we have talked about already today, you wrote a
13 book in 1996 called Darwin's Black Box?

14 A. That's correct.

15 Q. Royalties on that are pretty good I bet?

16 A. I do okay.

17 Q. That book makes a case for Intelligent Design; correct?

18 A. That's correct.

19 Q. Is it fair to say this the publication where you unfurl
20 the concept of irreducible complexity?

21 A. Yes.

22 Q. Prior to the publication of Darwin's Black Box, had that
23 concept ever been described in point by you in anything
24 published?

25 A. I don't think so. I don't think so. Certainly nothing

1 that has attracted as much notice.

2 Q. I am going to spend some time later on what exactly
3 irreducible complexity means. But first, I want to ask
4 you some other questions about the book.

5 I think you alluded a few questions ago that
6 Darwin's Black Box did go through some kind of review
7 process?

8 A. Yes.

9 Q. Can you describe that review process?

10 A. I really don't know much about it. My editor at the
11 Free Press said that he was going to send out the
12 manuscript to scientists for their comments. And I know
13 that one was, as I said, Robert Shapiro at NYU. And
14 there were four others. I know another fellow I met him
15 later on. And there were three others.

16 Q. Do you know who that other fellow was?

17 A. Yes.

18 Q. Who was that?

19 A. I believe his name is Mike Atchison who is a Professor
20 at the University of Pennsylvania I think in either the
21 dental school or the vet school.

22 Q. Do you know how the reviewers were selected by the Free
23 Press?

24 A. Let's see. I think I suggested some names. I think I
25 suggested some names. And the editor got in touch with

1 those folks.

2 To tell you the truth, at this point I am not
3 quite sure whether there were people -- I think there
4 were people who he got in touch with and couldn't do it.
5 Some that could. Some that did.

6 Q. Who were the people that you selected -- suggested? I
7 am sorry.

8 A. Suggested. Let's see. I guess -- I am not sure. I may
9 have suggested Shapiro. I did not suggest Michael
10 Atchison. I suggested the fellow at Texas Tech whose
11 name escapes me now who I had met earlier at a public
12 conference debate on Intelligent Design and Darwinian
13 Evolution held at Texas A&M in the early 1990's who was
14 an opponent of Intelligent Design.

15 There was some other fellow. I think he is at
16 Washington University -- or at least was. I have
17 forgotten his name. It's Sean something or other. I
18 think it was Sean something or other. He is a DNA
19 sequence analyst. I forget.

20 I think I suggested a man named Neville
21 Kallenbach. He is also at NYU. He was the Chair of the
22 Chemistry Department there, but he said he couldn't do
23 it.

24 Q. The fellow at Texas Tech, you said he was an opponent of
25 Intelligent Design. Do you know what his position was

1 on the history of life type issues?

2 A. Well, from what I remember, it was pretty standard
3 Darwinian Evolution.

4 Q. And the other people you identified, did you know what
5 their positions were on those issues?

6 A. Most of them I thought were pretty much standard
7 Darwinian positions, but who seemed to be at least
8 recognized that there might be problems with the current
9 ideas, who seemed like they might be used to thinking
10 about whether or not big issues were correct or not.

11 Q. And other than selections based on your recommendations,
12 do you know how the editor selected other people to
13 review your book?

14 A. Michael Atchison -- if I am remembering his name
15 correctly -- I believe was an instructor of my editor's
16 wife who was attending Vet School at the University of
17 Pennsylvania. And so he asked. I think that is the
18 connection why he asked him.

19 Q. Do you have any understanding of what kind of expertise
20 he brought to bear on the issues discussed in your book?

21 A. The issues discussed in my book are general biochemical
22 ones. The systems I talk about in my book are ones that
23 are discussed in very many biochemistry textbooks.

24 Most biochemists will have familiarity with these
25 systems. And so most people will be -- most biochemists

1 will be able to comment on them at the level I discussed
2 them.

3 Q. Is it your understanding that this Dr. Atchison had that
4 kind of expertise?

5 A. I did not know who -- I did not find out his name until
6 later.

7 Q. Do you know now whether he had any familiarity with
8 biochemistry?

9 A. Yes, he's a Professor of biochemistry.

10 Q. Fair enough. What was the result of this review
11 process; did you get comments?

12 A. I was sent a couple of comments. A number of comments.
13 One of the comments that was sent is on the cover of the
14 hardcover edition. Robert Shapiro at NYU -- no, I'm
15 sorry -- James Shapiro -- on the hard cover, James
16 Shapiro -- no, Robert Shapiro. I am sorry, Robert
17 Shapiro is on the hardcover. He supplied a paragraph
18 length comment and also some other comments, too.

19 James Shapiro provided -- reviewed the book for a
20 national review soon after it was published, but he
21 wasn't actually a reviewer of the book ahead of time.

22 I saw some of the comments from other people, but
23 right now it escapes me exactly what they were. I do
24 remember that most of them said that yes, there are
25 problems in biochemistry but were reluctant or disagreed

1 with the conclusion of Intelligent Design. But
2 nonetheless, they told the editor that there weren't any
3 errors of biochemistry that they detected in the books.

4 Q. In Darwin's Black Box, you weren't publishing any
5 results of your own original research; is that fair?

6 A. That's correct.

7 Q. Do you consider the kind of review that you just
8 described to me to be the same as what we call peer
9 review in the context of, for example, your publications
10 on nucleic acid sequence in "Nature" or "The Journal of
11 Molecular Evolution"?

12 A. What do you mean by the same? I'm not sure.

13 Q. Do you consider the review you just described to be peer
14 review in the same way that you would describe the
15 process that your research experienced for publication
16 in "Nature"?

17 A. Well, the book that I published is a very different sort
18 of book than the technical papers I was publishing. And
19 so I think that for the book that I published, this was
20 yes, a thorough peer review.

21 Q. In your experience as a scientist, is it common to have
22 the opportunity to select the reviewers of the technical
23 papers you submit to scientific journals?

24 A. You are often requested to submit names of reviewers
25 because the editors often times aren't sure who is the

1 best people to look to in the field. You submitted
2 names, and the editor selects among them.

3 Q. You said this was a very different type of publication.
4 What did you mean by that?

5 A. Well, it is a book. It is a book length publication.
6 My other publications were relatively short papers. It
7 deals with a more fundamental issue of science than the
8 ones that my papers deal with.

9 And it makes -- and it deals with subjects that
10 are controversial, which seem to have implications
11 beyond science and so on. That's what I meant.

12 Q. And it is also distinguished from your technical papers
13 in that it does not report original research?

14 A. That's correct. I am sorry. Maybe I should say that in
15 the past, I have published reviews of other people's
16 papers, too. So that does get into the literature, too.

17 Q. But Darwin's Black Box does not report original
18 research?

19 A. That's correct.

20 Q. I am going to hand you a copy of the paperback version
21 of the book. I would like you to turn to page 232.

22 A. (Witness complies.)

23 MR. WHITE: Are you going to mark this as an
24 exhibit?

25 MR. ROTHSCHILD: Do you have any objection to

1 that?

2 MR. MATZKE: No objection.

3 MR. ROTHSCHILD: Hearing no objection from the
4 owner of the book, we will mark it as Behe 3, but I am
5 not going to have it circulated.

6 (Behe Exhibit 3 was marked.)

7 BY MR. ROTHSCHILD:

8 Q. Could you turn to page 232 which is the chapter entitled
9 Science, Philosophy and Religion?

10 A. Yes.

11 Q. The first paragraph of that section under the subheading
12 The Dilemma is what I would call an acknowledgment to
13 the hard work that has been done in biochemistry in the
14 last approximately 40 years.

15 Is that a fair characterization?

16 A. Yes.

17 Q. And you say in there the knowledge we now have of life
18 at the molecular level has been stitched together from
19 innumerable experiments in which proteins were purified,
20 genes cloned, electron micrographs taken, cells
21 cultured, structures determined, sequences compared,
22 parameters varied and controls done; a lot of
23 experiments?

24 A. Yes.

25 Q. And I realize in this paragraph you are really crediting

1 the work of hundreds or thousands of scientists; is that
2 fair?

3 A. Yes.

4 Q. Other individuals that you would sort of consider the
5 giants in this field?

6 A. Of biochemistry in general?

7 Q. Yes. You are describing the giants in the area that you
8 are describing in this paragraph?

9 A. No. There's nobody in particular. There are people who
10 spend the better part of their life investigating one of
11 the systems that I talked about, and others which
12 investigate others and so on. So there's a large number
13 of giants and a smaller -- and an even larger number of
14 professionals who did all this work.

15 Q. You would fit among that group; right?

16 A. What do you mean?

17 Q. You would be among the larger number of individuals?

18 You would call yourself a giant?

19 A. I am a working scientist.

20 Q. In this area?

21 A. In biochemistry, yes.

22 Q. Does the work of James Watson and Francis Crick fall
23 under this description?

24 A. Sure.

25 Q. Would you agree that they are giants in the field?

1 A. Yes.

2 Q. What about Jacob Menod, M-e-n-o-d?

3 A. M-o-n-o-d?

4 Q. M-e-n-o-d?

5 MR. MATZKE: I think it is M-o-n-o-d.

6 A. I guess he is not that big of a giant then if you don't
7 know how to spell his name.

8 BY MR. ROTHSCHILD:

9 Q. Are you familiar with that name?

10 A. Yes.

11 Q. Would you consider him a giant in the field of
12 biochemistry?

13 MR. WHITE: Just for an objection. Exactly what
14 do you mean by giant? Are you talking about leading
15 people?

16 BY MR. ROTHSCHILD:

17 Q. Is that your understanding, Mike?

18 A. I guess by the word giant, you mean renowned
19 biochemists, renowned scientists.

20 Q. Fair enough. And Leslie Orgel, are you familiar with
21 her?

22 A. It is a him.

23 Q. I am sorry.

24 A. Yes, I have read his work.

25 Q. And he is a big figure in this field?

1 A. Certainly not as big as Watson and Crick. It is hard to
2 rank them, but he is a prominent scientist.

3 Q. In the first sentence of the next paragraph, you say the
4 results of these cumulative efforts to investigate the
5 cell, to investigate life at the molecular level is a
6 loud, clear piercing cry of design in quotes, italicized
7 and exclamation mark; is that correct?

8 A. Yes.

9 Q. When you make that statement, are you suggesting that
10 this is the result concluded by all of the scientists
11 that are described in the preceding paragraph?

12 A. No. I am concluding that this is the result of their
13 work. I am not saying that they have said so.

14 Q. It is not something that James Watson has said?

15 A. That's correct.

16 Q. Francis Crick?

17 A. That is correct. I am sorry. Let me amend that.

18 Francis Crick actually has said that. He said that in a
19 book of his published in the late 1980's that scientists
20 have to constantly remind themselves that what they see
21 in biology -- and I might be paraphrasing. What they
22 see in biology was not designed, but rather evolved.

23 So from that statement and similar other ones, I
24 conclude that what he sees looks to him like it was
25 indeed designed. If you want to be literary, that it

1 cries out design. But he does not -- he resists the
2 conclusion.

3 Q. Okay. And when you write here that the result is a loud
4 clear, piercing cry of design, what you mean by that is
5 Intelligent Design; correct?

6 A. Yes.

7 Q. Not just the appearance of design?

8 A. That's correct.

9 Q. So this conclusion that is the result of these
10 cumulative efforts, this is your conclusion; correct?

11 A. No, this is the conclusion based on the work of what
12 science has discovered. So the structure of the systems
13 that we have discovered, I say shows workers in the
14 field or appears to workers in the field as if they were
15 indeed intelligently designed.

16 Q. Even though most of them don't conclude that?

17 A. That's right.

18 Q. So let's be clear here. This loud, clear piercing cry
19 of Intelligent Design, you are saying that is something
20 that is a cry being experienced by this large group of
21 professional researchers, or is it a cry that you are
22 announcing?

23 A. No. I think if I -- let me try to be clear. I think it
24 is a cry which comes out of the work itself. Just as if
25 you passed by something like say Mt. Rushmore and looked

1 at that and said you know, look at that design, and the
2 person to your left says oh, never mind. We have a
3 theory about how that came about. Sure, it looks
4 designed.

5 My sentence here means that when a person looks at
6 that who has not been defeated or utterly -- whose ideas
7 have not already been diverted by another argument will
8 recognize the object to be designed.

9 Q. So is it then a fair characterization of this sentence
10 to say the results of these investigations of the cell
11 cry out to everybody this was intelligently designed;
12 just not all of us recognize it?

13 A. It says that people who look at this recognize the
14 design. Everybody who looks at it -- or who is
15 knowledgeable enough to understand how these things
16 work, looks at it and can see that it appears to be
17 designed even though some people think that some other
18 explanation could potentially account for it.

19 Q. Again, I just want to be clear on terminology. You said
20 appears to be designed, but you mean appears to be
21 intelligently designed?

22 A. Yes.

23 Q. Then you go on in this paragraph to say the result is so
24 unambiguous and so significant that it must be ranked as
25 one of the greatest achievements in the history of

1 science.

2 What is the achievements we are referring to here?

3 A. The discovery that life is purposely designed -- or at
4 least, segments of life are purposely designed.

5 Q. Whose discovery is that?

6 A. The scientific community at large.

7 Q. So the scientific community at large has made the
8 discovery that life is purposely designed?

9 A. Right. That is the implications of their work.

10 Q. Let's be clear here. That is your interpretation of the
11 implications of their work. We are now talking about a
12 discovery.

13 James Watson didn't discover that life was
14 purposely designed; did he?

15 A. Not alone. That's correct.

16 Q. You think he is one of a collective group of scientists
17 that made that discovery?

18 A. My argument is that the general work of thousands of
19 scientists cumulatively showing the intricacy and
20 elegance in molecular machinery of life, especially at
21 the cellular level, molecular level shows the Design of
22 Life, yes.

23 Q. And the discovery of that circumstance is one of the
24 great achievements in the history of science?

25 A. Yes.

1 Q. And all of these scientists are talking about
2 participated in that discovery?

3 A. Well, yes, piecemeal, yes. I can give you an analogy
4 maybe. Suppose you were on an archeological dig, and
5 there were 10,000 people scraping away little bits of
6 dirt, and eventually they uncovered some structure, say
7 a Sphinx or some such thing. It would be my argument
8 that it was their work that discovered this intelligent
9 designed Sphinx.

10 Q. But in the case of the Intelligent Design you are
11 referring to, this discovery all these scientists
12 allegedly participated in, they don't actually agree
13 with, most of them?

14 A. Well, I don't know about that. I know some don't. If
15 we are talking about tens of thousands or hundreds of
16 thousands of scientists, I think some of them do. I
17 think one would have to survey everybody in a carefully
18 worded manner to find out what everybody thinks of it.

19 Q. Then you say the discovery rivals those of Newton and
20 Einstein, Lavoisier and Schroedinger, Pasteur and
21 Darwin. Again, you are just speaking about the same
22 discovery that was the work of -- that was made by all
23 these scientists?

24 A. That's correct.

25 Q. And then you go on to say the observation of the

- 1 intelligent design of life is as momentous as the
2 observation that the earth goes around the sun or that
3 disease is caused by bacteria or that radiation is
4 emitted in quanta?
- 5 A. That's correct.
- 6 Q. And whose observation are we talking about now?
- 7 A. Who observed that disease is caused by bacteria?
- 8 Q. No. Who made this observation of the intelligent design
9 of life?
- 10 A. It is the work of the scientific community that did it.
- 11 Q. Again, it is these tens of thousands of scientists?
- 12 A. That's correct.
- 13 Q. You are not just referring to yourself?
- 14 A. Sure.
- 15 Q. Again, this is an observation of the intelligent design
16 of life that you are attributing to all these scientists
17 even though many of them actively disagree with you, and
18 many of them, you have no idea of their position?
- 19 A. That is correct. My writing in this paragraph is meant
20 to convey that their work makes manifest the intelligent
21 design of life; although some think that other
22 explanations may account for it.
- 23 Q. Is this book Darwin's Black Box what you would consider
24 your major contribution to the concept of Intelligent
25 Design?

1 A. Yes.

2 Q. And am I correct that the signature concept introduced
3 here is irreducible complexity?

4 A. Yes.

5 Q. Is it fair to say without the concept of irreducible
6 complexity, there really isn't any scientific content to
7 Intelligent Design?

8 A. No. I don't think that's fair.

9 Q. Would you agree that it is one of the primary arguments
10 in support of Intelligent Design?

11 A. It's one of the primary arguments to show the
12 unreasonableness of the alternative explanation to what
13 most people would recognize as design. That is to
14 Darwinian processes.

15 Q. So it is an argument against the argument for natural
16 selection?

17 A. Yes.

18 Q. I want to be clear here. Is it also an argument for
19 Intelligent Design?

20 A. Yes.

21 Q. Is it a central concept to the argument for Intelligent
22 Design?

23 A. It is an important concept. I wouldn't call it central.

24 Q. What are the other important concepts in support of the
25 proposition of Intelligent Design?

1 A. Another concept is that when we see a system which is
2 complex and functional, then we have in our experience
3 always found that such a thing was designed.

4 So another important concept is an inductive
5 argument that such systems bespeak design. And that in
6 our experience, we do not have any non design arguments
7 for them.

8 Q. We will get back to that. I will get back to that in
9 detail later. But is it fair to say that the concept of
10 irreducible complexity, along with the inductive
11 reasoning you just described, the sort of two
12 complementary pieces in your argument for Intelligent
13 Design?

14 A. Would you say that again?

15 Q. Is the concept of irreducible complexity and the form of
16 inductive reasoning you just described, the two
17 complementary pieces to your argument for Intelligent
18 Design?

19 A. Yes.

20 Q. Are there any other scientific concepts that are
21 important to the proposition of Intelligent Design?

22 A. There are a number of -- it depends on how you define
23 Intelligent Design. There are arguments for Intelligent
24 Design from biology and biochemistry. There are
25 arguments for Intelligent Design from the laws of

1 physics, from the laws of chemistry and the origins of
2 life, from astronomy based on the position of earth in
3 the universe and many others.

4 So the arguments I make are not exhaustive of
5 arguments for Intelligent Design, but they are
6 particularly important in arguments for Intelligent
7 Design in biochemistry.

8 Q. And what about in biology?

9 A. In biology, they are not -- I emphasize in the book that
10 these arguments are limited. I limit them to molecular
11 systems.

12 Q. And that is the purview of biochemistry?

13 A. That's correct.

14 Q. You are not making an argument one way or the other as
15 to whether these principles extend on to biological --

16 A. To higher levels of biology, that's correct.

17 Q. Are there any scientific concepts that you are aware of
18 or scientific work that addresses the question at the
19 biological level for Intelligent Design?

20 A. Well, I have certainly read arguments that features at
21 higher levels of biology are beyond non design
22 explanations. And those arguments tend to be the
23 inductive ones that I listed for biochemistry.

24 That is when we see functioning systems, complex
25 functioning systems, in our experience, they bespeak

1 design. Coupled to the fact that rigorous, detailed
2 explanations of how such systems could have appeared by
3 unintelligent mechanisms are currently lacking.

4 So I have certainly heard of such arguments. But
5 as a biochemist, I limit my own arguments to molecular
6 systems.

7 Q. Who are the sponsors of those arguments at a biological
8 level?

9 A. I would have to look them up. I can't think off the top
10 of my head.

11 Q. Are these people who are identified with the Intelligent
12 Design movement?

13 A. Yes. They are certainly people in the Intelligent
14 Design movement who make such arguments.

15 Q. Do you know whether any of those individuals are
16 biologists?

17 A. I would have to think about it for a while.

18 Q. Sitting here today, you can't think of any?

19 A. Not off the top of my head.

20 Q. In William Dembski's rebuttal report, the rebuttal to
21 the various plaintiff's experts which I appreciate you
22 have not read yet, but he says two seminal books that
23 have defined the ID movement are Darwin's Black Box and
24 Dembski, his own design inference.

25 Do you agree with that characterization?

- 1 A. Yes.
- 2 Q. And Dembski is not a biologist?
- 3 A. That's correct.
- 4 Q. Or a biochemist?
- 5 A. That's correct.
- 6 Q. He is not a scientist at all?
- 7 A. It depends on how you count mathematics and statistics.
- 8 He has a Ph.D. in mathematics and so on. Mathematics is
- 9 the basis of much of science.
- 10 Q. Do you consider mathematics, a mathematician, a
- 11 scientist?
- 12 A. Some I do, yes. There are such things as experimental
- 13 mathematics, statistics. It depends on your definition.
- 14 I would happily think of such people as scientists.
- 15 Q. Would you happily think of Mr. Dembski as a scientist?
- 16 A. I think of him more of a mathematician and philosopher.
- 17 Q. Not a scientist?
- 18 A. Yes, that's correct.
- 19 Q. I, as you might imagine, read your report very
- 20 carefully, and the phrase irreducible complexity does
- 21 not so far as I can tell appear anywhere in the report
- 22 except for if you're quoting someone who was critiquing
- 23 your work?
- 24 A. Okay.
- 25 Q. Does that sound correct to you?

1 A. Yes.

2 Q. And this is your big contribution. Why didn't you write
3 about it in the report?

4 A. I was not asked to address the argument for irreducible
5 complexity, or indeed to make an argument for
6 Intelligent Design. Well, I was not asked to address
7 irreducible complexity.

8 I was asked to address a set of specific topics
9 that Mr. Thompson gave to me. In doing so, I wrote the
10 report that you have.

11 Q. And just going back to something you said earlier. You
12 said irreducible complexity is an argument against the
13 unreasonableness of the alternative of Darwinism; is
14 that correct?

15 A. Right.

16 Q. Am I understanding you correctly that by itself,
17 irreducible complexity does not demonstrate design; it
18 merely demonstrates the flaw in the alternative?

19 A. No. I think it does both. In nonbiological
20 circumstances when we see a complex object that has a
21 function such as say the faces on Mt. Rushmore, we
22 recognize them to be designed.

23 And in other circumstances when we come across a
24 mousetrap or so, we recognize those to be designed. The
25 mousetrap we specifically recognize to be designed,

1 well, a big contributing factor is that it is
2 irreducibly complex. It needs a number of different
3 parts to function.

4 Nonetheless, in biology, the current paradigm for
5 how much complexity would arise is Darwin's paradigm for
6 how life arises is Darwin's Theory of Evolution by
7 random mutation and natural selection.

8 And the concept of irreducible complexity is
9 intended to argue that there are some systems that
10 resist such explanation in terms of small changes and
11 natural selection.

12 But at the same time, when we see such systems, we
13 recognize them to bespeak design, point to design.

14 I was wondering I hate to ask, but I have a full
15 glass of water here. I would like to make a little
16 break whenever it is convenient.

17 Q. You are always entitled to take one. Let's do it.

18 A. Thank you.

19 (A recess was taken.)

20 BY MR. ROTHSCHILD:

21 Q. Mike, I want to go back to something you said a few
22 minutes ago which is just to confirm you were not asked
23 to describe irreducible complexity in your report?

24 A. That's correct.

25 Q. And you also said, but you may have qualified it, so I

1 want to make sure the record is clear. You weren't
2 asked to make the case for Intelligent Design in your
3 report?

4 A. That's correct.

5 Q. So you didn't?

6 A. I did not.

7 Q. Going back to the book Design of Life, the forthcoming
8 book Design of Life, if you were described as an author
9 of that book, as one of the authors, would you agree
10 that that is a false statement?

11 A. That's correct.

12 Q. And if Mr. Dembski had represented that he had reached
13 out and secured your support and work on the book, that
14 would be false?

15 A. I think he did ask me if I would be a part of the team
16 writing it, and I said I didn't have time. So he
17 reached out. And he may have said something like well,
18 when it is done, maybe we can list you as an author.

19 Q. If he represented that he had solicited new material
20 from you for the book, would that be a false statement?

21 A. New material?

22 Q. New text to be part of the book.

23 A. For me to write material for the book?

24 Q. Right.

25 A. He solicited it. I believe I told him -- and this was a

1 while back again -- that I didn't have time to do so.

2 Q. Just to be clear, a statement that you are coauthor of
3 the book would be false?

4 A. I will not have written anything. I might be -- he
5 might in the future be able to persuade me to revise
6 some of the text or go over it to make sure that I think
7 that it correctly describes Intelligent Design and so
8 on.

9 So if one wishes to call such a contribution
10 authorship, in the future then I would be possibly an
11 author.

12 Q. If one were to say that now you were a coauthor of the
13 book, that would be false?

14 A. Well, it depends on if one had in mind this future
15 activity and anticipated I was going to be involved in
16 it.

17 Q. Would you characterize yourself right now, Mike, right
18 now a coauthor of the book?

19 A. I would not characterize myself that way.

20 Q. In Darwin's Black Box at page 39 -- let me rephrase
21 that. Could you turn to page 39?

22 A. Yes.

23 Q. Tell me if your definition of irreducible complexity is
24 found on that page.

25 A. That is the definition I gave in the book, yes. I have

1 since tweaked the definition a little bit.

2 Q. We will get to that. And is the definition on page 39
3 is that the text in the bottom paragraph that begins by
4 irreducibly complex I mean a single system?

5 A. That's correct.

6 Q. And just in terms of the definition of irreducibly
7 complex in this book, can you tell me where it ends in
8 this paragraph?

9 A. It continues just for that sentence by irreducibly
10 complex, I mean a single system composed of several well
11 matched, interacting parts that contribute to the basic
12 function wherein the removal of any one of the parts
13 causes the system to effectively cease functioning.

14 Q. Explain to me how that definition has been tweaked.

15 A. In response to -- some critics of my position have
16 argued that if one starts with a system which already
17 performs some function, one could potentially add a new
18 component which would assist the preexisting system to
19 function. And that in theory, one could eventually get
20 to a point where the extra component is required for
21 function.

22 And so in order to try to head off some
23 theoretical difficulties, I changed the definition in my
24 paper in Biology and Philosophy to add a phrase that by
25 necessity, the system has to have these parts.

1 I should add that the critics who brought up these
2 suggested difficulties did not give what I thought were
3 real examples of the phenomenon that they had in mind.
4 But it was a theoretical difficulty that I sought to
5 address.

6 Q. Okay. Is the paper you are referring to where the
7 definition was tweaked The Biology and Philosophy
8 Journal article that was attached as Exhibit 8 to your
9 report that you should have?

10 A. Yes.

11 Q. You can open up that notebook, and you will find that
12 Exhibit 8. Is that the right article?

13 A. Yes, it is.

14 Q. And the article is entitled A Reply to My Critics;
15 correct?

16 A. Yes.

17 Q. Can you show me where in this article you tweak the
18 definition? I think the bottom of page 694 is correct,
19 but don't take my word for it.

20 A. I think it is at the bottom of page 694.

21 Q. You said the defect can be repaired easily enough by
22 inserting a word to define irreducible complexity as a
23 single system which is necessarily composed, and you go
24 on from there?

25 A. Yes.

1 Q. If we turn to page 695, on the top half of the page you
2 say however commentary by Robert Pennock and others has
3 made me realize that there is a weakness in that view of
4 irreducible complexity.

5 You go on at the bottom of the page to say there
6 is an asymmetry between my current definition of
7 irreducible complexity and the task facing natural
8 selection.

9 And just sort of in lay terms, my understanding of
10 what you are describing here is you shouldn't work
11 backwards --

12 A. Yes.

13 Q. -- from the full system. That is not what natural
14 selection does. You have got to work bottom up?

15 A. That's correct.

16 Q. And you say in this article I hope to repair this defect
17 in future work; is that correct?

18 A. Yes.

19 Q. Has that defect been repaired?

20 A. I have not done that yet.

21 Q. So you recognize in that paper written in 2001 that
22 there is a defect in your current definition of
23 irreducible complexity, but now in 2005 you have not
24 repaired that?

25 A. I did not view it as important.

1 Q. Explain what the consequence of this defect is to your
2 proposition of irreducible complexity.

3 A. Virtually nothing. Pennock's argument was that if one
4 started out with a system that was more complex than the
5 system that he had in mind to produce, then you could
6 take away parts from a preexisting more complex system
7 to produce the irreducibly complex less complex system.

8 His example was a chronometer which sailors can
9 use to determine their position at sea by keeping time
10 very accurately. His argument -- although he did not
11 give details -- was that perhaps if some part of the
12 chronometer was broken, then it might not necessarily
13 keep time accurately enough to be used to determine
14 position at sea, but perhaps it could be used as a watch
15 or in some less rigorous circumstance.

16 I viewed that argument as a sort of kind of
17 interesting philosopher's type of argument, but one
18 which had little to do with the biochemical empirical
19 problem that I was trying to address. And in the
20 intervening time since he wrote that, I have not found
21 that to be -- yet to be a more important question to
22 address than other questions than I have spent time on.

23 Q. But it is fair to say that your definition which
24 discusses sort of removing a part from the whole is not
25 symmetrical to the challenge facing natural selection,

1 which is starting from some precursor with some subset
2 of parts and building up to the more complex structure?

3 A. Well, the whole purpose of my definition was not to be a
4 philosopher since I am not a philosopher. I was not
5 trying to devise some rigorous set of words to describe
6 something.

7 I was trying to put a focus on what I saw to be an
8 empirical problem for Darwin's Theory of Evolution by
9 random mutation and natural selection. I imagine there
10 could be other sets of words that would do that better,
11 but I thought it to be quite sufficient to put a light
12 on the problem that I saw.

13 MR. ROTHSCHILD: Ed, one thing I meant to put on
14 the record at the beginning is that Mike has served two
15 rebuttal reports on the deadline as agreed by the
16 parties. Obviously, that is very close in time to his
17 scheduled deposition.

18 While I have looked through them, I haven't had
19 time to process them in the same way I have his initial
20 expert report. And while I am not promising or
21 threatening to do this, I do want to reserve the right
22 of have another day of deposition to go over those
23 rebuttal reports.

24 MR. WHITE: I will object to that because it was
25 served on you on time. You have your seven hours of

1 deposition time pursuant to the rules.

2 MR. ROTHSCHILD: Obviously where rebuttal reports
3 were filed by people who did not file the initial
4 reports, there is a second seven hours available for
5 their deposition. And I think the same rule applies for
6 an expert like Mike or Bill Dembski who filed
7 effectively a whole second report.

8 But we don't have to resolve that here. I just
9 want to reserve our position on that.

10 MR. ROTHSCHILD: Could you mark this as the next
11 exhibit?

12 (Behe Exhibit 4 was marked.)

13 BY MR. ROTHSCHILD:

14 Q. Mike, do you recognize the document I have marked as
15 Behe 4?

16 A. Yes.

17 Q. What is it?

18 A. It an interview. It is an interview that Mark Ryland
19 did with me and had published in a publication called
20 Our Sunday Visitor.

21 Q. That is a publication of the Discovery Institute's
22 Center for Science and Culture?

23 A. No, it is a Catholic organization which puts that out.

24 Q. I just pulled it from the Discovery Institute site.

25 A. Yes, they have it placed there.

1 Q. On the second page of the version of the article that I
2 handed to you, there is a question what if the
3 Intelligent Design (ID) movement, and you answer that
4 question.

5 And in the second paragraph of your answer, you
6 say we are told by "Science" with a capital "s" that the
7 universe is just matter and energy in motion, but it
8 turns out that actual evidence of science does not
9 necessarily support that philosophical claim.

10 I am curious what you mean by science with a
11 capital S.

12 A. Okay. Let me say here that the interview was pretty
13 much written by Mark and passed by me for my approval.
14 He wrote it in question/answer form. So the words he
15 chooses are not necessarily the ones I myself would have
16 chosen.

17 So I'm not quite sure how to interpret what he
18 meant by that phrase we are told by Science with a
19 capital S.

20 Q. I am correct that you reviewed this before it was
21 published?

22 A. Yes, I did.

23 Q. Including Science with a capital s?

24 A. I reviewed it, yes.

25 Q. Sitting here today, you can't tell me what it means?

1 A. I will not -- the words really actually weren't my own I
2 must say. I do not want to say what I thought was meant
3 by that.

4 Q. Did you have any understanding of what was meant by that
5 when you reviewed this?

6 A. Yes. It is a popular notion that science postulates
7 that the universe is composed of matter and energy, and
8 that specifically a claim which is often advanced in the
9 name of science, that those are the only -- the only
10 entities that exist is also widespread.

11 An example of that I think is the television
12 series which was introduced by the late astronomer Carl
13 Sagan which he would begin by saying the universe is all
14 that is, was and ever will be.

15 So in this interview for a popular audience, I
16 think it was referred to here as this popular conception
17 that science is materialistic.

18 Q. And when you use the materialistic, what do you mean by
19 that?

20 A. Well, I mean that at bottom, the really existing
21 entities are simply matter and energy, or matter, energy
22 or whatever physicists understand them to be. That in
23 fact, there is nothing beyond that that actually exists.

24 Q. And then again understanding that you may not have
25 written this text, it says more specifically in my field

1 of biology, the ID movement is beginning to question the
2 claims of neo-Darwinian Evolutionary Theory.

3 Is that meant to describe you, is that an accurate
4 description, your field of biology, or should it have
5 been limited to biochemistry?

6 A. Yes, it should be limited to biochemistry. But most
7 people who would read a magazine of this sort don't
8 really distinguish between subdisciplines of biology.

9 Q. But again in terms of the claims you are making on
10 behalf of Intelligent Design, they are limited to the
11 biochemical arena?

12 A. That's correct.

13 Q. Turning to the top of the next page, you talk about or
14 the article states that you talk about questions about
15 undirected evolution that arose for you after reading a
16 book by another scientist who was skeptical of
17 Darwinism.

18 Who is that scientist?

19 A. A man name Michael Denton.

20 Q. Do you know whether Michael Denton is still skeptical of
21 Darwinism?

22 A. I haven't spoken with him in a few years, but I have no
23 reason to think that he's not.

24 Q. And then notwithstanding your audience, you do get into
25 the discussion of biochemical structures and

1 biochemistry, and you say we know that to go from one
2 kind of complex protein structure or function or cascade
3 to another requires many changes. And then you say we
4 can in effect quantify those changes and their
5 probability.

6 When you state that, is there a particular
7 methodology you are referring to?

8 A. Well, yes. It is fairly simple straightforward
9 mathematics, the probability, what amino acid changes
10 would have to be made in order to have one complex
11 function turn into a completely different complex
12 function.

13 Q. And is this a methodology you developed, or is this one
14 commonly used in the field of biochemistry?

15 A. It is essentially mathematics. Regular mathematics.

16 Q. In terms of the application of this mathematics to the
17 biochemical principles you are talking about, could I
18 find that methodology reported anywhere?

19 A. You can find a portion of it in a paper in Protein
20 Science that myself and David Snoke published recently.

21 Q. And is there anywhere else I would find that methodology
22 described?

23 A. You can find it in a number of -- well, let me back up
24 and say you can find mathematics that would lead to
25 similar conclusions as I speak about here if you applied

1 the mathematics to irreducibly complex systems.

2 It is however uncommon for evolutionary biologists
3 and people in the field to even consider irreducibly
4 complex systems. They often times make the assumption,
5 which is not explicitly justified, that single changes
6 can either give beneficial or detrimental effects.

7 In my paper with Snoke, we considered the
8 situation where a system would have to undergo multiple
9 changes before exhibiting a beneficial effect to the
10 organism. When one does that, you get the -- you can
11 quantitate the probability.

12 Q. We will go back to that article in a little bit.
13 Towards the bottom of the page you talk about a problem
14 for neo-Darwinism since by hypothesis there is no plan
15 or purpose or intelligence and biological change.

16 Am I correct in understanding that the concept of
17 Intelligent Design does include the proposition of a
18 designer acting with a plan or a purpose?

19 A. Yes, that -- if I may expand on that. You can tell that
20 the designer had the purpose of producing the system
21 that was produced. Just like whatever else you can tell
22 about Mt. Rushmore, about the guy who did it, you can
23 tell he had the purpose of producing those faces on the
24 mountain.

25 Q. And so using one of your examples, one can conclude that

- 1 the designer had the purpose of designing the bacterial
2 flagellum?
- 3 A. Correct.
- 4 Q. And had a plan to develop that?
- 5 A. Well, depending on how you define all these terms --
- 6 Q. Your terms.
- 7 A. I am sorry.
- 8 Q. Your terms.
- 9 A. Mark Ryland's terms. Yes, I think one could use that
10 word plan.
- 11 Q. Is Intelligent Design capable of describing what the
12 designer's purpose was?
- 13 A. Beyond producing the system itself, no.
- 14 Q. Is Intelligent Design capable of describing the plan for
15 developing the biological system?
- 16 A. In this same thing, beyond the plan of producing the
17 system, no.
- 18 Q. Is Intelligent Design capable of determining the
19 identity of the intelligent designer?
- 20 A. Not at the present time.
- 21 Q. Why do you qualify it in that way? What are you looking
22 for that would allow --
- 23 A. Further information might always come up. For example,
24 as I write about I believe in a rebuttal report, there
25 are a group of people who think that the designer is a

1 space alien, the Raelians.

2 So if those space aliens communicated to us or if
3 we in the future develop technology to fly to a distant
4 planet and came across their civilization or some such
5 thing, then we could have evidence of who that designer
6 was. It may not be probable, but it is not
7 theoretically excluded.

8 Q. Intelligent Design doesn't base any of its propositions
9 on Raelian philosophies or beliefs; does it?

10 A. No.

11 Q. Raelianism is actually a religion; is it?

12 A. I don't know. I don't think it is actually. It depends
13 on what you mean by a religion. I am not sure.

14 Q. Do you know whether Raelians describe their organizing
15 principle as religious?

16 A. I do not know for sure. As a matter of fact, I don't
17 think they do. As a matter of fact, I think they are
18 antagonistic towards religions as usually understood.

19 Q. Does Intelligent Design Theory have anything to say
20 about the possibility that space aliens could be the
21 designers of molecular structures like the bacterial
22 flagellum?

23 A. Intelligent Design Theory right now simply states that
24 these structures were designed and right now leaves open
25 the question of who the designer was. It does not

1 foreclose it. It doesn't say we can't determine who it
2 was. It just says we don't have enough evidence now to
3 determine who it is.

4 Q. And I take it that the conclusion of Intelligent Design
5 at this time does not incorporate into its reasoning who
6 the designer is?

7 A. That's correct.

8 Q. Going back to the space aliens, would space aliens of
9 the kind you just described, would those be natural
10 actors?

11 A. Yes.

12 Q. And would the conundrum then arise how did they come to
13 be?

14 A. It may or may not. As I am sure you know in one of --
15 actually in the expert report I submitted, Francis
16 Crick, whom you have mentioned earlier who was the Nobel
17 Prize winning co discoverer of the structure of DNA,
18 proposed life on earth may have arisen by being seeded,
19 purposely seeded, intelligently seeded by space aliens.
20 And he published a paper, along with Leslie Orgel to
21 that effect in a journal called Icarus in the early
22 1970's.

23 In that paper, he said that -- he addressed that
24 same question of whether this would simply push back the
25 question of the origin of the designers -- or at least

1 the originators of life. For my purposes, you can just
2 say that maybe they designed everything else, not just
3 started life.

4 But he said that well, even if it does push back
5 the question nonetheless historically, it is of interest
6 to determine how life started on earth. Even if we
7 can't answer the question of where those aliens came
8 from, nonetheless it is of interest to learn where life
9 on earth came from.

10 He also speculated that perhaps conditions were
11 considerably different on the alien planet, and that
12 perhaps life could have originated there without
13 intelligent intervention. So at least theoretically, at
14 least some smart person believed that did not
15 necessarily push the question back continuously.

16 Q. You have said yourself you don't find the space alien
17 proposition particularly satisfying; correct?

18 A. That's right.

19 Q. Or the idea of some kind of time transfer; correct?

20 A. I said I consider them to be implausible, yes.

21 Q. When you made the presentation to residents of Dover,
22 you were asked the question who is the designer;
23 correct?

24 A. I forget. I certainly may have been. I don't remember
25 everything that was asked.

1 Q. Do you remember giving the answer in that session I
2 think it is God?

3 A. I don't remember. But I have certainly said that in the
4 past. As a matter of fact, I say that in Darwin's Black
5 Box. I said that while these other things are
6 theoretically possible, most people, including myself,
7 will conclude that the designer is likely to be God,
8 yes.

9 Q. And when you say that, what is the concept of God that
10 you are holding? It is probably not George Burns. Who
11 is God?

12 A. Who is God? Of course, that question has vexed a lot of
13 people for a long, long time.

14 Q. What are the characteristics of the God you are
15 referring to when you say I think it is God?

16 A. What do you mean by characteristics? I am not sure.

17 Q. What is in your mind when you say I think it is God?
18 What are God's attributes?

19 A. I am a Roman Catholic. So my conception of God is
20 pretty much what Roman Catholicism holds. If you want a
21 description of that, there are many, many books on
22 theology and so on which are available. I am not a
23 theologian.

24 Q. Do you consider what you have described as the Darwinian
25 Theory of Evolution to be inconsistent with your faith?

1 A. No. As a matter of fact, I used to believe that
2 Darwinian Evolution was true. I was taught Darwinian
3 Evolution in parochial school.

4 After reading Denton's book, I saw there could be
5 scientific objections against it which had never really
6 crossed my mind because I had been taught the idea in
7 college and graduate school and so on. So I became
8 skeptical of it based on scientific reasons rather than
9 theological ones.

10 Q. You have raised a possibility, albeit skeptically, that
11 space aliens is one possible designer. Could the
12 intelligent designer be any natural actor we are
13 currently aware of on earth?

14 A. Could you clarify that? Do you mean people who are
15 alive today or things who are alive today?

16 Q. The types of creatures or living organisms that are
17 alive today.

18 A. Is it possible? Yes. In my book -- and I should
19 preface this by saying that I am not proposing this as
20 something true, but, of course, often times in science
21 things that appeared outlandish turned out to be true.

22 So it is entirely possible as I say in my book as
23 far as I know, that a human or a person with humanlike
24 intelligence in the future could in fact design an
25 organism.

1 Scientists are currently making changes in
2 organisms. There's a project out to try to construct a
3 cell from scratch. So I think there's no reason for me
4 to think that a person of human intelligence could not
5 have designed living systems.

6 Now, of course, we are talking about the past. So
7 one would have to also invoke something exotic like time
8 travel. But as I said in my -- I am not a physicist.
9 But as I said in Darwin's Black Box, there have been
10 speculations about time travel, and I referenced some
11 Scientific American article, in the relevant communities
12 of physicists.

13 So I know of no logical reason why a humanly
14 intelligent agent with some special effects could not
15 have designed the life we see.

16 Q. And the special effect you are referring to is time
17 travel?

18 A. That's correct.

19 Q. And without time travel, that --

20 A. That would be difficult.

21 Q. Impossible; right?

22 A. Never say impossible in science. But I know of no way
23 it could have been.

24 Q. Even if we speculate on the possibility of time travel,
25 there's quite a few sort of theoretical obstacles to

1 that concept? For example, how did we get to that
2 future creature, that future human.

3 A. Of course, when you talk about time travel, there is all
4 sorts of paradoxes. I mention those in my book as well,
5 things like grandsons shooting grandfathers and so on.
6 Any science fiction movie will show you lots of
7 paradoxes.

8 The point I was making there though is apparently
9 serious physicists had been talking about the
10 possibility. And I, as a lay person with regard to
11 physics, could only say well, maybe that might be
12 possible. And if it is possible, then the intelligent
13 designer that I speak of could have been a natural
14 creature.

15 And my point in saying that was to show that the
16 argument I was making pointed simply to Intelligent
17 Design. I was not making a theological or philosophical
18 argument trying to prove the existence of God or any
19 other supernatural being.

20 Q. Just thinking we may have to Michael J. Fox and
21 Christopher Lloyd in as rebuttal experts, but we'll
22 cross that bridge.

23 Then towards the bottom of this article that
24 apparently Mr. Ryland penned for your attribution, at
25 the very end of the article, you are quoted as saying we

1 are at the very beginning of a paradigm shift in
2 biology, and nobody really knows where this will end up.

3 What do you mean by a paradigm shift?

4 A. Well, a paradigm is essentially a way of seeing the
5 world. And a paradigm shift is to go from one way of
6 seeing the world to a different way of seeing the world.

7 For example, when Newtonian physics was thought to
8 describe correctly --

9 Q. I am sorry to cut you off. I really want to know what
10 you think the particular paradigm shift is as compared
11 to -- I am not criticizing you.

12 A. You didn't ask that. You just asked what I meant by a
13 paradigm shift.

14 Q. Fair enough.

15 A. I am thinking that the paradigm shift is a changing from
16 a view where we think that unintelligent mechanisms can
17 completely account for what we find in life to one in
18 which we see that intelligent effects are also necessary
19 to account for what we see in life.

20 Q. We talked a while back about your submission to
21 scientific journals of your work in the nucleic acid
22 sequence area; correct?

23 A. Yes.

24 Q. And I want to now shift to the concept of Intelligent
25 Design and ask you whether you have submitted any of

1 your work on Intelligent Design to peer reviewed
2 scientific journals?

3 A. Yes, I have.

4 Q. Describe those publications.

5 A. There were two of them. I submitted a manuscript
6 similar to the one that became "Reply to My Critics" in
7 Biology and Philosophy. I submitted that to the Journal
8 of Molecular Evolution.

9 Q. Okay.

10 A. And I also was invited to submit a manuscript discussing
11 Intelligent Design to a journal called Quarterly Review
12 Of Biology. I agreed to do so. But later, on the
13 editor got back and said that the Editorial Board had
14 decided that their journal would not publish arguments
15 for Intelligent Design.

16 Q. Are those the two examples?

17 A. Yes. I should include my paper on protein science which
18 I think -- which is relevant to Intelligent Design.

19 Q. Let's start with that. The protein science article,
20 that article does not actually mention Intelligent
21 Design; correct?

22 A. That is correct. It just talks about problems with
23 Darwinian Evolution.

24 Q. And so would you agree that that is not an article
25 making the case for Intelligent Design?

- 1 A. It makes a piece of the case, a small piece of the case.
- 2 Q. And does that article ever use the term irreducible
3 complexity?
- 4 A. I was specifically told by a referee for the journal to
5 remove the term irreducible complexity because it was
6 controversial and had appeared in my book. In the
7 original article I had written, it did in fact appear.
- 8 Q. And did it actually -- was that term used in conjunction
9 with an actual biological system that you were
10 researching?
- 11 A. This was a theoretical paper which used a mathematical
12 model to discuss protein evolution.
- 13 Q. So am I correct in understanding though that that paper
14 didn't report any original data or research?
- 15 A. Well, yes, it did. It reported our original
16 calculations on these sorts of systems.
- 17 Q. It didn't do any sort of laboratory experiments?
- 18 A. No, it was a theoretical paper.
- 19 Q. What was your understanding why you couldn't use that
20 term irreducibly complex?
- 21 A. The only thing I can tell you is what the reviewer told
22 me. It was a controversial term that had appeared in my
23 book, and that it should not appear in the paper.
- 24 Q. Did you argue with him?
- 25 A. No.

1 Q. Am I correct in understanding that sort of the purpose
2 of this article was to show a challenge to Evolution
3 through Darwinian processes?

4 A. I am sorry. Could you say that again?

5 Q. Am I correct in understanding that the purpose of this
6 article was to show a challenge to Evolution through
7 Darwinian processes?

8 A. Yes.

9 Q. And the challenge was to the process of binding of
10 proteins?

11 A. That was one of the possibilities. The paper concerned
12 the development of features of proteins that required
13 multiple amino acid changes from the parent protein.
14 One of those features could have been protein binding
15 surfaces.

16 Q. You write in the article, and it's attached as
17 Exhibit 10 to your report, that -- and I am now reading
18 from page 2657 at Exhibit 10.

19 A. Okay.

20 Q. The bottom corner, the discussion with the heading The
21 Model and Its Limits, you state our model is restricted
22 to the development of MR features by point mutation in a
23 duplicated gene. We strongly emphasize that results
24 bearing on the efficiency of this one pathway as a
25 conduit for Darwinian Evolution say little or nothing

1 about the efficiency of other possible pathways.

2 A. Thank you.

3 MR. WHITE: Just let him catch up to you, please.

4 A. I missed the place. That's correct.

5 BY MR. ROTHSCHILD:

6 Q. So this paper it would be fair to say doesn't make the
7 case against Darwinian Evolution generally, it just
8 attempts to demonstrate the challenge of one potential
9 pathway?

10 A. It concerns one pathway which is often times spoken of
11 in the literature as a prime way in which new proteins
12 and new protein functions could arise. So the purpose
13 of this was to show that that assumption, which is
14 prevalent in the biological community, has unconsidered
15 problems. That's correct.

16 Q. But doesn't consider the other pathways?

17 A. It limits itself to the one pathway.

18 Q. And in terms of that one pathway, what was the
19 conclusion that you and your coauthor arrived at?

20 A. The conclusion in a nutshell was that when more than one
21 mutation is required in a duplicated gene for the
22 acquisition of a new biochemical feature, that it would
23 require large population sizes and/or long numbers --
24 large numbers of generations, much time in order to
25 produce such a feature.

1 And that as the feature required more and more
2 changes, then the population sizes and length of time
3 became prohibitive.

4 Q. Prohibitive meaning?

5 A. That it would be larger than most populations of
6 organisms on earth, and the time would require longer
7 than geological -- longer than life has existed on
8 earth.

9 Q. Does any of the biological systems being discussed here
10 fall under your definition of irreducibly complex?

11 A. Well, it is related to the question of irreducible
12 complexity. In my book when I talk about irreducibly
13 complex, I was really oversimplifying much of the case.
14 That the difficulty I see for Darwinian Evolution is in
15 fact much more severe than I made it out to be.

16 When I talked about irreducible complexity in
17 Darwin's Black Box, I focused on the different parts of
18 a system such as the flagellum, which would be required
19 for it to function. However, I did not spend much time
20 talking about the ways in which the part of the systems
21 would specifically recognize each other.

22 Machinery in our everyday world is assembled by
23 intelligent agents. But molecular machinery in the cell
24 has to self assemble. This is a requirement above and
25 beyond the functioning of the molecular system itself.

1 In order for multiple parts to recognize each
2 other, areas of the surfaces have to be complementary,
3 chemically and physically complementary to each other.

4 Usually that involves multiple amino acid
5 residues. Amino acids are the subunits which comprise
6 proteins. The difficulty for Darwinian Evolution is
7 when one has to change multiple things before one gets a
8 selectable function, a function that helps out an
9 organism.

10 In my book, I focused on the multiple changes at
11 the protein level which would have to take place in
12 order to get a functioning protein system. One could
13 also look at it at the amino acid level to ask does one
14 need multiple changes simply to assemble the system in
15 the first place.

16 So the general problem for Darwinian Theory is the
17 same at the protein level in the question of developing
18 protein, protein interactions because multiple changes
19 would have to occur in order for -- in general for
20 proteins to bind to each other. So it is a related
21 concept. It is a related concept.

22 Q. So to summarize, there is even more steps required for
23 Darwinian Evolution than you suggest in Darwin's Black
24 Box?

25 A. Yes.

1 Q. Transferring to the Intelligent Design concept, does
2 this mean that there are similarly many interventions
3 required by the designer to create the systems that you
4 are referring to?

5 A. What do you mean by intervention?

6 Q. Actions by the designer.

7 A. Do you mean actions during the course of life's history
8 or independent actions? I am not sure.

9 Q. Actions in the development of any particular system that
10 you are using as an example.

11 A. I don't think one can tell. One can imagine. One can
12 speculate that there are systems say like software
13 systems which are intelligently written at one period of
14 time, but whose features only become active at later
15 periods of time.

16 So as far as Intelligent Design is concerned, one
17 can't tell whether there were multiple, or one, or even
18 zero interventions depending on how you want to define
19 the word intervention by an intelligent agent in life.

20 Q. The manuscript that was submitted to the Journal of
21 Molecular Evolution you said was similar to what we have
22 as Exhibit 8 to your report; correct?

23 A. Yes.

24 Q. Was that manuscript rejected by the Journal of Molecular
25 Evolution?

1 A. Yes.

2 Q. Were you told why?

3 A. I was sent a copy of the referee's report.

4 Q. What was your understanding of why it was rejected?

5 A. I would have to refresh my memory, but the editor of the
6 Journal of Molecular Evolution sent it not out to a
7 reviewer, but to another member of the Editorial Board
8 who very strongly objected to the idea of Intelligent
9 Design, who talked about God and various religious
10 concepts in his report.

11 I had not mentioned any of those in my paper. My
12 paper was a shortened version in which I focused on the
13 blood clotting cascade and my conversations with a man
14 named Russell Doolittle, who was a scientist who works
15 on the blood clotting cascade.

16 The reviewer, it's my impression again -- I have
17 to look back at it -- had very strong philosophical
18 objections to the concepts I was discussing.

19 As a matter of fact, he had objections to what I
20 had written in Darwin's Black Box, which did not appear
21 in the paper that I had submitted to the Journal. And
22 he was mostly arguing against those, rather than in the
23 content of the manuscript that I had submitted.

24 Q. The version of the article that eventually appears in
25 Biology and Philosophy actually does discuss God and the

1 supernatural to some extent; is that correct?

2 A. That's correct.

3 Q. That is different than what you submitted to JME?

4 A. That's correct.

5 Q. Have we now exhausted all of the articles that you have
6 ever submitted to peer reviewed scientific journals on
7 the subject of Intelligent Design?

8 A. That's correct.

9 Q. And also exhausted any requests you received from
10 journals to publish on the subject?

11 A. I think so, yes.

12 Q. I am not sure whether you would differentiate -- and you
13 can tell me if you don't -- but have you published --
14 submitted any peer reviewed articles on the subject of
15 irreducible complexity?

16 A. I am glad you brought that up. I submitted several and
17 they were published in peered review journals in
18 Philosophy of Science journals. The Philosophy of
19 Science journals that I have submitted to I find to be
20 much more tolerant to objections to Darwinian Theory
21 than the scientific journals that I have submitted to.
22 That is why several of my papers appear there.

23 Q. Have any of the articles you have submitted to peer
24 reviewed journals contain any empirical research?

25 A. They contain lots of empirical research. I discussed

1 the blood clotting system and bacterial flagellum and so
2 on.

3 Q. Let me amend that to your own empirical research.

4 A. Let me just think. Could you rephrase the question?

5 There are some articles, I am not sure if they would fit
6 under the category.

7 Q. Have you submitted any articles to peer reviewed
8 scientific journals on the subject of either Intelligent
9 Design or irreducible complexity that report your own
10 original empirical research?

11 A. So it is scientific journals now?

12 Q. Yes.

13 A. I have submitted empirical research to scientific peer
14 reviewed journals which questioned aspects of Darwinian
15 Theory, but not ones which make a positive argument for
16 irreducible complexity.

17 Q. And when you say you have submitted articles to peer
18 reviewed journals questioning aspects of Darwinian
19 Theory, do those contain original research?

20 A. Yes.

21 Q. What articles are you referring to?

22 A. There's an article in the Journal of Molecular Biology.
23 I have forgotten the title. It concerns histone H4 and
24 its amino acid sequence and its ability to tolerate
25 changes.

1 Q. When was that published? I should say was it published?

2 A. Yes, it was. It was published in the Journal of
3 Molecular Biology in 1996.

4 Q. Anything else that fits that description?

5 MR. WHITE: Why don't you clarify for the reporter
6 which one you were talking about?

7 A. It is Agarwal and Behe, 1996, Nonconservative Mutations
8 are Well Tolerated in the Globular Regions of Yeast
9 Histone H4. It is published in the Journal of Molecular
10 Biology, Volume 255, pages 401 to 411.

11 BY MR. ROTHSCHILD:

12 Q. Are there any other articles that would be responsive to
13 the question I asked?

14 A. I think that is all.

15 Q. Are you aware of any publications by any other
16 scientists submitted to peer reviewed scientific
17 journals on the subject of Intelligent Design?

18 A. There are two others -- three. Let me think. There's
19 one on -- can you repeat the question? I am sorry.

20 MR. ROTHSCHILD: Please read that back, please?

21 (The question, "Are you aware of any publications
22 by any other scientists submitted to peer reviewed
23 scientific journals on the subject of Intelligent
24 Design," was read by the reporter.)

25 A. On the subject of Intelligent Design, no.

1 BY MR. ROTHSCHILD:

2 Q. You are aware that there was an article that was
3 submitted by Stephen Meyer to proceedings of the
4 Biological Society of Washington?

5 A. Yes.

6 Q. Reminding of that, would that fit the description I
7 gave?

8 A. Yes. I am sorry.

9 Q. Did that article report any original research?

10 A. I actually haven't read the whole article, but I think
11 so. I think it is an analysis of existing research.

12 Q. Not original research?

13 A. It is an analysis of existing research, yes.

14 Q. And not his original research?

15 A. That's correct.

16 Q. Do you consider Stephen Meyer a scientist?

17 A. Yes. He has a degree in geology I think from -- I have
18 forgotten exactly where he worked. He worked as a
19 geophysicist for an oil company for a number of years
20 before pursuing an advanced degree in philosophy of
21 science.

22 Q. Do you understand his article on the subject of
23 Intelligent Design to involve any principles of geology
24 or geophysics?

25 A. I am not a geologist or geophysicist so I wouldn't know.

1 Q. You have never even read this article?

2 A. I have not read it in full, no. I have only read it in
3 part.

4 Q. You do consider that an example of a peer reviewed
5 article on the subject of Intelligent Design?

6 A. From news reports I have read, yes.

7 Q. That is the only one that you are aware of?

8 A. There are lots of articles related to -- that impinge on
9 the question of Intelligent Design. But as the reaction
10 to Meyer's paper shows, if one uses the phrase
11 Intelligent Design in a journal in the scientific
12 community, all sorts of red flags are raised. People
13 get very excited. And there is a lot to deal with.

14 So no, I do not know of anybody else who has taken
15 on the problems of inserting the phrase Intelligent
16 Design in their papers.

17 Q. So it is your view that the reason that Intelligent
18 Design can't find its way into peer reviewed scientific
19 journals is the scientific prejudice against that?

20 A. That is one large reason, yes.

21 Q. Anything else?

22 A. Another reason is that most scientists are educated not
23 to think of Intelligent Design or to think strictly in
24 Darwinian terms. So that even when they speak of
25 systems and make analogies between the systems they have

1 discovered in life and intelligently designed systems
2 that we see in our human world, they don't make the case
3 for Intelligent Design.

4 Q. In Darwin's Black Box, you make a number of statements
5 about scientific publications. And you are welcome to
6 turn in the book, if you like.

7 On page 185, you say scientific authority rests on
8 published work, not on the musings of individuals.

9 Do you recall making that statement?

10 A. Where is that, page 185?

11 Q. Yes. It is in the second full paragraph about a little
12 less than two-thirds of the way down.

13 A. Yes.

14 Q. Is that a statement you stand by?

15 A. Yes.

16 Q. And then you say on the next page in effect, the theory
17 -- this is the very last sentence in the chapter -- in
18 effect, the Theory of Darwinian Molecular Evolution has
19 not published, and so it should perish?

20 A. I did write that. It is an excellent sentence.

21 Q. And is a sentence you still stand behind?

22 A. Yes.

23 Q. If you turn back to page five.

24 A. Page five?

25 Q. Yes, in your book. You say if you search the -- this is

1 in the first full paragraph right around halfway down.

2 If you search the scientific literature on
3 Evolution, and if you focus our search on the question
4 of how molecular machines, the basis of life develop,
5 you find an eerie and complete silence. Another pretty
6 powerful sentence.

7 A. Thank you.

8 Q. That is one you also stand by?

9 A. Well, I think that's more of a -- that depends on
10 interpretation. By that I meant serious efforts at
11 determining how complex molecular machinery might have
12 developed by Darwinian processes.

13 I did not mean speculations, or even extended
14 speculations, or sequence comparisons without
15 considering the question of how natural selection would
16 work to construct the system and so on.

17 As I say elsewhere in the book, there have been a
18 number of papers published under general topic of
19 molecular evolution, but if one looks at them from the
20 point of view of trying to discover an actual pathway
21 that Darwinian mechanism would have used to construct
22 these systems, one comes up empty.

23 So maybe the words eerie and so on were -- I guess
24 one is a writer, and I try to entertain the audience as
25 well. It is my view that it continues to be the case

1 that there are no serious and detailed studies showing
2 how these things could have come about.

3 Q. There are a lot of articles about molecular evolution;
4 correct?

5 A. Yes. As I wrote in the book.

6 Q. And so your quarrel with that body of work is that it is
7 not sufficiently detailed or explanatory on the subject
8 of the Darwinian mechanism of natural selection?

9 A. That is the only point that my book addresses. So yes,
10 that is exactly the point that I focus on. I consider
11 the Darwinian mechanism to be the crux of the claim that
12 unintelligent processes can account for what people --
13 many people think, even many people who are not
14 Intelligent Design proponents think to appear to be
15 designed.

16 Q. Let's take an example like the bacterial flagellum.
17 Explain to me what would be required from the literature
18 to reverse your criticism.

19 MR. WHITE: Objection. What literature are you
20 talking about?

21 BY MR. ROTHSCHILD:

22 Q. The scientific literature that he said is inadequate.
23 Set the bar for me.

24 A. Well, there are a number of things. I'm not sure I can
25 say without actually looking at the papers themselves.

1 One good start would be an experimental demonstration
2 that say a new relatively simple complex system with
3 multiple interacting parts, parts which bound to each
4 other specifically, could arise by random mutation and
5 natural selection.

6 For example, in my paper with David Snoke, I talk
7 about new protein protein binding sites. And we express
8 our skepticism that such processes could develop in a
9 Darwinian fashion by what is commonly considered to be
10 a likely route of gene duplication in a reasonable
11 amount of time with a reasonable amount of organisms.

12 If somebody could demonstrate a new molecular
13 machine that contained four proteins that didn't
14 interact already would come together and bind to give a
15 new activity where there was none before, then I would
16 start to sit up and take notice.

17 The bacterial flagellum have several dozen
18 different proteins involved in its construction and its
19 structure. So if somebody could come up with something
20 more simple than that and experimentally show that was
21 feasible, then I would begin to wonder if something of
22 the structure of flagellum could also develop by such
23 processes.

24 Q. I can't promise I will get this question right, but I
25 will give it a try.

1 Is it fair to say that you require a sort of
2 laboratory demonstration of the development of these
3 kind of systems as opposed to a more historical
4 description that relies on -- I think it would be
5 correct to say -- phylogenetic analysis to explain a
6 potential pathway?

7 A. That is exactly correct. I think phylogenetic analyses
8 do not at all speak to the question of whether Darwin's
9 mechanism of random mutation and natural selection could
10 have built up complex structures.

11 They may give interesting insights into what
12 structures -- what proteins might have structures
13 similar to other structures, but they do not address the
14 question of how such complex systems could have been
15 produced by an unintelligent mechanism.

16 Q. They instead infer that mechanism as opposed to
17 demonstrating it?

18 A. They assume it. They don't infer it.

19 Q. Can we also agree that if Intelligent Design does not
20 publish, it perishes?

21 A. That's correct. But I might add that an idea of
22 Intelligent Design is relatively young. It is currently
23 viewed in a very skeptical and hostile light by many
24 people in the scientific community.

25 So I think that over time if it publishes, if over

1 time if it has been say a hundred years or so and it has
2 not come up with significant -- well, let me rethink
3 that. I am getting ahead of myself.

4 Let me say this: It's my view that Intelligent
5 Design has pretty much already been demonstrated in the
6 structures that we have discovered in life such as the
7 ones I discussed in Darwin's Black Box.

8 The situation as I view it is that many people in
9 the scientific community think that the design which
10 they see, the design which many people admit the
11 appearance of is an illusion. They think they have an
12 alternative mechanism.

13 The alternative mechanism they propose, as I have
14 discussed in my book, has precious little experimental
15 results to back it up. The way I view the situation
16 then is that science has lots and lots and lots of
17 evidence for Intelligent Design already in the
18 structures of the biochemical systems, but only
19 speculations and assumptions that some other
20 unintelligent mechanism can account for it.

21 So I view Intelligent Design as essentially the
22 obvious answer for many questions in biology,
23 biochemistry which --

24 Q. Which, biology or biochemistry?

25 A. Biochemistry. Which is being ignored because people are

1 looking in the wrong place. So it is my view that
2 Intelligent Design does not have to come up with any
3 particular paper. I do not have to come up with any
4 particular result in my own laboratory to demonstrate
5 design.

6 The design is demonstrated in the many, many
7 molecular systems have been elucidated by the community
8 of scientists at large.

9 Q. Is that a long way to answer the question no, ID does
10 not have to publish; even if ID does not publish, it
11 does not perish?

12 A. No, that is not a long way to say that. It is just to
13 say that ID has published kind of pseudonymously
14 (spelled phonetically), however one would pronounce that
15 word.

16 When you look at journals such as Cell that I
17 included in my expert report, when you see dozens of
18 papers that use the word molecular machines which liken
19 machines to ones designed by humans which point out many
20 analogies between such systems and ones we know to be
21 designed, I consider that to be papers on Intelligent
22 Design.

23 Q. You said there is not -- there's lots of evidence for
24 Intelligent Design. I think what you meant was exactly
25 what you just said, the many papers in Cell and the

1 like?

2 A. Yes.

3 Q. And there is no evidence of natural selection operating
4 at the biochemical level?

5 A. I did not say that.

6 Q. I apologize then. Is there evidence of natural
7 selection?

8 A. There certainly is.

9 Q. What evidence is that?

10 A. Well, one good piece of evidence of natural selection at
11 the molecular level is, for example, the sickle cell
12 mutation in hemoglobin. Sickle cell hemoglobin differs
13 from normal hemoglobin by one amino acid change in the
14 beta chain of hemoglobin.

15 That allows hemoglobin to self-associate in the
16 red blood cell when it is invaded by a malarial parasite
17 and be destroyed in the spleen. And therefore, it seems
18 to give a benefit to people in malarial infested areas
19 even though the homozygote for sickle hemoglobin -- that
20 is a person who has two genes for sickle cell disease --
21 for a sickle cell hemoglobin is severely ill and
22 generally dies before reproducing.

23 If you look at maps of the prevalence of the
24 sickle cell gene and the prevalence of malaria, their
25 correspondence is pretty striking. I, myself, consider

1 that a good example of natural selection at the
2 molecular level.

3 Q. Is that an example of a new protein binding site?

4 A. That is correct. It is.

5 Q. And in an example like that, does that rule out
6 Intelligent Design of that structure when you can
7 formulate a case for natural selection?

8 A. It rules out the requirement that an intelligent agent
9 had to have been involved in producing that. You can
10 never rule out Intelligent Design of any action.

11 Somebody might put a pile of garbage somewhere
12 that you think was blown there by the wind, but they put
13 it there because they like it there.

14 As I write in Darwin's Black Box, the scientific
15 problem is not ruling out design. The scientific
16 problem is not to say what you think has not been
17 designed, but what you think has required design.

18 Q. But you can never rule out Intelligent Design?

19 A. That's correct.

20 Q. The proposition regarding the hemoglobin that arose
21 through natural selection is possible, but it could also
22 have just been the product of an intelligent designer?

23 A. As I said before, you can never rule out Intelligent
24 Design. But my view of the sickle hemoglobin situation
25 is that there is no reason to assume, unless you are a

1 conspiracy theorist or something, there is no reason to
2 assume that intelligence was involved.

3 Q. And there is a fair amount of evidence of natural
4 selection at the biological level; is that true?

5 A. Yes. Natural selection is clearly something that
6 exists. It clearly explains some things.

7 Q. At the biological level?

8 A. Yes.

9 Q. We will get into that in a little more detail later.
10 But given the fact that natural selection has been
11 demonstrated at the biological level, does that mean the
12 explanation of Intelligent Design has no place in the
13 discussion of biological development?

14 A. Biological development is an enormously large topic, and
15 some aspects of it I think would require -- well, would
16 impinge on assertions of Intelligent Design.

17 Development -- as everything in biology,
18 development is controlled at the molecular level by
19 proteins and nucleic acids and so on. And one has to be
20 very careful and specific about which systems one is
21 talking about before you can make any conclusions about
22 that.

23 Q. We will get back to that in a little bit.

24 MR. WHITE: Eric, we have been going about an hour
25 and a half.

1 MR. ROTHSCHILD: Let me just ask one more set of
2 questions, and then this would be a great time to break
3 for lunch, which is hopefully here.

4 BY MR. ROTHSCHILD:

5 Q. I appreciate you have shown great stamina through the
6 process. Have you conducted any experiments to
7 demonstrate Intelligent Design?

8 A. Intelligent Design is not demonstrated through an
9 experiment. It's demonstrated by elucidating the
10 structure of a system.

11 For example, going back to Mt. Rushmore, one would
12 not need to do an experiment to conclude that Mt.
13 Rushmore was designed. The evidence for design is in
14 the parts of the system and how they interact to make a
15 functioning whole.

16 So the argument for Intelligent Design rests on
17 the structures that have been elucidated in
18 biochemistry.

19 Q. When you use the word elucidated, do you mean described?

20 A. Yes, something like that.

21 Q. I take it the answer is no, I have not conducted any
22 experiments to demonstrate Intelligent Design?

23 A. Yes.

24 Q. And I take it you haven't devised any experiments to
25 demonstrate Intelligent Design?

1 A. I have in my paper with David Snoke gone a step of the
2 way towards trying to delimit the places where we might
3 look for Intelligent Design to ask what sorts of changes
4 would be too large to expect an unintelligent process to
5 account for.

6 At that point, we might start to consider where
7 Intelligent Design resides in biochemistry. So I would
8 say that yes, in fact, I have done work on trying to
9 elucidate Intelligent Design.

10 Q. And you would agree that particular article, it is a
11 very small step towards that conclusion?

12 A. I would not want to characterize the size of the step.

13 Q. Last question. Are you aware of any experiments by
14 anybody else that demonstrate Intelligent Design or
15 purport to?

16 A. I am aware of lots of experiments that in my opinion do
17 demonstrate Intelligent Design. And a number of them
18 are cited in my book Darwin's Black Box. They are the
19 experiments which describe the structures of the
20 molecular machinery that has been found in the cell.

21 Q. Other than that, no?

22 A. That's quite a bit.

23 Q. Those studies don't purport to demonstrate Intelligent
24 Design?

25 A. The authors themselves do not claim that, yes.

1 (A recess was taken.)

2 AFTERNOON SESSION

3 BY MR. ROTHSCHILD:

4 Q. Good afternoon, Mike.

5 A. Good afternoon.

6 Q. I just want to go back to the discussion you had about
7 what kind of experimental evidence would cause you to
8 rethink your conclusions about Intelligent Design.

9 And if I understood you correctly, you said if it
10 could be demonstrated that a new molecular machine with
11 four newly binding proteins could be demonstrated in the
12 laboratory, that would cause you to start rethinking?

13 A. Yes.

14 Q. Why four?

15 A. Well --

16 Q. I don't want you to go to eight.

17 A. Because that is a sufficient number to get beyond the
18 reach that I see of random -- just random, small
19 mistakes causing a couple of proteins to stick together.

20 For example, you mentioned sickle hemoglobin. On
21 occasion, you can get one protein to stick to another,
22 especially if it is in high concentration, kind of
23 nonspecifically. To get four to stick together would in
24 my mind entail enough specificity to make sure we were
25 talking about a complex functional system.

1 Q. And you also I think used the term that they would have
2 to be interacting, they just couldn't be four proteins
3 that got brought together; is that right?

4 A. I am not sure what you mean by got brought together.

5 Q. Did you say that they would have to be interacting to
6 meet this standard?

7 A. Yeah, but that I meant they had to specifically bind to
8 each other to the exclusion of other proteins.

9 Q. Is that concept of interacting part of your definition
10 of irreducible complexity?

11 A. Yes, it is.

12 Q. It's actually captured in the written definition?

13 A. Can I look at the written definition again to refresh my
14 memory?

15 Q. Absolutely.

16 A. What page is that on again?

17 Q. 39.

18 A. Thank you.

19 MR. WHITE: Eric, are you speaking about the
20 tweaked definition or the untweaked?

21 MR. ROTHSCHILD: Whatever he wants to use.

22 A. Yes, it is in there interacting. By irreducible
23 complexity, I mean a single system composed of several
24 well matched interacting parts that contribute to the
25 basic function.

1 BY MR. ROTHSCHILD:

2 Q. And the interacting there is referring to proteins?

3 A. Well, it doesn't actually refer to proteins itself. One
4 can talk about mousetraps with this. But in the context
5 of a molecular machine, yes, proteins.

6 Q. I want to go over some of the terms that are in play in
7 this dispute and are in your expert report. If you
8 could turn to page 15 of your expert report in the black
9 binder?

10 A. Okay.

11 Q. Section two is titled Intelligent Design is not
12 Creationism. When you make that assertion, can you just
13 tell me what definition of Creationism you are using?

14 A. As it says on page 15 in the second complete paragraph,
15 in popular usage, a Creationist is a person who thinks
16 the world is relatively young, on the order of 10,000
17 years. And that the major categories of organisms were
18 created ex nihilo by a supernatural being God. That is
19 what I mean by Creationism.

20 Q. And does Creationism require that -- entail --
21 necessarily entail both of those concepts, young earth
22 and major categories of organisms created ex nihilo?

23 A. In popular usage, I think that is what is generally
24 understood by the term. There are a number of people
25 who define it in their other ways. But I was using what

1 I thought was the popular definition of the term.

2 Q. Using that definition, Intelligent Design is not
3 Creationism?

4 A. That is correct.

5 Q. When you refer to the belief that major categories of
6 organisms were created ex nihilo by a supernatural
7 being, can you explain what you mean by that?

8 A. By that, I mean that there existed no organism and then
9 an organism was present.

10 Q. So another way of phrasing that, that an organism began
11 abruptly, and they are sort of basic type, fish with
12 fins, bird with wings?

13 A. No, you can't say quite that. Ex nihilo creation is not
14 just an abrupt appearance in the fossil record. Ex
15 nihilo is really kind of a theological term which means
16 that matter was created in a fundamental supernatural
17 sense by God.

18 Just seeing in the fossil record that something
19 was not there and something was, in my view does not
20 allow one to say that it was ex nihilo Creationism.

21 Q. Maybe I phrased that poorly with the word appearance.
22 Is it basically the same as saying that forms of life
23 began abruptly in their basic types, bird with wings and
24 feathers and fish with scales and fins?

25 A. I am little confused. Do some people think that, or is

1 that what I was thinking?

2 Q. Is that creation ex nihilo?

3 A. I think one has to be careful that one can have creation
4 ex nihilo which could mean that an organism was there
5 one second and next second -- was not there one second
6 and the next second was there with its characteristics.
7 But one cannot say that that is the only way that some
8 organism might be present -- or you might find evidence
9 for an organism which appeared suddenly.

10 There might be other explanations for sudden
11 appearance, especially in the fossil record, other than
12 ex nihilo creation.

13 Q. I want to keep the fossil record out right now. I am
14 trying to make sure I understand that if someone
15 believed that life began abruptly, not the evidence, but
16 life began abruptly --

17 A. Life itself.

18 Q. -- in their major types, humans with their
19 characteristics, or fish with fins or birds with wings,
20 is that creation ex nihilo?

21 A. Not necessarily. Again, I am afraid there's lots and
22 lots of distinctions in this area.

23 One could imagine a space alien coming down and
24 assembling the parts of a cell, the parts of a complex
25 organism. Again, we ourselves manipulate life on earth.

1 If there is in fact an advanced natural civilization
2 somewhere, it could be that they made organisms -- even
3 complete organisms by manipulating preexistent matter.
4 So that would not be ex nihilo creation.

5 Q. What I described with life beginning abruptly, birds
6 with wings, etcetera could be creation ex nihilo, could
7 be the space aliens, could be the time travelers; is
8 that?

9 A. That's correct. That's correct.

10 Q. You also write that some people use the word Creationism
11 more broadly to indicate any belief that a supernatural
12 being has affected nature in any way.

13 Using that definition, is Intelligent Design
14 Creationism?

15 A. Using that definition?

16 Q. Yes.

17 A. No, it is not. Because, again, Intelligent Design does
18 not require that a designer be a supernatural entity.

19 Q. Although it certainly contemplates that was a likely
20 possibility?

21 A. Well, Intelligent Design is not a real person. There
22 are individual people who think Intelligent Design is a
23 reasonable explanation who also think that -- will weigh
24 various possibilities and come to the conclusion that
25 perhaps such an explanation is likely.

- 1 Q. A supernatural explanation?
- 2 A. That's correct.
- 3 Q. And that would include yourself?
- 4 A. Yes. As I said, I do think that the designer was indeed
- 5 God.
- 6 Q. Are you familiar with the term creation science?
- 7 A. Yes.
- 8 Q. What is your understanding of that term?
- 9 A. It's -- I can't give a dictionary definition of it.
- 10 From what I understand, it is the effort to show that
- 11 aspects of the natural world are consistent with the
- 12 Biblical account of creation, specifically in the
- 13 Christian Bible, in Genesis.
- 14 Q. Turn to page 11 of your report.
- 15 A. (Witness complies.)
- 16 Q. On page 11, you take the position that Intelligent
- 17 Design is a scientific theory; correct?
- 18 A. That's correct.
- 19 Q. And am I correct that the definition of scientific
- 20 theory that you are using is stated under section 1.2.2,
- 21 the analysis of a set of facts and their relation to one
- 22 another?
- 23 A. That is a theory. And then I say that a scientific
- 24 theory is a theory which is constructed solely on the
- 25 foundation of empirical facts about the natural world

1 and logical inferences.

2 Q. So when you say it is a scientific theory, it is that
3 definition, a theory constructed solely on the
4 foundation of empirical facts about the natural world
5 and logical inferences?

6 A. Yes.

7 Q. And where do you derive that definition from, or is it
8 created by you ex nihilo?

9 A. As I reference in the report number 13, I have a
10 reference to a dictionary definition for theory. And in
11 part, I reference my own argument in the Journal of
12 Biology and Philosophy as to what I consider to be a
13 scientific theory.

14 Q. But I want to be very precise here because if I
15 understood your testimony a few moments ago, you are
16 distinguishing between theory and scientific theory?

17 A. That's correct.

18 Q. And the definition that you -- that footnote 13 pertains
19 to, which I believe is a dictionary definition, is for
20 theory generally, but not for scientific theory?

21 A. That's right.

22 Q. So your definition of scientific theory is the one that
23 you state in the Journal of Biology and Philosophy?

24 A. That's correct.

25 Q. What I want to know is where did you get that definition

1 from?

2 A. It is one that I have derived from my experience in
3 science and my experience with reasoning about the
4 natural world.

5 Q. So it is not a definition that you found in a
6 dictionary?

7 A. That's correct. As many philosophers of science will
8 tell you, it is extremely difficult to define science.
9 And so I offered this as a definition based on my own
10 experience.

11 Q. Okay. Scientific organizations have made an effort to
12 define scientific theory; haven't they?

13 A. Well, I don't think so. Well, if they have, I haven't
14 seen one which was very sophisticated.

15 Q. At page eight of your report, you state that the word
16 theory is sometimes used in science to indicate in the
17 words of the National Academy of Sciences -- quote -- a
18 well substantiated explanation of some aspect of the
19 natural world that can incorporate facts, laws,
20 inferences and tested hypotheses.

21 You are familiar with that one?

22 A. Yes.

23 Q. Is it your testimony that that is not a particularly
24 sophisticated definition?

25 A. That's correct.

1 Q. You prefer your own to the definition that is suggested
2 by the National Academy of Sciences?

3 A. Well, as I explain in the section, section 1.1, how the
4 word theory is used in the scientific community,
5 although the National Academy in their argument about
6 Evolution teaching in the schools defines a theory in
7 the way that you just mentioned, in actual scientific
8 practice, the word theory has a number of different
9 usages.

10 And so my use of the word theory tries to be broad
11 in scope to encompass not only the specific instances
12 that the National Academy has in mind, but others as
13 well.

14 Q. So is it fair to say that more scientific concepts would
15 fall under the umbrella of the word theory using your
16 definition than the definition we just read from the
17 National Academy of Sciences?

18 A. Yes.

19 Q. Substantially more?

20 A. Yes.

21 Q. Using your definition of theory, you wouldn't argue that
22 Evolution is a theory; right?

23 A. That's correct.

24 Q. And just to be more precise, scientific theory?

25 A. That's correct, too.

1 Q. Would you agree that it is the generally accepted theory
2 in the scientific community?

3 A. Rephrase. Back me up a little bit.

4 Q. Would you agree that Evolution is a generally accepted
5 theory in the scientific community?

6 A. Here I would have to ask what you mean by Evolution. Do
7 you mean to include particularly Darwin's mechanism of
8 random mutation and natural selection?

9 Q. That would be part of it.

10 A. What do you mean by generally accepted?

11 Q. Is it well accepted in the scientific community.

12 A. What do you mean by well accepted? Does over 50 percent
13 of scientists believe it or over 90 percent?

14 Q. What do you think the answer to that question is?

15 A. To tell you the truth, I am not quite sure. I have met
16 many, many scientists who are skeptical of Darwinian
17 Evolution. I have seen no rigorous surveys of the
18 scientific community asking in detail about whether
19 scientists think that random mutation and natural
20 selection, in particular, can explain the complex
21 molecular machinery of the cell.

22 In the absence of that information, I am not sure
23 how I would answer that question.

24 Q. The Darwinian Theory of Evolution is not just the Theory
25 of Evolution of the cell; correct?

1 A. That's correct.

2 Q. So looking at the Theory of Evolution generally, would
3 you agree that it is well accepted in the scientific
4 community?

5 A. One more time. By evolution, do you mean Darwinian
6 Evolution?

7 Q. Yes.

8 A. Again, I am going to have to say I am not quite sure how
9 to interpret your phrase well accepted. It certainly is
10 -- there are a number of papers which assume Darwinian
11 Evolution to be true which are published in the
12 literature.

13 But if you mean by well accepted do most
14 scientists think that Darwinian Evolution is a complete
15 explanation even above the level of a cell, I would have
16 to say I don't know. I have met a number of people who
17 are skeptical of that. So I would just say I don't
18 know.

19 Q. What about Intelligent Design, can you characterize how
20 well that is accepted in the scientific community?

21 A. Well, in the same vein, Intelligent Design does not have
22 many specific papers published in scientific journals.
23 And as I have indicated previously, there's an animus
24 against the idea of Intelligent Design in a number of
25 quarters in the scientific community.

1 But I have also spoken with a number of scientists
2 who agree that something like Intelligent Design is a
3 reasonable explanation or potential explanation for much
4 of life.

5 So again in the absence of some sort of
6 authoritative survey of attitudes on this, I would have
7 to say I couldn't tell you what percentage of scientists
8 think Intelligent Design is likely to be true.

9 Q. You certainly couldn't make a claim that it is well
10 accepted?

11 A. Again, I am going to have to say I don't know. It is
12 going to have to depend on what you mean by well
13 accepted. There are -- also, it has to depend on what
14 you mean by Intelligent Design.

15 And it depends on what -- who you are including in
16 the body of scientists. Are you including just Ph.D.'s
17 at research institutions, or people with bachelor's
18 degrees in the relevant sciences, or medical doctors, or
19 engineers and so on?

20 So if the definition is expansive enough, I think
21 one might find that if you surveyed people, there would
22 be a significant fraction of scientifically trained
23 individuals who thought something like Intelligent
24 Design was in fact true.

25 (Behe Exhibit 5 was marked.)

1 BY MR. ROTHSCHILD:

2 Q. Mike, I am showing you your rebuttal analysis of Kenneth
3 Miller's statement which we received I think on Tuesday
4 of this week.

5 If you could turn to page ten, the bottom of the
6 first full paragraph, you say: Thus even if the
7 majority of the scientific community disapproves of
8 Intelligent Design, there may be sound reasons for
9 discussing the topic in high school science classrooms.

10 When you used the phrase scientific community in
11 that passage, what did you mean?

12 A. That was a conditional statement. That means that when
13 I meant scientific community, I meant essentially all
14 scientists who were -- essentially all scientists who
15 were work as scientists if they did disapprove. I
16 wasn't assuming that they did disapprove.

17 Q. Do you have a -- using your definition of scientific
18 community, do you have any assessment of whether
19 Intelligent Design is accepted by a majority of
20 scientists?

21 A. Well, again, I do not have evidence I could show to you,
22 but it is my feeling I would take an expansive
23 definition of the scientific community. I would even
24 include people like biology teachers and people who have
25 studied science and think about it. I might even

1 include philosophers of science in that.

2 In that broader category, it is my feeling anyway
3 that something like Intelligent Design has significant
4 support.

5 Q. What about in the field of evolutionary biologists, do
6 you believe that Intelligent Design has --

7 A. No, I don't.

8 Q. It is not well accepted?

9 A. If by evolutionary biologists you mean people at
10 universities, who teach at universities in the United
11 States or in the world and who did their doctoral work
12 on evolutionary biology, then no, I don't think it is
13 well accepted there.

14 Q. What about the discipline of biochemistry, using that
15 same kind of definition?

16 A. I think the -- it is my feeling that the amount of
17 support would be significantly higher than in the
18 discipline of evolutionary biology, but I couldn't give
19 you numbers.

20 Q. Would you characterize it as well accepted in the
21 discipline of biochemistry?

22 A. It depends on what you mean by well accepted. If you
23 include working biochemists who teach or do research in
24 all colleges and universities in the United States or
25 elsewhere, I would say it is my feeling that there is a

1 significant fraction, enough so that I would say -- I
2 would say there is a significant fraction who think that
3 Intelligent Design might possibly be true.

4 Q. You are not suggesting a majority?

5 A. It depends again on what you mean. Because it's also
6 been my experience in discussing Intelligent Design with
7 many people, that many people have a distorted view of
8 what Intelligent Design is as I present it. They easily
9 confuse it with Creationism and other things that I do
10 not argue for.

11 I found in some conversations -- which is, of
12 course, just anecdotal. I found in some conversations
13 when people find the more limited and directed nature of
14 my argument, they think it is more reasonable than
15 accounts of Intelligent Design that they read in
16 editorials and other places.

17 Q. Using your definition of theory, is Creationism -- using
18 your definition of scientific theory, is Creationism a
19 scientific theory?

20 A. No.

21 Q. What about creation science?

22 A. No.

23 Q. Is astrology a theory under that definition?

24 A. Is astrology? It could be, yes.

25 Q. Are you familiar with the term hypothesis as it is used

1 in science?

2 A. I am not sure an hypothesis has any singular meaning in
3 science. I have certainly heard the word hypothesis and
4 have a vague, general understanding of what it means,
5 yes.

6 Q. What is that vague, general understanding?

7 A. Vaguely, it's that -- it is a proposed explanation for
8 how something might work. Often times, it is used as a
9 synonym for a theory.

10 Q. It is pretty close to a synonym for the one way you
11 define theory in your report on page eleven; isn't it?

12 A. Yes. I would use it as a synonym for the fifth part of
13 Darwin's Theory where he talks about natural selection.
14 I would say that was a hypothesis as well.

15 Q. Would you agree that the way you describe hypothesis is
16 a synonym for the way you describe scientific theory?

17 A. Yes.

18 Q. Going back to the National Academy of Sciences
19 definition, a well substantiated explanation of some
20 aspect of the natural world that can incorporate facts,
21 laws, inferences and tested hypothesis. Using that
22 definition, does Intelligent Design qualify as a
23 scientific theory?

24 A. Okay. Can you direct me to that page, again?

25 Q. Go back to page eight of your report.

1 MR. WHITE: Which exhibit number is that,
2 Exhibit 1?

3 MR. ROTHSCHILD: Yes.

4 MR. WHITE: The other one.

5 A. I am sorry.

6 MR. WHITE: What page was that, Eric?

7 BY MR. ROTHSCHILD:

8 Q. Page eight at the top where Mike reports the definition
9 used by the National Academy of Sciences.

10 A. I am going to say that I would argue that in fact it is.

11 Q. Intelligent Design does meet that?

12 A. It's well substantiated yes.

13 Q. Let's be clear here. I am asking you looking at that
14 definition of a scientific theory in its entirety, is it
15 your position that Intelligent Design is a scientific
16 theory?

17 MR. WHITE: Objection. This is a definition of
18 theory; right?

19 MR. ROTHSCHILD: This says --

20 MR. WHITE: On page eight.

21 MR. ROTHSCHILD: It says the word theory is
22 sometimes used in science to indicate.

23 A. I think one can argue these a variety of ways. For
24 purposes of an answer to the -- a relatively brief
25 answer to the question, I will say that I don't think it

1 falls under this.

2 BY MR. ROTHSCHILD:

3 Q. What about this definition -- what is it in this
4 definition that ID can't satisfy to be called a
5 scientific theory under these terms?

6 A. Well, implicit in this definition, it seems to me that
7 there would be an agreed upon way to decide that
8 something was well substantiated.

9 And although I do think that Intelligent Design is
10 well substantiated, I think there is not -- I can't
11 point to external -- an external community that would
12 agree that it was well substantiated.

13 Q. Is there anything else about this definition that ID
14 doesn't satisfy?

15 A. I don't think so.

16 Q. It does have tested hypotheses in your view?

17 A. I think it does.

18 Q. Can you describe a tested hypothesis that is part of
19 Intelligent Design?

20 A. Yes. One is that if you knock out components of an
21 irreducibly complex system, then the system would fail.
22 The system would cease to work.

23 Russell Doolittle, who is a Professor of
24 Biochemistry at the University of the California San
25 Diego, a member of the National Academy of Sciences, had

1 argued in an essay in a magazine called Boston Review
2 that there was experimental evidence showing that one
3 could knock out -- and by that term knock out, I mean
4 destroy and cease to function several components of the
5 blood clotting cascade, and nonetheless the cascade
6 would continue to work. And he saw that specifically as
7 an argument against my idea of irreducible complexity
8 and by inference Intelligent Design.

9 But when you knock out those components, in fact
10 the system did in fact fail to work. So the hypothesis
11 of irreducible complexity is if you remove one of those
12 parts, it would cease to work. And the experiment
13 showed that was in fact correct.

14 Q. Doesn't the example you give and the definition again
15 touch on the defect we discussed earlier, which is that
16 sort of working backwards?

17 Natural selection is a process that works from the
18 bottom up moving forward, and here you are talking about
19 removing a part.

20 A. It is not working backwards because one is simply
21 looking at the preexisting -- the existing system,
22 taking a part out and asking yourself can it fulfill its
23 role or a closely similar role.

24 And the answer in this case, in this
25 experimentally examined case was no. So I think that

1 particular point does not apply here.

2 Q. Using this National Academy of Sciences' definition of
3 scientific theory, does germ theory qualify?

4 A. I believe it does, yes.

5 Q. Anatomic theory?

6 A. I will bet you that does, too.

7 Q. Theory of Evolution?

8 A. Unfortunately, the Theory of Evolution is a compound
9 theory with many different claims in it, several of
10 which do fit this definition, but several of which do
11 not.

12 So one has to be very careful that one doesn't
13 accept a less well substantiated aspect of Evolutionary
14 Theory on the strength of some utterly unrelated aspect
15 of Evolutionary Theory.

16 As I said in my expert report, I think that the
17 claim of Evolutionary Theory that there has been change
18 over time on earth and other such claims are in fact
19 well substantiated. But what I view to be the critical
20 claim relevant to Intelligent Design of Darwin's
21 particular Theory of Evolution is that random mutation
22 -- the unintelligent process of random mutation and
23 natural selection can explain the complexity of life,
24 especially the molecular complexity of life, I think
25 that does not fit that definition.

1 Q. Does the assertion that random mutation and natural
2 selection occur at the organism level, does that part of
3 the theory pass the theory test set up by the National
4 Academy of Science?

5 A. Again, we have to be careful. It is certainly true that
6 random mutation occurs, and that it can have effects at
7 the organismal level. But the sorts of things that we
8 see it doing in our present world are very small changes
9 in preexisting system.

10 It is a huge extrapolation to then say the same
11 process, even at the organismal level, where I am not an
12 expert, it is an extrapolation to say that same process
13 is responsible for building more complex systems from
14 the ground up.

15 Q. Are you familiar with Paul Nelson?

16 A. Yes, I know Paul.

17 Q. And tell me what you -- is Paul Nelson involved in the
18 Intelligent Design movement?

19 A. Well, he is a fellow of the Discovery Institute I am
20 pretty sure. He is very interested in Intelligent
21 Design. And so I guess that qualifies him, yes.

22 Q. You are also a fellow at the Discovery Institute;
23 correct?

24 A. Yes.

25 Q. You have been such for a number of years; correct?

- 1 A. I am sorry?
- 2 Q. You have been that for a number of years; correct?
- 3 A. Yes. I think since the mid 1990's sometime.
- 4 Q. What is entailed in being a fellow at the Discovery
5 Institute?
- 6 A. Mostly, you agree to have your name put on their
7 letterhead. And every now and again -- essentially, it
8 is just -- from my point of view, it is a mechanism to
9 keep together or group together and allow people to meet
10 who are interested in the question of Evolution and
11 Intelligent Design.
- 12 Q. Do they sponsor any of your research or your work?
- 13 A. In the past, there were three years that they gave me a
14 grant of roughly \$10,000.00 per year. They didn't give
15 it to me. I should correct myself. They gave it to
16 Lehigh University to release me from some teaching
17 obligations so that I might spend more time thinking and
18 writing about Intelligent Design.
- 19 Q. Do you have any policy making function as it relates to
20 the Discovery Institute?
- 21 A. No.
- 22 Q. I want to show you an article published in the
23 July/August 2004 edition of Touchstone, a Journal of
24 Mere Christianity. The cover of the magazine says
25 Darwin's Last Stand, a Special Issue on Darwinism,

1 Naturalism and Intelligent Design.

2 And the particular article I am going to give you
3 is sort of a composite interview with a number of
4 individuals.

5 MR. ROTHSCHILD: Why don't we go ahead and mark
6 that?

7 (Behe Exhibit 6 was marked.)

8 BY MR. ROTHSCHILD:

9 Q. Have you ever seen this article before?

10 A. No, I haven't.

11 Q. If you could turn to page 64 of the article.

12 A. (Witness complies.) Okay.

13 Q. If you look at the bottom, there is a quote attributed
14 to -- well, first of all, there is a question where is
15 the ID movement going in the next ten years, what new
16 issues will it be exploring and what new challenges will
17 it be offering Darwinism?

18 And the answer attributed to Nelson is: Easily
19 the biggest challenge facing the ID community is develop
20 a full fledged theory of biological design. We don't
21 have such a theory right now, and that's a real problem.
22 Without a theory, it is very hard to know where to
23 direct your research focus. Right now, we have got a
24 bag of powerful intuitions and a handful of notions such
25 as "irreducible complexity" and "specified
complexity",

1 but as yet no general theory of biological design.

2 Do agree with that statement?

3 A. The whole thing, no, I don't.

4 Q. What don't you agree with?

5 A. I don't think that the biggest challenge facing the ID
6 community is a develop a full fledged theory of
7 biological design. I don't think such a thing is
8 necessary.

9 I think if the look at the history of science, it
10 was not required of other ideas in the past. And I
11 don't see any reason why Intelligent Design now has to
12 produce some full fledged accounting of itself before it
13 can proceed.

14 Q. But you do agree it doesn't have that yet?

15 A. It depends on what you mean by having a full fledged
16 theory of design. If I looked at Mt. Rushmore, the
17 conclusion of design would be full fledged right away.
18 And that is what I focus on.

19 There are many, many questions that grow out of
20 that which would be very interesting to develop and
21 which could be developed in the future. But I do not
22 think answers to any of them are really necessary for
23 the conclusion of design.

24 Q. I want to get away from Mt. Rushmore. I know it is a
25 clever analogy.

1 A. I like it.

2 Q. I want to talk about biological design and ask you
3 whether Intelligent Design has a full fledged theory of
4 biological design?

5 A. I don't know what you mean by full fledged.

6 Q. I didn't give this answer. I know you didn't either.
7 But --

8 A. I disagree with Paul Nelson. I think that the
9 conclusion of design in biology -- leaving Mt. Rushmore
10 out of it -- can be deduced. We can come to that
11 conclusion based on what we already know about molecular
12 systems.

13 I think the design is evident in the structures.
14 The only reason that there is controversy over this is
15 that other people think there is a non design
16 explanation. But if you look in the literature, if you
17 even look in the expert reports for the other side,
18 people say that complex molecular machines have not
19 received Darwinian explanations -- detailed Darwinian
20 explanations, experimentally verified explanations as of
21 yet.

22 In my view then, the situation is that we have an
23 obvious answer staring us in the face which many people
24 fail to recognize because they think that an alternative
25 which has not proved itself might be the answer instead.

- 1 Q. Could you turn to page 239 of Darwin's Black Box?
- 2 A. (Witness complies.) Yes.
- 3 Q. And actually we will look at 238 as well. You discuss a
4 rule described by Richard Dickerson?
- 5 A. Yes.
- 6 Q. And on page 239, you rephrase Dickerson's rule to state
7 science must invoke only natural causes and explain by
8 reference only the natural law; right?
- 9 A. Okay. Yes.
- 10 Q. And if you look at page 238 and what Dickerson actually
11 said, he included in that definition that you are
12 rephrasing that science shouldn't invoke the
13 supernatural; correct?
- 14 A. Right.
- 15 Q. And the rule that's being described here, is a term for
16 that methodological naturalism?
- 17 A. I think some people do use the term methodological
18 naturalism in roughly the same sense, yes.
- 19 Q. Do you have any problem with using the term that way?
- 20 A. Only if we keep in mind that there are -- there's some
21 fuzziness about his definition.
- 22 Q. Is the rule of methodological naturalism one that is
23 prevailing in science today?
- 24 A. No, not necessarily. For example, in the earlier part
25 of the 20th Century, the Big Bang Theory was proposed.

1 That seemed to point to an explanation beyond nature or
2 a cause beyond nature at least it struck many scientists
3 at the time. Yet scientists -- a number of scientists
4 nonetheless thought it seemed to be consistent with the
5 data.

6 I would think that that was -- actually people
7 kind of disregarded methodological naturalism in that
8 point -- at that point. There have been other points in
9 the history of science where they have also disregarded
10 that.

11 Q. Do you agree that Intelligent Design -- for Intelligent
12 Design to be accepted as science, it requires the
13 rejection of methodological naturalism as a constraint
14 on science?

15 A. No, I don't.

16 Q. So if somebody was to say that so long as methodological
17 naturalism sets the ground rules for how science is to
18 be played, Intelligent Design theory has no chance?

19 A. Well, again, here is this fuzziness of the phrase
20 methodological naturalism. I think as in when one is
21 discussing Intelligent Design simply because of the
22 history of interaction between the science and biology
23 in particular and religion, that people when they hear
24 something like Intelligent Design immediately think one
25 is proposing something like the Book of Genesis or

1 whatever as an explanation.

2 I don't think they are -- so immediately they
3 think of it as a religious explanation even though I try
4 to stress in my own writings that I view it as an
5 empirical explanation.

6 So I think if one took a strict philosophical
7 definition of methodological naturalism and one was
8 aware of the false notions that have been ascribed to
9 it, then one could say that ID could proceed even if
10 that were the case -- even if methodological naturalism
11 were accepted.

12 But I think that as a practical and historical
13 matter, that most people are not so rigorous in their
14 thinking. And therefore, it does -- people's notions of
15 methodological naturalism are more broad than the
16 definition that Richard Dickerson gave. And therefore,
17 it does -- that notion presents a significant block to
18 developing Intelligent Design.

19 Q. I am going to read to you from Mr. Dembski's rebuttal
20 report. He says given methodological materials -- which
21 he uses interchangeably with methodological naturalism
22 -- as a regulated principle for science, ID is by
23 definition excluded from science. ID proponents regard
24 methodological materialism as an arbitrary rule imposed
25 on science, and therefore propose to get rid of it. In

1 doing so, they are changing the ground rules of science.

2 Do you agree with those statements?

3 A. I am going to have to hear that --

4 MR. WHITE: Would you please show that to him?

5 MR. ROTHSCHILD: What don't we mark that as the
6 next exhibit? It is at the bottom of page 20.

7 (Behe Exhibit 7 was marked.)

8 BY MR. ROTHSCHILD:

9 Q. Bottom of page 20, where it says comment.

10 A. Okay. There are some things that I would agree with and
11 some I would not agree with.

12 Q. Go ahead.

13 A. Okay. I would say that it is wrong to say that ID would
14 be by definition excluded from science if you are taking
15 that to mean some sort of philosophical or logical
16 definition. Simply because as I said, Intelligent
17 Design does not even require a nonnatural designer.

18 Even if one judges that to be unlikely, that
19 unlikeliness or not does not affect the words by
20 definition. By definition, it would have to be utterly
21 illogical to propose it. So I disagree with that
22 statement.

23 I do agree with the next statement that
24 Intelligent Design proponents regard methodological
25 materialism as an arbitrary rule imposed on science, and

1 therefore -- I don't know about proposed getting rid of
2 it. All of this is difficult because this rule is
3 written down nowhere in particular. It is just kind of
4 a background assumption.

5 So there is nobody one could appeal to to say can
6 you change this rule, please. I do think it is an
7 arbitrary assumption, particularly when one is talking
8 about things such as the origin of the universe and the
9 origin of life and other things like that. I think it
10 does in fact beg the question of whether material
11 processes can in fact account for such basic events.

12 So in a sense, I agree with Dembski that I regard
13 it in some ways as arbitrary, but I don't think it by
14 definition excludes ID.

15 Q. Though to a large extent, it does; is that fair?

16 A. As a practical matter as opposed to a dictionary
17 definition type of matter, it does, yes.

18 Q. And ID proponents are seeking to change the ground rules
19 of science so that Intelligent Design can be considered
20 in full?

21 A. Well, you have to be careful of using phrases like the
22 ground rules of science because there are no ground
23 rules of science. There are common -- often times
24 common assumptions. Common assumptions can change from
25 time to time.

1 There are many examples in the history of science
2 where such a thing has happened. Such as when the Big
3 Bang Theory was proposed, people thought it was given
4 that the universe was eternal.

5 So we in the Intelligent Design community want to
6 persuade a larger fraction of the scientific community
7 at large that in fact methodological naturalism is not a
8 useful guiding principle in this area.

9 Q. Just so we are clear here the phrase ground rules is not
10 my own. It is not yours. It is Mr. Dembski's. He says
11 they are changing the ground rules of science. I
12 interpret that as the current ground rules.

13 Would you agree that the current ground rules, how
14 most scientists operate and consider the boundaries of
15 science include the principle of methodological
16 naturalism?

17 A. I am afraid I will not agree with that simply because I
18 think the great majority of scientists have not given
19 these issues much thought.

20 Q. Just to read you another statement by Mr. Dembski.

21 MR. WHITE: Eric, what page?

22 MR. ROTHSCHILD: This is in a different
23 publication.

24 MR. WHITE: Would you like to show it to him?

25 MR. ROTHSCHILD: Yes, just give me a second.

1 (Behe Exhibit 8 was marked.)

2 MR. WHITE: While we look at the copy, can we take
3 a break? We have been going about an hour.

4 MR. ROTHSCHILD: That's fine.

5 (A recess was taken.)

6 AFTER RECESS

7 BY MR. ROTHSCHILD:

8 Q. In this article by Mr. Dembski called "What Every
9 Theologian Should Know about Creation, Evolution and
10 Design", which is marked as 8, there is a section on
11 science that starts on page 82.

12 A. Yes.

13 Q. And it states that science according to the Darwin's
14 establishment by definition excludes everything except
15 the material and the natural.

16 MR. WHITE: Where is that?

17 A. Where is that?

18 BY MR. ROTHSCHILD:

19 Q. Right under -- in the second paragraph under science.

20 A. Okay. I have got it.

21 Q. And it goes on to say the cornerstone of the scientific
22 method is the postulate that nature is objective and the
23 a systematic denial of purpose, do you see that? I am
24 shortening that a little bit.

25 A. Yes.

- 1 Q. And then it says -- by going on to the next page, first
2 full paragraph, it says by defining science as that form
3 of inquiry restricted solely to what can be explained
4 the terms of naturalistic purposeless material
5 processes, the Darwinian establishment has ruled IDT out
6 of science from the start.
- 7 A. I didn't see where you were reading that from.
- 8 Q. The full paragraph on BF 83.
- 9 A. Okay.
- 10 Q. And if you go down near the bottom of the page,
11 Mr. Dembski describes this naturalistic material process
12 as methodological naturalism, second to the last
13 paragraph?
- 14 A. Okay.
- 15 Q. Do you agree -- do you understand Mr. Dembski to be
16 saying here that this is how science currently defines
17 itself with this constraint of methodological
18 naturalism?
- 19 A. I don't think he said that science defines itself that
20 way. I think he said the Darwinian establishment. By
21 that, I bet you he means many of the leading proponents
22 of Darwinian theory think that in fact, the universe has
23 to be explained as a self-contained system.
- 24 Q. If you go further down the page, the last paragraph on
25 the page, he refers to the scientific community; doesn't

1 he?

2 A. I'm kind of nearsighted.

3 Q. He says okay, since BWT is so poorly supported
4 empirically and since the scientific community is
5 telling us that IDT isn't science, he is referring to
6 the whole scientific community; isn't he?

7 MR. WHITE: Objection. Calls for speculation.

8 A. What do I do?

9 BY MR. ROTHSCHILD:

10 Q. Let's move on, Mike. In the second to the last
11 paragraph, he states so long as methodological
12 naturalism sets the ground rules for how the game of
13 science is to be played. IDT, meaning Intelligent
14 Design Theory, has no chance Hades. I think most of us
15 use a different expression.

16 A. Bill is a smart guy.

17 Q. Do you agree with Mr. Dembski?

18 A. Again, it depends on what you mean by methodological
19 naturalism. If you think that the designer had to have
20 been by definition an entity contained within the
21 universe, that is logically possible, but that hobbles
22 Intelligent Design because it restricts the possibility
23 of designers.

24 And so to that extent, to the extent that it
25 artificially restricts the possibilities open to

1 Intelligent Design, it would restrict the number of
2 people who think it is a good theory.

3 Q. So again from any practical standpoint, methodological
4 naturalism is a severe constraint on Intelligent Design?

5 A. From a practical standpoint, it is.

6 Q. You have sort of thrown out these conceptual
7 possibilities of natural designers. I think we agree.

8 You don't take those particularly seriously; do you?

9 A. As I stated in my book, I don't find them persuasive.
10 On other grounds, I think that there are beings beyond
11 nature. I am a Roman Catholic as I have written in the
12 book. I am rather a conventional religious believe.

13 So I find it consonant -- or what is the word? I
14 find it parsimonious to think that the designer that is
15 indicated by what we have discovered in science is the
16 same as the designer that -- the being that I understand
17 from my religious beliefs.

18 Q. And even putting aside your belief in God, you have
19 written that by Intelligent Design, you mean to imply
20 design beyond the simple laws of nature?

21 A. I wrote that. But by that, I meant -- I actually meant
22 design which is probably easier for a non supernatural
23 being to perform. If one is talking about the design of
24 laws of nature, then that would be a harder -- even a
25 space alien would have a tough time with that. So

1 design beyond the laws of nature is the kind of design
2 we see in artificial systems like machinery in our human
3 world. That is what I meant about the design that I
4 think that I see in biochemistry.

5 Q. And then in the same document, which again is this Reply
6 to Critics article, you say that the hypothesis of
7 Intelligent Design may reasonably be taken to imply the
8 involvement of a supernatural agency, a miracle?

9 MR. WHITE: Excuse me. Are we back on Exhibit 8
10 to his expert report?

11 MR. ROTHSCHILD: Yes.

12 MR. WHITE: What page are you talking about?

13 MR. ROTHSCHILD: Page 702.

14 MR. WHITE: Which paragraph, Eric?

15 MR. ROTHSCHILD: It is in the final paragraph.

16 MR. WHITE: Can you ask him again?

17 BY MR. ROTHSCHILD:

18 Q. That is something you have written, right, that the
19 hypothesis of Intelligent Design may reasonably be taken
20 to imply the involvement of a supernatural agency, a
21 miracle?

22 A. Yes. Just like the Big Bang and so on have been taken
23 by someone that way.

24 Q. The Big Bang also involves a number of hypotheses that
25 have actually been tested; is that fair?

1 A. I suppose so. I am not a physicist.

2 Q. And the experimental tests of the Big Bang concept has
3 been published to a great extent in peer reviewed
4 literature; correct?

5 A. I assume so.

6 Q. One of the things you -- one of the positions you have
7 taken is that it's okay to consider the supernatural as
8 part of the Intelligent Design concept, but you're not
9 worried that that is going to infect every area of
10 science. I think in your book you used the example of
11 the regulation of enzymes?

12 A. Yes.

13 Q. What is the basis for that confidence?

14 A. The basis is that we know of natural principles that can
15 account for the regulation of enzymes. Looked at in one
16 way simply Newtonian mechanics, how hard bodies hit each
17 other, how electrostatics work. Chemistry, we have good
18 explanations for how such things work.

19 On the other hand, we do not have good
20 explanations for how unintelligent processes could
21 produce molecular machinery. So that is why I said
22 that.

23 Q. You are familiar with the phrase God of the gaps?

24 A. Yes.

25 Q. It is basically the proposition that God is the

1 explanation for things we haven't yet figured out yet?

2 A. Yes.

3 Q. Some of the things that you now say we have good natural
4 explanations for, we didn't a hundred years ago;
5 correct?

6 A. Yes. We weren't even aware of some of the phenomenon a
7 hundred years ago like enzymes.

8 Q. I am not speaking just about the molecular area where
9 you studied, but lots of phenomena?

10 A. Yes, but I don't think most of them were ascribed to
11 God. I don't think enzymes weren't ascribed to God a
12 hundred years ago because people barely knew there were
13 such things as enzymes.

14 Q. When enzymes were first discovered, but the regulation
15 of them was not understood, one explanation could have
16 been God takes care of that; fair?

17 A. Well, if you are asking if I think that would be a good
18 explanation, certainly there might be somebody who would
19 propose any explanation one can think of. But I would
20 not think that even then, that would be considered to be
21 a good explanation.

22 I am no historian of science, but I think such
23 explanations were not accepted -- have not been accepted
24 for hundreds of years before the 19th Century.

25 Q. What distinguishes Evolution at the molecular level from

1 these various other aspects of nature that an
2 intelligent designer is a good explanation?

3 A. The feature that distinguishes it is that we learn --
4 have learned what the molecular systems look like. We
5 are not basing our proposal on an ignorance of how
6 things were work or an ignorance of what is there. We
7 are proposing it on the basis of what we have discovered
8 in the cell.

9 Fifty years ago, a hundred years ago, nobody in
10 the world knew that there were such things as molecular
11 machines. And as a matter of fact, scientists such as
12 Ernst Haeckel and a man named Thomas Huxley, both of
13 whom were friends of Darwin, thought that cells could
14 arise from sea mud by spontaneous generation. They
15 suggested that because they had no idea of the
16 complexity of the cell.

17 So we had scientists proposing what we in
18 retrospect see are absurd explanations, not because of
19 what they knew, but because of what they were ignorant
20 of.

21 But now in the past hundred years, science has
22 opened Darwin's Black Box, to coin a phrase, and we have
23 discovered what's in there. And by this process of
24 induction that I talk about, that these have structures
25 which we see in other cases that require design, and

1 because of the problem of irreducible complexity that we
2 talked about, it seems to be a big obstacle for
3 Darwinian explanation, I propose that we have strong
4 evidence for -- strong positive evidence for design.

5 This is not a negative argument from ignorance.
6 It is an argument from knowledge.

7 Q. Let's return to your report. It might seem a funny
8 question to get at this juncture of the deposition, but
9 what is Intelligent Design?

10 Let me just sort of maybe shorten this a little
11 bit. Is it what is described on the top of page eleven
12 of your report?

13 MR. WHITE: You are talking Exhibit 1?

14 MR. ROTHSCHILD: Yes.

15 A. Yes. Intelligent Design Theory, let me read the
16 sentence. Intelligent Design Theory proposes that the
17 origin of some aspects of living organisms is best
18 explained as the result of deliberate intelligent design
19 rather than as the result of such unintelligent
20 processes as the self-organization proposed by
21 complexity theory or the natural selection proposed by
22 Darwinian Theory. That is a reasonable definition.

23 BY MR. ROTHSCHILD:

24 Q. I violate this rule consistently, but when you are
25 reading, try and slow down a bit. That was very fast.

1 A. I am sorry.

2 Q. Is that definition one that you believe is agreed upon
3 in the Intelligent Design community?

4 A. For the most part, yes.

5 Q. And then you go on to say in that passage Intelligent
6 Design Theory focuses exclusively on the proposed
7 mechanism of how complex biological structures arose.

8 Is that assertion about Intelligent Design Theory
9 one that you understand to be agreed upon in the
10 Intelligent Design community?

11 A. For the most part, yes.

12 Q. In making that statement, I know you are working from a
13 list of claims associated with Darwin's Theory listed by
14 Ernst Mayr that are set forth on page nine and ten of
15 your report; is that correct?

16 A. Yes.

17 Q. And one of the things that you're saying by inference
18 here is that Intelligent Design Theory does not focus on
19 the Darwinian claim of common descent; is that correct?

20 A. That's correct.

21 Q. Is it your understanding that that limitation would be
22 agreed by the Intelligent Design community?

23 A. For the most part, yes.

24 Q. Some would extend Intelligent Design to address the
25 issue of common descent?

1 A. I think some would be -- some would question common
2 descent. But I think they would acknowledge that is not
3 part of Intelligent Design Theory proper.

4 Q. And then you also exclude from Intelligent Design
5 purview the question of gradualism; correct?

6 A. That's correct.

7 Q. And, again, would that be the consensus in the
8 Intelligent Design community?

9 A. For the most part, yes.

10 Q. Some would?

11 A. It is hard to get everybody to agree on lunch, let alone
12 that, yes. So some would always have some quibble.

13 Q. That is not part of the price of admission; is that
14 true?

15 A. What is that?

16 Q. I will withdraw that. I want to go back to some of the
17 issues. But for a moment, let's fast forward to page
18 17.

19 At the top of the page, it is stated the only
20 assertion that Intelligent Design Theory itself properly
21 makes is that some aspects of biology are indeed the
22 product of Intelligent Design.

23 Why is that the only assertion that Intelligent
24 Design Theory properly makes?

25 A. Because Intelligent Design is concerned with the

1 question of whether some aspect of nature could have
2 arisen by unintelligent processes or required
3 intelligent activity to produce it. Therefore, when you
4 go beyond that simple deduction, you are essentially --
5 you are essentially going to rely on other - you are
6 trying to make other deductions, trying to rely on other
7 evidence other than the simple apprehension of design.
8 So that's why.

9 Q. Let's go back to some of the issues that you excluded
10 from Intelligent Design's purview. Let's start with
11 common descent.

12 Am I correct in understanding that that is the
13 proposition that all organisms share a common ancestor?

14 A. Roughly. There has been some kind of discussion about
15 this in the biological literature about whether one can
16 really trace back all lineages to a single, common
17 ancestor including the different classes of single
18 celled organisms, but that's roughly the case for larger
19 organisms such as plants and animals and so on.

20 Q. From where Mike Behe comes out on this, you find the
21 proposition that all organisms share a common ancestor
22 fairly convincing?

23 A. Yes.

24 Q. I would like a little clarification. When you say
25 Intelligent Design Theory does not concern any other

1 claims such as common descent, are you saying that
2 Intelligent Design Theory accepts that proposition of
3 the Darwinian Theory or just has no opinion, whatsoever?

4 A. Intelligent Design is not a thinking entity. It's this
5 theory. And the theory is focused solely on the
6 question of whether or not there is design.

7 So no more than plate tectonics has to do with the
8 orbit of Mercury or something like that. It simply does
9 not come under the aegis of Intelligent Design, those
10 questions.

11 Q. I think you have described Evolution as a theory, sort
12 of a historical theory?

13 A. I don't think I used that word.

14 Q. A theory of the history of life?

15 A. I don't think I used that either. That doesn't sound
16 like me.

17 Q. Let's see if I can get this right. So going back to the
18 common descent point, am I correct in understanding then
19 that Intelligent Design Theory simply does not take a
20 position on common descent one way or the other?

21 A. That's correct.

22 Q. Now you say that the idea of common descent is fairly
23 convincing?

24 A. Yes.

25 Q. Is that based on the scientific evidence?

- 1 A. From my reading of the scientific evidence, yes.
- 2 Q. And if a proponent making the case for Intelligent
3 Design included in his or her argument that common
4 descent was in doubt, would you characterize that as an
5 improper claim on behalf of Intelligent Design?
- 6 A. I would think that that was a claim outside of the
7 purview of Intelligent Design Theory.
- 8 Q. If students, say Dover students were taught that the
9 proposition of common descent was in doubt, would you
10 consider that an unsound education for those students?
- 11 A. From my understanding, nobody has proposed to teach them
12 that. So I am not sure I would -- I am not sure why we
13 have to go there.
- 14 Q. Let's go there because I am saying if students --
- 15 A. If any students were taught that -- could you say that
16 again?
- 17 Q. If students were taught that the proposition of common
18 descent was in doubt and not supported by scientific
19 evidence, was in doubt, would you given what you know
20 about the scientific evidence, would you think the
21 students are being improperly taught?
- 22 A. Again, I think you have to kind of slow down and think
23 about it. I myself find the evidence persuasive. The
24 question is can there be evidence against common descent
25 at all? And if there is, do most scientists accept it

1 or not? And if some people don't, what are their
2 reasons for doing so?

3 Common descent is a broad concept. As I was
4 alluding to earlier, there are some scientists who even
5 wonder if -- who wonder -- who have no sympathy for
6 Intelligent Design but who wonder if the branches of
7 single celled organisms all arose from a single actually
8 existing cell.

9 So you would have to be careful about how you
10 define common descent. You would have to be careful to
11 say whether you thought the evidence weighed heavily in
12 favor of common descent. But is there no evidence
13 whatsoever on the other hand, on the other side?

14 So I would say that I don't think if students were
15 taught that they -- that the scientific community as a
16 whole -- to the extent that I know what the scientific
17 community as a whole thinks -- if they thought
18 Intelligent Design was in doubt, that would be
19 incorrect.

20 But if you were asking could students be shown
21 evidence that made the claim of Intelligent Design less
22 clear or did not assume -- not Intelligent Design -- I
23 meant common descent -- made the claim of common descent
24 unclear or looked at it from a different point of view,
25 I think students -- I think it is quite proper

1 academically for students to entertain a wide range of
2 ideas, even those that we think might be false, simply
3 to give them the experience of looking at a subject from
4 a variety of different viewpoints.

5 Q. If you were asked to be an expert witness in support of
6 a change to curriculum that communicated to students
7 that the Theory of Common Descent is held in doubt by
8 some scientists, could you personally based on your
9 expertise support that position?

10 A. Again, let me just make the distinction. It is clear
11 that some scientists do doubt common descent defined as
12 the fact -- defined as a single cell.

13 Q. Let me interrupt you. Let's say common descent
14 generally.

15 A. In general, mammals being derived from earlier
16 vertebrates and things like that. It is not the case
17 that much of a fraction of the scientific community
18 doubts that. So as a simple statement of what the
19 scientific community thinks, that would be incorrect.

20 Q. You would have no basis to think there is scientific
21 merit to the other view?

22 A. What other view is that; that common descent is
23 incorrect?

24 Q. Right.

25 A. I don't know -- again, it depends on how you define

1 common descent. I think there is strong evidence for
2 it.

3 The people I have heard who make cases against
4 common descent often times point to the fact that we do
5 not know of any mechanism that could transform one sort
6 of an organism into another sort of an organism by
7 random processes and natural selection. And I know of
8 no such mechanism either. And there is no such
9 mechanism published in the scientific literature.

10 So I could not address their objections.
11 Nonetheless, I think that the evidence in favor -- if
12 you think similarities between organisms are evidence in
13 favor of common descent, I think that is -- I agree then
14 that there is good evidence.

15 So all in all, I think common descent is a fine
16 idea. It is a good one to work under. But no idea
17 should be accepted utterly as a postulate. No idea
18 should be accepted and evidence -- even that some people
19 think is evidence against it, that evidence should not
20 be kept -- should not be ruled inadmissible in some
21 discussion or other.

22 Q. When you talk about the good evidence for common
23 descent, does that include the evidence from gene
24 sequencing?

25 A. Yes.

1 Q. Does it include the fossil record?

2 A. Yeah, to a degree.

3 Q. You said something a little bit earlier that even if a
4 scientific concept is wrong, that's all right to teach
5 it. I am paraphrasing.

6 A. Well, I said if most people think it is wrong. Of
7 course the definition of science, you don't know
8 anything absolutely for sure. So even if most people
9 think it's wrong, yes, it can be a good pedagogical
10 exercise to teach students about a concept just to give
11 them a different point of view.

12 Q. When you do that, teach something that is widely
13 recognized as being wrong, what is the right pedagogical
14 approach? Do you present it as if it is not wrong, not
15 called into question?

16 A. Not at all, no. You can stand up and say this is what
17 the great majority of scientists believe. This is the
18 evidence they point to. However, there is this band of
19 crazies over here who doubt this. This is what they
20 say.

21 Here's two articles in Scientific American or some
22 popular journal acceptable to students arguing the case
23 for one and the case for the other. Go through these.
24 What do you think of these arguments and so on? Why are
25 these guys the nuts? Why are the assumptions here?

1 What is the evidence here?

2 There is no need -- when you use the word teach, I
3 do not mean you should not say student should be taught
4 a theory. That does not mean presented as true. It
5 means presented and say here are some ideas. Examine
6 these ideas. Examine the evidence, and see how people
7 make up their minds. Sometimes different people come to
8 different judgments.

9 So I think something like that is a great
10 pedagogical exercise.

11 Q. You also said that Intelligent Design Theory does not
12 concern the age of the earth?

13 A. That's correct.

14 Q. And again, are you saying Intelligent Design Theory --
15 let me rephrase that. Would you agree that the
16 generally accepted scientific position on the age of the
17 earth is it is very old, billions of years old?

18 A. Yes.

19 Q. And that it is not widely held in the scientific
20 community that the earth is six to ten thousand years
21 old?

22 A. Right.

23 Q. And are you persuaded by the scientific evidence for the
24 older earth?

25 A. Yes.

1 Q. When you say Intelligent Design Theory does not concern
2 the age of the earth, does Intelligent Design Theory
3 accept the widely accepted old earth proposition, or
4 does it just simply have no position at all?

5 A. Again, that is not its subject matter. Let me give you
6 an example. I am afraid I am going to go back to Mt.
7 Rushmore again.

8 If you drove by -- if you had never heard of Mt.
9 Rushmore and you drove by it and looked up at the faces
10 on the mountain, you would immediately perceive that
11 they were the result of intelligent activity. You would
12 not perceive how old they were. They could be millions
13 of years old for all the person looking at them for the
14 first time. They could have been carved last week.

15 You need more evidence other than the way that the
16 parts of the system interact to form a functioning
17 whole. You need more evidence than that to answer
18 additional questions such as how old is this system.

19 Q. Would you agree that Intelligent Design Theory speaks to
20 the development of life over time?

21 A. Can you spell out what you mean by the development of
22 life over time?

23 Q. It is a concept that deals with how living organisms or
24 attributes came to be over time.

25 A. Well, Intelligent Design really doesn't have a lot to

1 say about time for the reason that I alluded to in the
2 last answer. Intelligent Design in biology sees things
3 and can conclude that they are the result of intelligent
4 activity. If for other reasons we decide that these
5 arose at some point in the past, then we are talking
6 about a biological system that was not there at some
7 point and then developed somehow.

8 And Intelligent Design Theory would argue that
9 intelligence was a part of that development process.
10 But other than that, I am not quite sure what I could
11 say.

12 Q. Okay. So Intelligent Design then allows individuals to
13 hold the view that the earth is 10,000 years old while
14 also accepting the other tenets of Intelligent Design?

15 A. Intelligent Design says nothing about the age of the
16 earth. So people could think it was infinitely old or
17 ten years old for all Intelligent Design says. But yes,
18 they could also think that it was 10,000 years old.

19 Q. I am surprised you say it could be infinitely old
20 because part of what I understand you to be saying with
21 the creation of systems at the molecular level is part
22 of it is a function of time. That if we had infinite
23 time, we might get there.

24 A. Maybe infinite was not a good word to use. Thank you
25 for pointing that out. Even if it was much older than

1 we currently think it to be I will say.

2 Q. And then one of the other claims of Darwin's Theory is
3 the claim of gradualism rather than through sudden
4 production of new individuals that represent a new type?

5 A. Yes.

6 Q. And I assume you are going to say the same thing --
7 well, I won't assume. Do you accept the proposition of
8 gradualism?

9 A. Yes.

10 Q. Is it the case for Intelligent Design Theory that it
11 doesn't take a position one way or the other?

12 A. Yes.

13 Q. I am going to use the word abrupt appearance here, but I
14 don't mean simply the evidence -- the fossil record. I
15 mean actually the new form appearing.

16 A. Okay.

17 Q. Let me ask you when you talk about sudden production of
18 new individuals that represent a new type, that is what
19 you are really talking about; right?

20 A. Those aren't my words. Those are Ernst Mayr words.

21 Q. What do you understand him to mean with those words?

22 A. Ernst Mayr, he is dead now. I guess he had in mind
23 something like a Creationistic view of the production of
24 life.

25 Q. Which is sort of life out of nothing?

1 A. Yes, ex nihilo.

2 Q. Fish appear where there were no fish before and not from
3 a precursor?

4 A. If you are talking about in real time, it's a puff of
5 smoke and there's a fish, I think that is probably what
6 he had in mind, yes.

7 Q. So if students were taught that Intelligent Design holds
8 that forms of life appeared in that form, you know, dogs
9 with tails and birds with wings, that would be an
10 incorrect representation of Intelligent Design?

11 A. You have to be a little bit nuanced here. It would not
12 be a necessary consequence of the idea of Intelligent
13 Design. But I think somebody making an argument like
14 that would mean that if one saw that in a brief period
15 of time a complex system was produced, then that would
16 severely constrain the unintelligent mechanisms that
17 might have produced it.

18 So since one can divide the world into intelligent
19 and unintelligent causes since they are mutually
20 exclusive, then if you say that the unintelligent causes
21 seem implausible, that is kind of a negative argument
22 for an intelligent activity.

23 Q. But the sudden production of these new types that we are
24 talking about, is a claim that that occurred one that
25 Intelligent Design can properly make?

- 1 A. That they occurred suddenly, no. Intelligent Design
2 does not require intelligently designed structures to
3 appear suddenly. But I think the point is that complex
4 structures that do appear suddenly are unlikely to have
5 been produced by unintelligent causes.
- 6 Q. But that is not answering my question. You had made an
7 assertion in your report about claims that Intelligent
8 Design can properly make.
- 9 A. Yes.
- 10 Q. You limit it really to the mechanism?
- 11 A. That's correct.
- 12 Q. I am asking you would an assertion of the sudden
13 production of new types, like birds or fish, would that
14 assertion be one that Intelligent Design Theory can
15 properly make?
- 16 A. I am not intending to be difficult. I am just trying to
17 understand what you are trying to say.
- 18 Q. I appreciate that if that occurred, one might well
19 conclude that Intelligent Design was responsible?
- 20 A. Yes.
- 21 Q. That's not my question. You have been very precise
22 about what Intelligent Design can claim and cannot
23 claim. And if I got up and said Intelligent Design
24 provides that types of organisms could appear suddenly,
25 abruptly?

1 A. Could appear or must appear?

2 Q. Could or did appear suddenly, would that be a claim that
3 Intelligent Design could properly make?

4 A. That is an empirical claim that has to be made by
5 paleontology or an eyewitness or something like that.
6 It is not a theoretical claim that an intelligent design
7 theory could make.

8 Q. Do you have -- can you describe how irreducibly complex
9 systems came into being according to Intelligent Design
10 Theory?

11 A. No.

12 Q. Let's go now to the issue of mechanism. On page eleven
13 of your report, you say Intelligent Design Theory
14 focuses exclusively on the proposed mechanism of how
15 complex biological structures arose.

16 When you use the term mechanism in that sentence,
17 what do you mean?

18 MR. WHITE: Eric, you are talking about the top
19 paragraph?

20 A. The underlined portion?

21 BY MR. ROTHSCHILD:

22 Q. And both.

23 A. The means by which the structure was affected, was put
24 together.

25 Q. The means by which the structure was put together?

- 1 A. Yes. More or less, yeah.
- 2 Q. Be sure.
- 3 A. Well, I don't think I am prepared to give an on the spot
4 precise definition of mechanism. But yes, I will say
5 tentatively the means by which the structure was brought
6 into being.
- 7 Q. And then you go on to say that Intelligent Design
8 focuses exclusively on the fifth claim of Darwinism
9 (natural selection) in Ernst Mayr's list?
- 10 A. Right.
- 11 Q. I am correct that you don't doubt that natural selection
12 can explain some aspects of biology?
- 13 A. That's right.
- 14 Q. What aspects of biology can natural selection explain?
- 15 A. Natural selection can explain -- can at least explain
16 small changes in preexisting structures. Small
17 understood as small changes in the genetic coding for
18 some of those features.
- 19 Q. Could you turn to page 22 of Darwin's Black Box?
- 20 A. (Witness complies.) Yes.
- 21 Q. Last paragraph, a little more than halfway down, you say
22 this is not to say that random mutation is a myth or
23 that Darwinism fails to explain anything. (It explains
24 micro-evolution very nicely.)
- 25 When you make that statement, what do you mean by

1 micro-evolution?

2 A. Small changes in preexisting systems.

3 Q. And what are you distinguishing micro-evolution from?

4 A. The large changes necessary to build new and complex
5 systems.

6 Q. Would you characterize that as macro-evolution?

7 A. I don't like to use those words because they are tied up
8 with paleontology and other things. I would just say
9 large -- new biochemical systems or large changes in
10 biochemical systems.

11 Q. When you say that macro-evolution deals with issues of
12 paleontology, is part of what you are saying that that
13 gets into the question of speciation, whether one
14 species can evolve into another?

15 A. Yeah. I think different people define them different
16 ways. But yes, I think micro-evolution is sometimes
17 defined as evolution at the species level or maybe
18 between the species level, but that macro-evolution is
19 above the species level.

20 Q. Using those definitions, do you have a scientific
21 opinion on whether natural selection can explain
22 evolution above the species level?

23 A. I do not have a strongly held opinion because the
24 scientific community does not know what would
25 distinguish one species from another or one family from

1 another or groups of organisms from each other.

2 Q. Is it fair to say that the concepts that you focus on in
3 your book at the biochemical level, irreducible
4 complexity, don't really address the question of whether
5 speciation could occur, that new species could have
6 evolved from older ones?

7 A. That is substantially correct. I did say that this does
8 not -- and I emphasize very strongly that this is an
9 argument at the molecular level. But I also cautioned
10 that if one concludes that Intelligent Design is
11 involved at the molecular level, then one shouldn't be
12 too swift in concluding it was not involved for things
13 that we do not know how they developed.

14 Since the scientific community does not know in
15 detail how large changes even at the organismal level
16 could be produced by small cumulative changes in DNA, I
17 simply recommend keeping an open mind.

18 Q. But you have not taken a position on that?

19 A. That's correct.

20 Q. And to your understanding, has Intelligent Design Theory
21 generally taken a position on that issue?

22 A. Has Intelligent Design Theory? Again, there are -- no.
23 Intelligent Design in general does not focus on whether
24 something is a new species or a new family or whatever.
25 It looks at specific structures and asks whether

1 specific structures could have been produced by
2 unintelligent processes or required Intelligent Design.
3 So Intelligent Design Theory would not take a stand on
4 that question.

5 Q. If it did, that would be improper, that would be an
6 improper claim?

7 A. I would have to see the exact claim. It might be. If
8 it was couched in a particular way, it would in fact
9 touch on some of the issues that are proper to
10 Intelligent Design. But it might not. I would have to
11 see.

12 Q. Is it fair to say that if common descent is correct,
13 then speciation has occurred?

14 A. Yes.

15 Q. Do you take a position on whether natural selection can
16 produce new genes with new functions?

17 A. I say that it can.

18 Q. Can?

19 A. Yes.

20 Q. Is that in any way part of Intelligent Design Theory?

21 A. Is what, that new genes can be produced by natural
22 selection?

23 Q. Right.

24 A. Only in the sense that it is the background information
25 we have against which we develop Intelligent Design

1 Theory.

2 Q. Would the assertion that natural selection cannot
3 produce new genes with new functions be an improper
4 claim by Intelligent Design?

5 A. I would have to see the context. If it were meant --
6 one would have to decide what was being claimed to be
7 the new function and the new gene. New genes -- one
8 could define a new gene as an old gene with just one
9 small change in it.

10 Q. I am just asking the general proposition if someone said
11 natural selection cannot produce new genes with new
12 functions, would that be an improper claim on behalf of
13 Intelligent Design Theory?

14 A. Unless it was qualified to say it was just small
15 changes, then that would be too overly broad, yes.

16 Q. I received a report that when you spoke to Dover
17 residents, you said evidence of natural selection is
18 imaginary?

19 A. I did not say that.

20 Q. I don't have a piece of paper that says it. It was just
21 something that was reported to me. Why don't we take a
22 break?

23 (A recess was taken.)

24 AFTER RECESS

25 BY MR. ROTHSCHILD:

- 1 Q. Mike, what is the proposed mechanism of how complex
2 biological structures arose according to Intelligent
3 Design Theory?
- 4 A. Intelligent Design does not propose a mechanism. It
5 simply tries to support the conclusion that intelligent
6 activity was involved in producing the structures.
- 7 Q. When you say in your report that Intelligent Design
8 Theory focuses exclusively on the proposed mechanism of
9 how complex biological structures arose, it really
10 doesn't propose a mechanism at all?
- 11 A. It does not propose. It focuses on the mechanisms that
12 other theories have proposed and tries to show why they
13 are inadequate. But it itself does not have a mechanism
14 understood as how physically the parts were put
15 together. It does not have one to propose.
- 16 Q. So when you say Intelligent Design Theory focuses
17 exclusively on the proposed mechanism of how complex
18 biological structures arose, you mean that it is an
19 argument against the mechanism suggested by what you
20 call Darwinian Evolution and nothing else?
- 21 A. No. It's not only that. It's also the contention that
22 whatever the mechanism, it was an intelligently directed
23 one.
- 24 Q. But in terms of the mechanism, it is just a criticism of
25 Darwinian Evolution's mechanism and not a positive

1 description of a mechanism?

2 A. That's correct.

3 Q. If you turn to page 11 of your report --

4 A. (Witness complies.)

5 Q. -- in the bottom paragraph, you say Intelligent Design
6 is based entirely on empirical observable facts about
7 biology plus logical inferences?

8 A. Yes.

9 Q. What are the empirical observable facts you are
10 referring to?

11 A. The structures of the molecular machinery and such that
12 have been discovered in the cell.

13 Q. Nothing else?

14 A. No. As well as the -- as well as experiments that try
15 to demonstrate the ability of other processes to account
16 for them or the lack of experiments that show the
17 ability of other mechanisms or other ideas to account
18 for them.

19 Q. And when you are talking about experiments, what
20 experiments are you talking about?

21 A. There have been experiments in which bacteria have been
22 grown in laboratories over extended periods of time.
23 And in my view, they have failed to show that random
24 mutation and natural selection could come up with new
25 complex biochemical systems.

1 Q. So these are experiments you have reviewed, but not
2 experiments you have done?

3 A. That's correct.

4 Q. Or anyone else in the Intelligent Design community has
5 done?

6 A. That's correct.

7 Q. What are the logical inferences that comprise
8 Intelligent Design?

9 A. The logical inferences is a process of inductive
10 reasoning. When we see complex systems -- functional
11 complex systems, we have always seen that such systems
12 have required design to produce.

13 And now we see similar systems in the cell.
14 Systems which the entire biological community calls
15 molecular machines because like machines in our everyday
16 experience, they are intricate, they are precise, they
17 use force, they accomplish purposes.

18 And when we come across such systems in our
19 everyday world, we always conclude that they required
20 intelligent design. And by a process of induction when
21 we come across such things in other places too, then we
22 are justified in concluding design.

23 Q. And when you have presented this to lay audiences you
24 use the if it looks like a duck and quacks like a duck
25 and walks like a duck, it is probably a duck?

- 1 A. In recent months, I have done that, yes.
- 2 Q. I can't resist. Is it your expert opinion that ducks
3 are intelligently designed?
- 4 A. Daffy Duck is. Certainly the cilia and blood clotting
5 systems in ducks are intelligently designed.
- 6 Q. You don't have an expert opinion on whether ducks --
- 7 A. Ducks en masse, no, I do not.
- 8 Q. When you say that when we see functional systems --
9 complex functional systems in our everyday world, we
10 have always found them to be designed, what kind of
11 functional systems are you talking about?
- 12 A. Things like say mousetraps that I pictured in my book,
13 Darwin's Black Box. Systems that have interactive
14 parts, the parts have to be precisely or very closely
15 made so that they function with other parts of the
16 system to produce the functioning work of the system.
- 17 Q. I know I have discouraged you from using the example,
18 but you have also invoked Mt. Rushmore repeatedly.
19 Where does that fit in?
- 20 A. Again, that is a system, it is not a mechanical system,
21 of course, like a miscellaneous trap, but we easily
22 recognize design because we see a number of precisely
23 matched parts or finely matched parts that work together
24 to give a particular -- seem to have a particular
25 function. For example, portraying the image of George

1 Washington.

2 And so whenever we see systems like that, at least
3 ones that are really specific and finely done, we reach
4 a conclusion of design.

5 Q. Just so we are clear, when you are talking about these
6 functional complex systems that we recognize design for
7 in our everyday world, are we only talking about
8 mechanical devices like mousetraps or are we also
9 talking about nonmechanical objects like Mt. Rushmore?

10 A. We can also be talking about the nonmechanical objects,
11 too.

12 Q. I will yield to your affection for Mt. Rushmore and ask
13 you to sort of walk me through the inductive reasoning
14 that you are referring to in the case of Mt. Rushmore
15 that you think is analogous to or identical to the kind
16 of reasoning we would do to conclude that a molecular
17 system is intelligently designed?

18 A. Well, for example if you look at the face of George
19 Washington on Mt. Rushmore, first of all, you look at
20 this mountain and you notice that the rocks are in a
21 special relation to each other, such that one rock is in
22 a position and such a size as to convey the image of a
23 nose. And next to it are ones that are recessed and
24 shaped in such a way as to look like eyes and mouth and
25 so on.

1 And when we see something like that, we
2 intuitively judge from our experience that such thing is
3 not a coincidence. It is not the result of an
4 earthquake or erosion or volcanic activity or some such
5 thing because the likelihood of all of those pieces
6 forming so as to produce that image is beyond our
7 willingness to credit.

8 Q. When you say we intuitively judge as part of this
9 inductive reasoning -- let me rephrase that.

10 This kind of inductive reasoning that you just
11 described, is this part of a scientific practice or
12 methodology, or is this just something that every slob
13 can do?

14 A. It is a common ability. It is not restricted to
15 scientists, but scientists also can do it. Even in our
16 common experience, everybody walks down the road and can
17 look to the left and recognize that maybe a flower bed
18 had been arranged and look to the right and say there's
19 dandelions scattered about the lawn. And maybe they
20 don't look like they have been arranged.

21 We easily conclude design for one, arrangement,
22 and a pass on judgment of design for another.

23 Q. I take it in the case of molecular systems, it is not
24 your -- you are not asserting that every lay person can
25 come to the conclusion of Intelligent Design by

1 observing the physical characteristics of the structure?

2 A. Well, if the structure is laid out before them and
3 explained, I think they can apprehend or they can see
4 the basis on which the design conclusion is made.

5 Q. They would understand it if you explained it?

6 A. Yes. And I have had experience explaining it to a
7 number of lay audiences, and they generally understand.

8 Q. For example, if Eric Rothschild who is scientifically
9 as unsophisticated a person as you might find was shown
10 the hemoglobin example that you described and the
11 bacterial flagellum, is it your position that is sort of
12 something a lay person in each circumstance could
13 discern one was intelligently designed and the other
14 might not have been?

15 A. I think the hemoglobin would be more difficult. The
16 bacterial flagellum, I think even unsophisticated Eric
17 Rothschild would be able to appreciate that. Especially
18 if I got a little movie or illustration of how it
19 worked, and we saw the parts moving in relationship to
20 each other and instructed people on exactly what was
21 going on, I think that yes, I think that even
22 nonscientists could appreciate that.

23 Q. I am not so much talking about appreciating it. It can
24 be explained to them. But is the inductive reasoning
25 that you are talking about part of the scientific

1 activity, is it a scientific enterprise?

2 A. Yes, it is. Logic is part of science. Induction is
3 part of logic. But logic is not restricted to the
4 scientific community. One doesn't need a Ph.D. to
5 exercise critical judgment and to be logical.

6 It is my experience when I show drawings of a
7 bacterial flagellum to lay audiences, they quickly grasp
8 the difficulty for Darwinian Evolution and quickly grasp
9 the point about Intelligent Design.

10 Q. I mean would you agree that that same -- that a lay
11 audience could easily be convinced that the human eye
12 was intelligently designed by just looking at the
13 marvelous composition that it is?

14 A. I think many people -- I think many people would be
15 convinced of that, yes.

16 Q. But you are not making that claim as part of your
17 proposition of Intelligent Design?

18 A. That is above the molecular level. I don't claim that,
19 but I must add that it has not been demonstrated that it
20 could arise by unintelligent processes either.

21 Q. I guess to put a point on my question, is it your
22 position that the reasoning -- the inductive reasoning
23 required to conclude that a biological system was
24 intelligently designed must be carried out by a
25 scientist or could we equally rely upon any lay person

1 to complete that part of the case for Intelligent
2 Design?

3 A. Most lay people do not know what is going on in the
4 cell, which I think is why most lay people take the word
5 of many scientists that Darwinian Evolution can account
6 for it.

7 When they are instructed however in the complexity
8 of the molecular machinery in the cell, in my experience
9 most lay people quickly see difficulties for Darwinian
10 Evolution and quickly appreciate the argument for
11 Intelligent Design.

12 Q. I am trying to differentiate between one can understand
13 it and appreciate it, and it actually being part of the
14 scientific conclusion. Let me just give an example.

15 We can all look at dinosaur bones, but there is an
16 expertise that goes into determining the relationship
17 between one fossil and another or a group of fossils;
18 correct?

19 A. Yes.

20 Q. You wouldn't expect me or you to do that as well as
21 Kevin Padian?

22 A. Right.

23 Q. So I am trying to get a feel for whether we can make
24 that same distinction in terms of the inductive
25 reasoning that goes into a determination of Intelligent

1 Design at the molecular evolution, or if you and I are
2 equally situated in terms of making that inference?

3 A. It would require some knowledge of the structure. You
4 cannot conclude design or non design if you don't know
5 the structure you are speaking of, yes.

6 Q. So the inductive reasoning we are talking about here is
7 a somewhat specialized enterprise?

8 A. The subset of inductive reasoning applied to
9 biochemistry does indeed require somebody to know what
10 biochemistry has discovered. So there aren't as many
11 people who know that.

12 Q. Now I want to go to the inductive reasoning that we
13 might use to evaluate systems in our everyday world. A
14 mousetrap is one example you gave.

15 In the case of a mousetrap, we have all seen that
16 they are constructed by humans; correct?

17 A. I don't think so. I have never seen a mousetrap being
18 constructed. I would bet most people in this room
19 haven't either.

20 Q. Fair enough. Is there any discipline that you --
21 scientific discipline that you think -- specialized
22 scientific discipline that goes into reasoning that
23 objects that we are familiar in the world were
24 intelligently designed?

25 A. Yes. There's archeology. There is also I guess

1 forensic sciences as well, cryptography.

2 Q. And in fact in Of Pandas, it is stated that archeology
3 has pioneered the development of methods for
4 distinguishing effects of natural and intelligent
5 causes. Is that a proposition you agree with?

6 A. I would have to know more about archeology. I have to
7 admit I don't know much about their methods.

8 Q. You acknowledge that part of what archeology does is,
9 for example, look at stone objects and try and reason to
10 a conclusion of whether those stones were just -- the
11 structure of those stones was simply the result of
12 erosion or in fact were worked on by human hands to come
13 to that structure?

14 A. In marginal cases, archeology does that. But in the
15 cases of nonmarginal cases, if you see a large Egyptian
16 pyramid or so on, it doesn't take an archeologist to
17 realize it was designed.

18 Q. That is something you could conclude?

19 A. Yes, even me.

20 Q. And, again, explain to me how you would reason that that
21 structure was designed.

22 A. Okay. We will call it the Sphinx then. I would reason
23 to say the Sphinx was designed because I could see the
24 features -- in a well done Sphinx, well preserved, I
25 could see the features of the rock and stone which

1 corresponded to features in a human face, an idealized
2 ed human face. I would realize that the probability of
3 such a thing happening by erosion or some unintelligent
4 process like that is very, very small.

5 And so inductively, I would conclude that things
6 like that are designed.

7 Q. Inductively, you would conclude that humans designed it;
8 correct?

9 A. I probably would think so. But if somebody came along
10 and said that a space alien had beamed it down, that
11 would not contradict my conclusion of design. I might
12 be surprised by it, but it would not contradict my
13 reasoning to design.

14 Q. Is your understanding of the field of archeology that
15 the conclusions that archeologists try to make is simply
16 that an object was intelligently designed, or do they
17 attempt to reach the conclusion that humans designed the
18 particular artifact?

19 A. Well, frankly, I am not all that familiar with what
20 archaeologists do. I assume for the most part, they
21 assume that designed objects were made by humans.

22 I imagine there are cases though when they might
23 have to decide whether something was made by an animal
24 or animals who mimic or construct structures.

25 There are claims by -- what's his name -- Von

1 Heneken. There are people who talk about space aliens
2 coming to the earth, which, of course, I am quite
3 skeptical of. But I assume that an archeologist would
4 at least be able to come to a conclusion that some
5 nonhuman designer with intelligence could have made some
6 artifact.

7 Q. Let's unpack that a little bit, could have made some
8 artifact. So when an archeologist looks at an artifact,
9 part of what the archeologist is building into his or
10 her conclusion is could a particular actor have done
11 what I see here; right?

12 A. You mean if they're trying to conclude who the designer
13 was, could the Mayans have designed some object?

14 Q. Sure.

15 A. In some cases, I imagine. In dealing with design, you
16 have to be sensitive to the fact that there are marginal
17 cases where you might be suspicious, but which you
18 cannot say for sure are designed. I wrote about them in
19 Darwin's Black Box.

20 If you look at rock formations -- if you look from
21 the earth at rock formations on the moon, to some people
22 it looks like there's a man on the moon, a face of a man
23 on the moon. Was that designed? Maybe. As I say in
24 the book, who knows? Maybe space aliens a long time
25 ago.

1 Probably most people would not find the evidence
2 sufficiently compelling to say that yes, that was
3 designed. There are chance processes which occasionally
4 throw up structures that remind us to one degree or
5 another of some object.

6 But then there are cases which are not marginal
7 which are much more compelling. And back to Mt.
8 Rushmore again, it doesn't matter if the man on the moon
9 is ambiguous. Our conclusion with respect to Mt.
10 Rushmore is very firm because it is not a marginal case.
11 It has got lots of features that fit the function, the
12 visage of George Washington.

13 So with the archeologists -- to get back to your
14 original question -- if they were excavating in a Mayan
15 village and they came across some complicated object
16 maybe say a detailed carving of a cat or something, and
17 somebody -- again, I am no archeologist, but if the
18 archaeologist says Mayans didn't like cats or didn't
19 have cats or anything like that, they would not conclude
20 that the object was not designed. They might conclude
21 that somebody other than a Mayan did it, or it is
22 probable that somebody other than a Mayan did it, or
23 some renegade had a kitty cat for a pet.

24 But they would not conclude that, therefore, this
25 statue arose by random processes just because their

1 closest candidate for a designer did not seem to be
2 interested in producing such things.

3 Q. Go back to Mt. Rushmore. You said we see the
4 characteristics of a face; right?

5 A. Yes.

6 Q. And we recognize that as a human face?

7 A. Yes.

8 Q. Meaning it is a depiction of something akin to
9 ourselves?

10 A. Right.

11 Q. So that is consistent with the idea that it is something
12 a human would create; is that fair?

13 A. It is consistent, but it does not require that it must
14 have been a human that did that.

15 Q. We also can come to some conclusions about human's
16 capability of creating a structure of the kind we see in
17 Mt. Rushmore?

18 A. That's correct.

19 Q. Including their capabilities at that point in history?

20 A. Yes.

21 Q. What their physical abilities were?

22 A. Right.

23 Q. What their technological resources were?

24 A. Right.

25 Q. Even if we didn't have a historical record of its

1 creation, we would be able to develop some models of how
2 they actually did it?

3 A. That's correct.

4 Q. For example, if we go back further in history to
5 something like Stonehenge, we have to figure out how the
6 rocks moved there and how they got up there?

7 A. That's right. But what we don't do in the case of
8 Stonehenge is even if we can't figure that out, we do
9 not conclude that the figures weren't designed, that
10 they came about by a random process.

11 We apprehend the design. And then there are a lot
12 of other questions which follow which are interesting
13 like who did it, how did they do it, and so on. And we
14 look for answers to those questions.

15 But the conclusion of design for Stonehenge and
16 for Mt. Rushmore, even if you didn't see anybody around
17 who looked as if they had any ability to make that
18 structure, you would still conclude it was designed, but
19 if you were interested in the identity of the designer,
20 you would have to look elsewhere.

21 Q. Just to continue this, in the case of something like
22 Stonehenge, we can make a judgment about the motives of
23 the actor who designed Stonehenge; correct?

24 A. I'm not sure. I am sure some people can speculate on
25 it. Once more, even in the absence of a motive, we

1 would still not conclude that the faces of Stonehenge
2 were the result of an accident, or erosion, or some such
3 thing.

4 Q. I think you mixed your mind when you said faces of
5 Stonehenge.

6 A. It is getting late.

7 Q. So all of these aspects of the design of the object,
8 motive, who the designer was, abilities, resources are
9 available to the person studying Mt. Rushmore or
10 Stonehenge, but are outside the purview of Intelligent
11 Design as it is currently described?

12 A. Well, a couple of things. I actually don't think the
13 ability to figure out what Stonehenge was about was
14 available at the time when it was first discovered and
15 recognized to be designed. I am not read up on
16 Stonehenge. But as far as I understand, it was a
17 mystery for centuries how such things could have been
18 designed.

19 Intelligent Design in regard to biology does not
20 say we can never understand how the structures of cells
21 or the structures of life were designed. Maybe we will
22 at some point. Lots of scientific propositions have
23 central questions unanswered when they are first put
24 forward, and Intelligent Design is no exception to that.

25 So I don't think it is different -- that different

1 from Stonehenge in that respect.

2 Q. And another difference between Stonehenge and the
3 biological systems that you are talking about is that
4 biological systems and their parts have an ability to
5 replicate themselves?

6 A. Yes. That is a difference.

7 Q. And Stonehenge and mousetraps don't? Mice do.
8 Mousetraps don't.

9 A. Yes. No analogy is ever great. But if the ability to
10 reproduce does not specifically address how the
11 appearance of design could have come about, then the
12 analogy to Stonehenge becomes much stronger than if that
13 weren't the case.

14 Q. I mean no analogy is great, but this one is central to
15 your assertion?

16 A. Stonehenge? It is more the mousetrap that is central.

17 Q. Equally unable to reproduce or replicate?

18 A. Mousetraps are made in factories. So you could just as
19 a thought experiment say to yourself suppose there were
20 changes in the factory which caused little changes in
21 the mousetrap, and how would that explain its structure.
22 And it is surprisingly difficult to even then come up
23 with a route for a gradual production of an interactive
24 machine like a mousetrap.

25 Q. Let's go talk a little bit more about irreducible

1 complexity. We have your definition on page 39 in
2 Darwin's Black Box. It has been slightly tweaked in
3 your "Reply To Your Critics" article?

4 A. Yes.

5 Q. One of the things you say on the next page of Darwin's
6 Black Box on page 40 -- let me withdraw that for a
7 moment.

8 Your definition of irreducibly complex talks about
9 production directly; correct?

10 A. Yes.

11 Q. And then on page 40, you talk about the fact that you
12 cannot rule out the possibility of an indirect
13 circuitous route?

14 A. That's correct.

15 Q. And then in that first paragraph, you say that as the
16 number of unexplained -- you say that the likelihood of
17 such an indirect route is pretty darn small to
18 paraphrase?

19 A. Yes.

20 Q. And you say as the number of unexplained irreducibly
21 complex biological systems increase, our confidence that
22 Darwin's criterion of failure has been met skyrockets
23 towards the maximum that science allowed.

24 I take it your criteria of failure is Darwin's
25 statement that if it could be demonstrated that any

1 complex organ existed which could not possibly have been
2 formed by numerous successive slight modification, my
3 theory would absolutely break down. That is the
4 statement. Only you are applying it to the molecular
5 level?

6 A. That's right.

7 Q. What is the basis for your statement that our confidence
8 that Darwin's criteria of failure has been met
9 skyrockets towards the maximum that science allows?

10 A. That is just a statement that says as more complex
11 systems are discovered, the hypothesis that they all
12 began as something else, and changed into something
13 else, and then further on something else at say the
14 amino acid level requires a level of function and a
15 level of -- a level of frequency of complex interactive
16 machines that we have no experience of seeing.

17 In our experience, we don't see one machine by
18 small undirected steps turn into a different type of
19 machine, and then by more small undirected steps turn
20 into another type of machine and finally end up as a
21 mousetrap or an outboard motor or some such thing.

22 Q. When you made this statement, have you quantified this
23 at all?

24 A. I have not.

25 Q. Has anybody?

- 1 A. Nobody has specifically done so. But if one has a
2 knowledge of biochemistry, then one can have reasons to
3 be skeptical.
- 4 Q. I am not the attorney who is going to be deposing Bill
5 Dembski so I haven't vetted his work completely, but I
6 understand he has a sort of probabilistic contribution
7 to Intelligent Design Theory?
- 8 A. That's correct.
- 9 Q. Does that link up with your proposition at all?
- 10 A. It does.
- 11 Q. How is that?
- 12 A. Well, he tries to calculate probabilities that
13 particular structures such as the flagellum would arise
14 by unintelligent processes if there are no selectable
15 states between the beginning and the end and comes up
16 with very small probabilities.
- 17 Q. So built into his -- is what you just described the
18 concept of specified complexity?
- 19 A. It is not the concept itself. It is how one tries to
20 determine if a system is sufficiently complex. That is
21 how you go about it.
- 22 Q. And am I correct in understanding that what you just
23 described -- the analysis you just described assumes the
24 correctness of your proposition of the irreducible
25 complexity of the bacterial flagellum?

1 A. That's correct. If there are no selectable states from
2 individual proteins to this complex molecular machine,
3 then this is the probability we would come up with.

4 Q. Okay. Are you aware of Mr. Dembski applying that method
5 to any other molecular system?

6 A. No.

7 Q. Are you aware of him applying that methodology to any
8 biological system?

9 A. Well, you mean other than a biochemical system?

10 Q. Right.

11 A. No.

12 Q. If we could go back, I want to ask you some questions
13 about the definition of irreducible complexity. My
14 questions -- I realize you have described the definition
15 as being just the sentence that begins by irreducibly
16 complex, page 39?

17 MR. WHITE: Of Exhibit 3?

18 MR. ROTHSCHILD: Yes.

19 A. That's correct.

20 BY MR. ROTHSCHILD:

21 Q. I appreciate that it was tweaked. But then there is
22 another sentence that I have always treated as part of
23 the definition, but I will take your word for it, that
24 follows it with the statement that an irreducibly
25 complex system cannot be produced directly by slight

1 successive modifications, just the next sentence?

2 A. That is the next sentence.

3 Q. You don't consider that part of the definition, but
4 further elaboration?

5 A. That's correct.

6 Q. I am going to ask you some questions about both of these
7 sentences. I appreciate you're not saying that is the
8 definition, but I still want to ask you questions about
9 both.

10 A. Okay.

11 Q. In that second sentence, you say an irreducibly complex
12 system cannot be produced directly, that is by
13 continuously improving the initial function which
14 continues to work by the same mechanism.

15 What do you mean by continue to work by the same
16 mechanism?

17 A. Just that it has the same -- it works -- the parts
18 interact in the same way as they do at the beginning.

19 Q. So if natural selection had created the bacterial
20 flagellum, one would see some precursor that moves the
21 bacteria in a similar way?

22 A. If natural selection -- let me repeat your question. If
23 natural selection was responsible for the bacterial
24 flagellum, would we see simpler precursors that moved in
25 the same way?

- 1 Well, I think if natural selection had made the
2 bacterial flagellum, we would see a very large series of
3 intermediate mechanisms which connect one to another by
4 steps of small -- of reasonable probability which would
5 continuously increase the efficiency of the system.
- 6 Q. But it has to work by the same mechanism?
- 7 A. If it is going to be produced directly, yes.
- 8 Q. Why is that part of the equation of irreducible
9 complexity?
- 10 A. Why is what exactly?
- 11 Q. That it worked by the same mechanism.
- 12 A. Because that essentially is what I mean by directly. If
13 you are working by a different mechanism, then you have
14 to develop one way of doing something and then switch it
15 into a different way of doing something, then perhaps
16 switch it into multiple different ways before you
17 finally end up to the structure we see today. I
18 consider that to be an indirect route.
- 19 Q. Then if I am also correct, you talk about continuously
20 improving the initial function until you get to the
21 function as it exists in the irreducibly complex system;
22 correct? Bad question. I will try that again.
- 23 A. Okay.
- 24 Q. I think I understand you to be saying when we talk about
25 the function of the system, you limit your description

1 of irreducibly complex systems to systems where the
2 function that is there at the end was also operating in
3 the precursor; is that right?

4 A. Well, I think I am looking at it from a different
5 direction. I see that the system at the end is working
6 a particular way by a particular mechanism. And how it
7 would work by other mechanisms is not clear. And how it
8 would change between mechanisms is not clear.

9 So to point out for the reader the difficulty for
10 Darwinian processes step by step, tiny steps to get to a
11 complex system, I point out that the present system is
12 working in this complex way, and that it is not at all
13 obvious how other circuitous routes might have produced
14 this.

15 Q. You talk about you have the system. It is functioning.
16 If you removed a part, it would cease functioning?

17 A. Yes.

18 Q. When you say cease functioning, you mean functioning the
19 way it functions when it has all the parts, the
20 flagellum moves the bacteria?

21 A. Yes. I believe I'd say it causes the system to cease
22 functioning. So I mean the functioning of the system.
23 So the bacterial flagellum would no longer be able to
24 work as a rotary propulsion device and so on.

25 Q. If one found an example of -- if one took away a part of

- 1 the bacterial flagellum and it still functioned -- and
2 it still survived but did not function as a rotary
3 motor, that would not fit your definition?
- 4 A. What would not fit?
- 5 Q. The example I just gave would not be a response to your
6 challenge of irreducible complexity?
- 7 A. That's correct. If you took away a part of the rotary
8 motor and you saw that it could work as a paperweight
9 then or even as a gasoline pump or some such thing, that
10 would not go any part of the way towards explaining the
11 system in my argument.
- 12 Q. And just to keep it in the arena of molecular systems,
13 one proposition that has been asserted -- and I realize
14 it may not be one you agree with -- is that the type
15 three secretion system was a precursor to the bacterial
16 flagellum?
- 17 A. That has been asserted. But nobody -- if I might add,
18 nobody has even attempted to show in journals how the
19 type three system could have arisen by Darwinian means
20 or then been converted into a flagellum by Darwinian
21 means at the level of detail that would be required to
22 actually test the hypothesis.
- 23 Q. A few questions. First of all, I understand there is
24 some dispute about which came first here, the chicken or
25 the egg?

- 1 A. Exactly.
- 2 Q. I want you to assume for the purpose of my questioning
3 that there was a case made for type three before
4 bacterial flagellum?
- 5 A. Somebody has made that case.
- 6 Q. So we won't argue --
- 7 A. Whether it is correct or not.
- 8 Q. -- whether it is correct. Now you said that even those
9 who are made that case have not demonstrated in
10 sufficient detail how the secretion system evolved to
11 the bacterial flagellum?
- 12 A. That's correct.
- 13 Q. What would be the demonstration -- and sorry. Let's put
14 aside the question of how you got to the type three
15 secretion system in the first place; okay?
- 16 A. Okay. But I just note that you are starting with a very
17 complex machine.
- 18 Q. Fair enough.
- 19 A. As it is.
- 20 Q. Fair enough. But you have made the assertion that you
21 have an irreducibly complex system. If you took away a
22 part it wouldn't function?
- 23 A. It would no longer function. The system would no longer
24 function, that's correct.
- 25 Q. And I take it what you are saying is even if one

1 demonstrated natural selection that caused type three
2 secretion system to evolve to bacterial flagellum, that
3 doesn't address your challenge of irreducible complexity
4 because it is not the same function?

5 A. Could you repeat that, please?

6 Q. Actually, let's back it up one level. First, what would
7 it take to -- what level of evidence is required to
8 demonstrate that in fact type three evolved through
9 natural selection to bacterial flagellum?

10 A. With, I will say that an enormous amount of evidence
11 would be required involving many, many experiments
12 demonstrating what natural selection is capable of
13 doing, elucidating what sort of selective effects that
14 we would expect to have, showing that none of these
15 steps had unexpected detrimental effects as well, a
16 whole host of experiments.

17 In my opinion when one says how did this evolve by
18 Darwinian processes from say type three, even if we are
19 starting at this level, to the bacterial flagellum, one
20 is covering light years of difficulty. And it is not a
21 matter of just sitting down in your armchair and kind of
22 thinking of what might be intermediate, or even going
23 into experiment -- into a laboratory and doing one or
24 two experiments and saying gee, that looks like the way
25 it happened.

1 To be confident that such a thing could happen
2 would require many, many experiments. And none of them
3 have been done, which is one reason why I am skeptical
4 that Darwinian Theory can explain such things.

5 Q. I will tell you that I am struck by the fact of how high
6 the bar is for demonstrating natural selection, but you
7 are saying that Intelligent Design of the bacterial
8 flagellum requires no experimental evidence.

9 A. Well, that is because there is an asymmetry in the
10 claims of design and Darwinian Evolution. What both are
11 trying to explain is the strong appearance of design in
12 the cell.

13 If you read Richard Dawkins, the blind watchmaker,
14 and I think I quote him at several points on one of my
15 reports, he says biology is the study of things that
16 give the strong appearance of design. He talks about
17 the overwhelming appearance of design in various
18 passages.

19 He does not think it is true. But the point is
20 that the physical evidence we see, just like the

21 physical evidence of Mt. Rushmore, strongly suggests
22 design to people who know about it.

23 If somebody looked at Mt. Rushmore and says that
24 was designed, and somebody else came along and says no
25 no, no, there was a river flowing by here and the wind

1 kind of crossed over and that is how the faces came up,
2 and you said, where is your evidence? And he says well,
3 gee, that is what all my colleagues think, but there is
4 no demonstration of that, no experiment on that in the
5 literature, and you say I don't think that is true. I
6 think it was designed.

7 He says where is your evidence? And you say look
8 at those faces. That is the evidence. So I think it is
9 entirely proper to be confident of the conclusion of
10 design based simply on what we have and to strongly
11 question assertions that unintelligent processes could
12 produce these things. Because the exact problem that
13 the all purported explanations for these things in the
14 cell are trying to address is the strong appearance of
15 complex, functional, sophisticated apparently designed
16 machinery.

17 Q. So the burden of proof is heavily on the Darwin side?

18 A. That's correct.

19 Q. That's because it looks designed to us humans in the
20 same way a mousetrap looks designed?

21 A. Because of our inductive reasoning, that's correct.

22 Q. Going back to the type three and bacterial flagellum,
23 putting aside all the issues of proof, I think if I
24 understand you correctly, you are saying that example
25 falls outside my concept of irreducible complexity

1 because even if it occurred as suggested, and even if
2 natural selection was demonstrated, that doesn't count
3 because the functioning of the system is different at
4 the different stages; is that right?

5 A. Well, my point is that it does not explain the rotary
6 propulsion function of the flagellum; that the function
7 of the type three secretory system itself has nothing to
8 do with propulsion.

9 There are many other secretory systems known in
10 bacteria, none of which have anything to do with
11 propulsion.

12 The connection between the propulsion --
13 propulsive activity and the protein secretory activity
14 is apparently -- there is no necessary connection
15 between the two. If it had been discovered that the
16 bacterial flagellum also had a function which could
17 hydrolyze sucrose when a part was removed, that would
18 have nothing to do with explaining the rotary propulsion
19 activity either.

20 Furthermore, the discovery of the type three
21 secretory systems makes the flagellum a much more
22 complex object than it was thought to be when I wrote my
23 book. And so to me as a skeptic of Darwinian Theory, I
24 see people trying to appeal to a more complex object to
25 explain one they couldn't explain when it was a less

1 complex object. And so I remain skeptical that those
2 types of examples don't convince me.

3 Q. By the way, when you talk about the bacterial flagellum,
4 is there a particular bacterial flagellum you are
5 referring to?

6 A. Well, I refer to the common one which is generally
7 pictured in a biochemistry textbook by Voet & Voet,
and
8 that is one from E. coli.

9 Q. Do you have a position on whether strains of bacteria,
10 the flagellum for strains of bacteria other than E. Coli
11 are also irreducibly complex?

12 A. As I understand, most are variations on the basic theme
13 of the bacterial flagellum. And therefore, I would
14 expect them to have similar difficulties.

15 Q. The proposition we are discussing, either secretion
16 system to the flagellum or flagellum to the secretion
17 system, to the extent that has merit, is that a direct
18 route or an indirect route?

19 A. You mean if in fact Darwinian processes did somehow by
20 some unexplained way produce first the type three
21 secretory system and then by some unexplained way
22 produce the flagellum after that, would that be an
23 indirect route? Yes, that would be an indirect route.

24 Q. Would that be an example of exaptation?

25 A. Exaptation? If such a thing occurred, it might be an

1 example of exaptation, but you would have to do a lot of
2 work to determine that in the first place.

3 Q. At the organism level or the organ level, do you
4 recognize that exaptation is a valid scientific
5 explanation for how different characteristics evolved?

6 A. I think it is a pretty fuzzy explanation myself. I
7 think it is more just a label that people put on things
8 rather than an explanation.

9 It doesn't explain where the structure that is
10 being exapted came from in the first place. It doesn't
11 explain how the structure fit the new function. It
12 doesn't explain what forces might have caused that to
13 happen.

14 Essentially, it is just a convenient label to say
15 that well, yeah, there was this structure, and
16 apparently it is involved in something else. But it is
17 more of a label than an explanation.

18 Q. Are you familiar with the literature on the evolution of
19 the mammalian middle ear bone?

20 A. No.

21 Q. What about the literature on the development of the wing
22 of the bird?

23 A. Not really, no.

24 MR. WHITE: We've almost gone an hour. Do you
25 want to take a break?

1 MR. ROTHSCHILD: Sure.

2 (A recess was taken.)

3 AFTER RECESS

4 BY MR. ROTHSCHILD:

5 Q. As you define irreducible complexity, you limit the
6 definition to a single system; correct?

7 A. Yes.

8 Q. Explain to me what you mean by a single system.

9 A. Well, because living things are made up of molecules and
10 it turns out science has discovered in the past hundred
11 years or so that the foundational level of life is the
12 molecular level, and so when I mean a single system, I
13 mean a single system composed of a number of molecules,
14 generally proteins, which has some identifiable
15 recognizable function.

16 Q. I just want to make sure I get this right because I
17 think your definition of single system included a single
18 system. Let me make sure I get it precise.

19 A single system is -- you said a single system is
20 composed of a number of molecules, generally proteins,
21 which has some identifiable recognizable function?

22 A. Yeah.

23 Q. What is the limiting principle? Is it the number of
24 molecules? Is it the fact of a function? How do you
25 distinguish showing as a single system from something

1 that is more than a single system?

2 A. It would necessarily be smaller than a cell. It would
3 generally be one in which the component parts acted on
4 each other to either modify or bind to each other. And
5 it would have to have a generally single and coherent
6 function.

7 And a good example, again, is the flagellum, the
8 parts of which form a coherent structure which works
9 together to form a rotary propulsive device.

10 Q. Okay. Is this concept of a single system something that
11 is defined in biochemistry?

12 A. It is assumed, but I don't recall anyplace where it is
13 defined.

14 Q. What do you mean it is assumed?

15 A. People talk of, say for example, the blood clotting
16 system or the proteasome which degrades proteins or
17 other coherent entities in the cell that have relatively
18 well defined roles. But nobody bothers with
19 constructing a definition for them.

20 Q. Is every structure found in the cell a single system, or
21 are there structures that are multisystem?

22 A. There can be multisystem structures. One example might
23 be say the cell membrane which contains a number of
24 different proteins, as well as lipids and carbohydrates
25 and so on.

1 Q. So that would not qualify for an irreducibly complex
2 system as you define it?

3 A. Right.

4 Q. If a biochemist went into the world of the cell and was
5 asked to label structures single systems or not single
6 systems, what would you tell him to do -- or her?

7 A. I would tell him to see if there was a well defined
8 function for a number of different components, look to
9 see if the components acted upon each other to produce
10 the function.

11 And if that were the case, then I would say try
12 to -- I would say that is probably what I mean by a
13 system. But I guess I should -- let me just say a
14 comment.

15 My point in all of this is not a rhetorical one to
16 come up with definitions for entities in biology that
17 never have -- cannot be challenged or don't have
18 shortcomings. And that is not unique to me. It is hard
19 to define life. It is hard to define species. It is
20 hard to define a number of things related to biology.

21 My purpose is to try to direct attention on what I
22 perceive to be a difficulty for current understanding.

23 Q. Is that an admission that your limitation to single
24 systems is not precise?

25 A. It means you have to consider the system itself, and it

1 is hard to consider it in the abstract without looking
2 at what you are talking about.

3 Q. So effectively what you are saying is if I wanted to
4 challenge the concept of irreducible complexity,
5 understanding I would need to limit my challenge to
6 single systems, I would really have to tell you what the
7 systems are, and you would let me know if that was a
8 single system or multisystem?

9 A. I would certainly have my opinion on it, yes, and I
10 would be glad to share it with you.

11 Q. And there is no external reference that I could turn to
12 to try to cull those out myself?

13 A. Well, most scientists are not used to thinking about
14 problems such as this. There are not many people in the
15 scientific community who would have written on this
16 before, yes.

17 Q. And the reason I ask is clearly the systems you are
18 talking about, as you acknowledge, they have multiple
19 parts. And I am trying to understand when I see a
20 system that has multiple parts, how I know whether or
21 not it is a single system as you define it or something
22 else.

23 I think you are telling me there is no real
24 demarcation line?

25 A. Well, there are certainly some clear examples. There

1 are some examples which are less clear. But for the
2 clear examples, they are clear. And so we can worry
3 about the unclear examples later.

4 Q. And in your book Darwin's Black Box, you give several
5 examples of irreducible complexity. One is the
6 bacterial flagellum?

7 A. Yes.

8 Q. And you would stand by your statement that is a single
9 system?

10 A. Yes.

11 Q. Then there is the blood clotting cascade?

12 A. Right.

13 Q. Is that a single system?

14 A. Yes.

15 Q. The -- another word I will butcher -- the eukaryotic
16 cilium?

17 A. Yes.

18 Q. Is that a single system?

19 A. Yes. It is a single system.

20 Q. And the immune system?

21 A. The immune system in general, there are a number of
22 different systems that are under the title of immune
23 system.

24 I wrote specifically in Darwin's Black Box about
25 one aspect of the immune system, the aspect which

1 generates antibody diversity.

2 Q. I would like one minute to look at a letter and get it
3 out. No response, but I will take it as a yes.

4 MR. WHITE: Something separate from this?

5 MR. ROTHSCHILD: Yes.

6 BY MR. ROTHSCHILD:

7 Q. I apologize. On the immune system, is the aspect of the
8 immune system that you are talking about the adaptive
9 immune system?

10 A. Yes.

11 Q. Is that aspect of the immune system a single system?

12 A. The system for generating antibody diversity, yes.

13 Q. Is a single system?

14 A. Yes.

15 Q. Is it your position that all complex molecular systems
16 are intelligently designed?

17 A. No.

18 Q. And we gave the hemoglobin example. That was one you
19 said was not necessarily intelligently designed. Is
20 that a complex molecular system?

21 A. Well, in my book I said starting from a protein such as
22 myoglobin, which is similar to one of the subunits of
23 hemoglobin, is it possible to get a hemoglobin like
24 molecule by natural selection? As far as I can tell, it
25 is it possible.

1 That aspect of it, I am not saying the entire
2 molecule, but I am saying going from a single to a
3 tetramer may be within the capability of natural
4 selection.

5 Q. That is one example, but is that the only example of a
6 molecular system that you acknowledge is not
7 intelligently designed?

8 A. Again, I didn't say it wasn't intelligently designed.
9 We don't have evidence that it was. And we don't have
10 experimental evidence that Darwinian processes could
11 have done it.

12 I am just saying that I don't know at this point.
13 It seems simple enough that I for the purposes of
14 argument will concede that it could be produced by
15 natural selection.

16 There are other things for which I am not sure we
17 have enough evidence. There are some systems that I
18 think the evidence is reasonably convincing that
19 Darwinian processes could produce them, and they are
20 relatively complex depending, but not complex -- not
21 irreducibly complex in the way I define irreducible
22 complexity.

23 There are complex systems like the membrane of the
24 cell which I would not argue are irreducible. There are
25 a number of other aspects of the cell that I do not

1 argue require Intelligent Design.

2 Q. Can you give me some other examples?

3 A. I can give you an example of a protein whose activity I
4 think is reasonably ascribed to natural selection. And
5 there's a group of proteins called antifreeze
6 proteins -- perhaps you have read about them -- which
7 act as antifreeze in organisms which live in subfreezing
8 temperatures at least for part of their lives.

9 There is a protein which was discovered in some
10 species of fish that lives in the Antarctic Ocean where
11 the temperature of the water is actually a couple of
12 degrees colder than the freezing point of the blood of
13 the fish.

14 And the protein that was identified as being able
15 to preserve the fish from freezing has some similarities
16 to other proteins. And the people who discovered it and
17 who sequenced the gene and the protein for it made what
18 I thought was a convincing case that by relatively small
19 steps, one could improve the ability of this protein to
20 inhibit freezing and eventually lead by small steps,
21 each one better than the other, in a Darwinian fashion
22 to the protein that is present today in the fish.

23 And it's my conclusion that that is possible by
24 Darwinian processes because they clearly showed that
25 there were small steps, one could improve the function.

1 And in addition, there are many intermediate steps which
2 can be visualized ed in the protein.

3 They are currently -- even after tens of millions
4 of years -- or millions of years anyway in the protein
5 still multiple copies of this protein, some of which
6 vary from each other.

7 So in my opinion, that is a pretty good example of
8 what I would expect a Darwinian process to lead to. But
9 that is certainly the exception rather than the rule.

10 Q. Was that demonstrated experimentally or just with an
11 explanation for how it occurred?

12 A. It was demonstrated partly by experiment and partly by
13 explanation. The experiment was to sequence the protein
14 and sequence the gene and other parts of -- there are
15 multiple copies of the gene for this protein, some of
16 which vary from each other in various ways.

17 And it was clearly demonstrated which steps would
18 be necessary, and that they were small. And there are
19 residual structures -- which is part of the experimental
20 evidence. There are residual structures which appear
21 intermediate between these two -- between the original
22 gene and the antifreeze gene. So it was a mixture of
23 both.

24 Q. There was no experiment that showed the development of
25 this protein from precursors?

- 1 A. That's correct.
- 2 Q. You used the cell membrane as the other example, and you
3 said that is not irreducibly complex. Does it have as
4 many parts as some of the systems you have described as
5 irreducibly complex?
- 6 A. Well, it depends on how you define a part. If you
7 define a part as a molecule, which is a reasonable thing
8 to do, then it has got zillions of parts.
- 9 Q. More than some of the systems you have described?
- 10 A. Many more, yes.
- 11 Q. Let's get to the topic of the adaptive immune system.
12 When you discuss this in Darwin's Black Box, were you
13 referring to any particular organism's immune system?
- 14 A. I was referring to the one which is general to the
15 vertebrates.
- 16 Q. Let's go back to Darwin's Black Box, page 138.
- 17 A. Yes.
- 18 Q. The second full paragraph.
- 19 A. Yes.
- 20 Q. In that paragraph, you say we can look high or we can
21 look low in books or in journals, but the result is the
22 same. Scientific literature has no answers to the
23 question of the origin of the immune system.
- 24 A. What page is that?
- 25 Q. 138.

- 1 A. Okay. Thank you. Yes.
- 2 Q. And when you say the origin of the immune system, are
3 you talking about the evolution of the immune system
4 through natural selection?
- 5 A. That's correct.
- 6 Q. And is that -- do you believe that was an accurate
7 statement when you wrote it, that the scientific
8 literature has no answers to the questions of the
9 evolution of the immune system?
- 10 A. Yes. The aspect of which I was writing, yes.
- 11 Q. The adaptive immune system?
- 12 A. The adaptive immune system, right.
- 13 Q. Do you really mean no answers?
- 14 A. No firm experimentally or detailed answers to how the
15 adaptive immune system might have evolved in a Darwinian
16 process by single mutations and natural selection.
- 17 Q. Now I take it that you haven't personally made any
18 attempt to develop that kind of Darwinian explanation
19 for the development of the immune system?
- 20 A. That's correct.
- 21 Q. You are not aware of anybody in the Intelligent Design
22 movement who has devoted any effort to that?
- 23 A. Most people think it would be an unproductive effort,
24 yes.
- 25 Q. Unproductive because they know the answer, or because of

1 how difficult the experiment would be?

2 A. Because we think it is likely to be -- it is likely that
3 the immune system was not produced that way. So
4 pursuing it would not be expected to generate positive
5 results.

6 Q. And I take it that you haven't made any attempt to
7 develop a Darwinian explanation of the type you
8 described for any other system you have described as
9 irreducibly complex?

10 A. In my book, I do describe a few simple scenarios of how
11 a Darwinian explanation might be attempted for a couple
12 of those. Then I show why I think those are unlikely.
13 But beyond that, I have not.

14 Q. And how about an Intelligent Design explanation for the
15 development of the immune system, have you develop a
16 model for how that would occur?

17 A. As I said, Intelligent Design does not specifically deal
18 with the question of how something was produced. It
19 just deals with the question of whether we can apprehend
20 the effects of intelligence in the system.

21 Q. Now among vertebrates, there are immune systems that
22 have different compositions; is that fair?

23 A. I am sure there are details that differ, yes.

24 Q. For example, are you familiar with the hagfish?

25 A. Not really very familiar.

- 1 Q. Do you recognize it to be a vertebrate?
- 2 A. Yes.
- 3 Q. And do you have any awareness of the composition of its
4 immune system relative to other vertebrates?
- 5 A. I would have to refresh my memory.
- 6 Q. And then are you aware that there are organisms below
7 the vertebrate class that have immune systems that are
8 also differently composed than the vertebrates?
- 9 A. Yes.
- 10 Q. Is it fair to say that these organisms have some, but
11 not all, of the parts that the vertebrate's immune
12 systems have?
- 13 A. I would have to have that spelled out for me. I am not
14 quite sure what you are referring to.
- 15 Q. You don't know whether organisms, for example,
16 tunicates, which I have learned about recently, you
17 don't whether they have an immune system or not?
- 18 A. I would have to check that out as well.
- 19 Q. Sitting here today, you don't know how the immune
20 systems of classifications of animals outside
21 vertebrates compare to the immune systems of
22 vertebrates?
- 23 A. The vertebrate system appears in vertebrates. But
24 outside of vertebrates, there is different -- there are
25 different mechanisms.

1 Q. And again, you are agreed that under the principle of
2 common descent, vertebrates share ancestors with non
3 vertebrates many, many years ago?

4 A. Yes.

5 Q. Now if it were the case that the scientific literature
6 did report answers to the question of the Evolution of
7 the immune system, would that cause you to reconsider
8 your claim that the immune system is irreducibly complex
9 and could not have evolved through natural mechanisms?

10 A. If they were detailed and specific proposals for the
11 development of the aspects of the immune system which
12 are irreducibly complex, I would consider it. But often
13 times speculations are confused with explanations. I
14 would not count a speculation as an explanation.

15 Q. When I don't say detailed and specific, do you mean
16 testable?

17 A. Testable is a great idea. Yes, testable, and also
18 essentially a mutation by mutation analysis. If
19 preferable an amino acid by amino acid analysis showing
20 why the change was an improvement, showing why it did
21 not have detrimental effects and other such detailed
22 questions.

23 Q. Now when we talk about a mutation by mutation analysis,
24 I take it that would be a heck of a lot of mutations?

25 A. Yes, it would.

1 Q. I realize you apprehend that to be a challenge to the
2 Darwinian mechanism?

3 A. I do.

4 Q. But it is also as a practical matter a challenge to the
5 scientific research community to literally demonstrate
6 the development of something as complex as the immune
7 system step by step; is that fair?

8 A. That is the nature of the problem, yes. It is a complex
9 problem. And one can't just say because it is complex,
10 we will pass over rigorously demonstrating it and just
11 assume it to be true.

12 In order to be confident that is correct, there is
13 no avoiding such detailed work.

14 Q. Again, Intelligent Design has no similar burden?

15 A. Again, Intelligent Design is apprehended by the
16 structure of the system. So it has a different -- it
17 has different problems to address than do Darwinian
18 assertions.

19 Q. Now when you made the claim in Darwin's Black Box about
20 the scientific literature relating to the immune
21 system -- let me get your precise language -- you said
22 the scientific literature has no answers to the
23 questions of the origin of the immune system, what was
24 your method for surveying the scientific literature?

25 A. I went to abstracts of leading journals. And often

1 times at the year end, they list the papers by topic
2 which have been published in the journal during the
3 year. I surveyed a number of journals for ones that had
4 published papers with titles that seemed likely to bear
5 on the topic of the Darwinian Evolution of complex
6 molecular systems.

7 And I surveyed a number of journals and looked up
8 a number of papers that seemed to have tantalizing
9 titles, and was often times always disappointed that the
10 title did not actually deliver the specified answer that
11 had been implied.

12 Q. How many journals did you look at for this purpose?

13 A. I would guess tenish, about ten.

14 Q. What time period starting backwards from 1996 did you
15 use?

16 A. Maybe 15 years or so.

17 Q. And that survey was of peer reviewed literature?

18 A. Yes.

19 Q. At pages 136 and 137, you describe a couple of articles
20 on the subject of the evolution of the immune system
21 that you did read, one by David Baltimore?

22 A. Yes.

23 Q. And there was another one titled Evolution of the
24 complement system?

25 A. Right.

1 Q. And evolution of the complement system is actually a
2 different part of the immune system than what we are
3 talking about; right?

4 A. That's correct.

5 Q. But I take it neither of these articles met your
6 standard of what would constitute answers to the
7 questions of the evolution of the immune system?

8 A. Before I answer yes, I'd just like to say that I do not
9 think this is my standard. I think the standard is
10 required by the complexity of the system itself.

11 If one is trying to explain how a computer came to
12 be, you can't gloss over details. And if one really
13 wants to understand how these systems came to be, you
14 can't just say these details are too hard for us to
15 figure out so we will just assume that that happened.
16 The details are critical.

17 I don't think I am being petulant in trying to
18 look for papers that really attend rigorously to step by
19 numerous step which Darwin said his theory would work
20 by. I think I am just demanding of Darwin's Theory what
21 it promises it has.

22 Q. You have acknowledged that natural selection is a valid
23 concept at least for some aspects of biology?

24 A. That's correct.

25 Q. And in fact has been experimentally demonstrated;

1 correct?

2 A. That's right.

3 Q. So I mean it is not a total fiction?

4 A. No. I never said -- I have always insisted that natural
5 selection does explain some things in biology.

6 Q. So your quarrel is with extending the application of
7 natural selection to these complex biochemical
8 structures?

9 A. That's right. The assumption that I am challenging is
10 that natural selection explains everything in biology.
11 Not that it explains some things. I acknowledge it
12 explains some things.

13 Q. I think what we are coming to agreement here on is the
14 very complexity of the structures that you are talking
15 about makes the complexity of the difficulty of the
16 demonstration extremely great?

17 The same complexity which you apprehend as a
18 challenge to the Darwinian mechanism is a challenge -- a
19 practical challenge to the demonstration of the
20 Darwinian mechanism?

21 A. It is a practical challenge. It is a practical
22 challenge to that demonstration. There is also a reason
23 for thinking that maybe the Darwinian mechanism is not
24 correct. Because if intelligent scientists in their
25 laboratories who are setting up conditions to examine

1 what natural selection could do and are able to screen
2 out all the bumps and difficulties of the natural world
3 can't show that it has much power to do anything such as
4 we are seeing here, then it gives somebody who is
5 skeptical of Darwinian Theory reason to think that maybe
6 nature can't do that either.

7 Q. Are you familiar with the transposon hypothesis for the
8 evolution of the immune system?

9 A. Yes.

10 Q. Can you explain what that is?

11 A. Well, it is that genes for a recombination system in a
12 bacterium which can rearrange DNA in the bacterium were
13 somehow transferred to a eukaryotic, and they seem to be
14 similar to the genes which help to rearrange genes in
15 the immune system. Some people think that the proteins
16 for those systems originated from the bacteria.

17 Q. Okay. Does that constitute a Darwinian explanation in
18 your view?

19 A. Well, it certainly -- let me say one can explain things
20 in detail, and one can make brief stories about things.
21 That is a brief and speculative story. It has got some
22 interesting pieces of data to go with it, that is the
23 similarities in protein structure.

24 But it does not even address the critical question
25 of what caused such a thing to happen. Could that have

1 happened by natural selection, by small changes plus
2 natural selection? I have not seen it argued in
3 sufficient detail to even make a judgment about whether
4 such a thing is possible.

5 (Behe Exhibit 9 was marked.)

6 BY MR. ROTHSCHILD:

7 Q. One article -- and it has been marked as an exhibit --
8 that you didn't include in Darwin's Black Box is this
9 article by Sakano and others in Nature from July, 1979.

10 Are you familiar with this article?

11 A. No, I am not.

12 Q. You don't have any way to judge whether it provides data
13 in support of the transposon hypothesis?

14 A. I haven't read the article so I don't know.

15 Q. Since the publication of Darwin's Black Box, have you
16 continued to survey the scientific literature in the way
17 you did to write Darwin's Black Box for answers to the
18 questions of the evolution of the immune system?

19 A. Well, since the book has been published, I have
20 certainly kept my eye out, but I have had to make a lot
21 less effort because people send me candidate articles,
22 e-mail me about them. So I do try to keep abreast of
23 that, yes.

24 Q. You do that for all of the irreducibly complex systems
25 you identified in Darwin's Black Box?

1 A. I try to keep aware of it, yes.

2 Q. Is it still your position that there is no scientific
3 literature answering the question of the evolution of
4 the immune system?

5 A. The adaptive immune system?

6 Q. Yes.

7 A. Yes.

8 (Behe Exhibit 10 was marked.)

9 BY MR. ROTHSCHILD:

10 Q. I have marked as Exhibit 10 an article by Susanna Lewis
11 and Gillian Wu again dealing with this issue of the
12 evolution of the adaptive immune system.

13 Is this an article you are familiar with?

14 A. No, I am not.

15 Q. Looking it over, do you recognize it as an article that
16 is addressed to the question of the evolution of the
17 adaptive immune system?

18 A. It seems to be another kind of speculative article which
19 as far as I can see does not report any results of
20 experiments, which is a relatively short article. But
21 it does deal with the immune system.

22 Q. Just having flipped through it in the last thirty
23 seconds, you have deduced it as speculative?

24 A. I would have to read it in detail. If it was a serious
25 attempt to address this question, it would necessarily

1 be much longer.

2 MR. ROTHSCHILD: I am going to mark another
3 exhibit Behe 11.

4 (Behe Exhibit 11 was marked.)

5 BY MR. ROTHSCHILD:

6 Q. This is an article in Nature by Zhou and others?

7 A. Yes.

8 Q. And have you seen this article before?

9 A. I have not seen this.

10 Q. So in your efforts to keep abreast of the literature on
11 the evolution of the immune system, neither of these
12 articles is something that you have stumbled upon?

13 A. I have not read these, and I would be waiting for larger
14 news stories to point to these things -- to point to
15 significant developments in understanding these systems.

16 Q. I am not sure I understand that. What would you be
17 looking for?

18 A. I would be looking for more than this let me just say.
19 I haven't read this paper so I am not quite sure what it
20 says. In my experience in the past, papers which
21 purport to explain evolutions -- the evolution of
22 complex systems such as described in Darwin's Black Box,
23 often times either focus on very small aspects or are
24 speculative or overlook problems that a real Darwinian
25 pathway would have to deal with.

1 Q. It sounds like that is your working assumption about
2 anything that comes across?

3 A. It is, and it is based upon experience.

4 Q. You said you would expect to have been made aware of an
5 article through other news or something to that effect.
6 I wasn't sure what you meant by that.

7 A. Well, a real detailed explanation for understanding such
8 a system would I think be large news across the
9 scientific community. So that one would see not only an
10 occasional article even in Nature dealing with a topic,
11 one would see reviews in scientific literature such as
12 the annual reviews summarizing not only some step that
13 some people are trying to address, but the overall
14 multiple problems that such a system would have to deal
15 with.

16 I would expect maybe even Scientific American or
17 the New York Times or some such publications to have
18 large headlines saying that finally we have an
19 understanding of at least one molecular system.

20 Q. So when you talked about keeping abreast of the
21 literature, it's sort of indirectly so to speak? If big
22 news comes over the transom that will make you aware
23 that it has happened, but you are not trying to survey
24 the literature that is going on in the scientific
25 journals every month?

1 A. I read papers that I come across that look promising. I
2 don't know read all papers. There's a very large
3 literature in all of science of course.

4 The ones that I do in fact come across have not
5 looked all that -- looked promising. And I have become
6 convinced over the years that this is an unlikely route
7 to explain such systems. And therefore, it is lower on
8 my priority than other things.

9 Q. And so there's a lot of literature in the scientific
10 community. There is in fact a lot of literature on the
11 evolution of the immune system?

12 A. When you say the evolution of the immune system, you
13 have to qualify that further. If you asked if you mean
14 the evolution of the parts of the immune system which
15 are irreducibly complex, and if you further qualify that
16 by saying by detailed demonstration of how random
17 mutation and natural selection could lead to these
18 things step by step, there is not a large literature on
19 that.

20 Q. And the kind of article you are talking about where it
21 would describe the evolution of the immune systems
22 mutation by mutation, is that within the abilities of
23 modern science right now; could they do it?

24 A. Well, when you say could they do it, it assumes that it
25 could be done. In the sense that it assumes that this

1 system might have occurred by mutation by mutation.

2 I think that if in fact Darwinian Evolution were
3 true, then there should be pathways that smart people
4 such as work on these things would be able to discern
5 and develop telling experiments to answer some of these
6 questions.

7 I think part of the problem why there isn't more
8 activity in this area and why it seems to be a difficult
9 problem even to start to address for science is that
10 because this is really a poor framework for which to
11 design experiments for which to try to understand the
12 origin of the immune system.

13 Q. Just going back to this article by Zhou, do you
14 recognize that it does in fact report experimental
15 research?

16 A. It does seem to, yes.

17 Q. And if you go to the conclusion, could you read the
18 conclusion section?

19 A. The whole thing there?

20 Q. Yes.

21 A. We have directly established the pathway of DNA breakage

22 --

23 Q. You don't have to read it aloud.

24 A. I am sorry.

25 Q. I understand the confusion.

1 A. Okay. I have read it.

2 Q. Looking at that, do you recognize it to be describing
3 some aspects of the operation of Darwinian processes to
4 develop the immune system?

5 A. No. I am afraid I don't. It looks like many, many
6 other papers that I have read which simply assume that
7 Darwinian processes explain this.

8 There is nothing in here -- I didn't see the
9 phrase natural selection in this conclusion here. There
10 is no consideration of selective pressures, of
11 difficulties that such a system would face or any of
12 numerous details that a real explanation would have to
13 account for.

14 Q. Mr. Zhou will be disappointed.

15 A. Well, we can be friends, anyway.

16 Q. Is the proposition that the origin of some aspects of
17 living organisms is best explained as the result of
18 deliberate Intelligent Design a testable proposition?

19 A. Yes.

20 Q. How would you test that proposition?

21 A. I have written about this in a couple of articles,
22 including the one in Biology and Philosophy, "Reply
to
23 My Critics". I have written that if it could be
24 demonstrated that random mutation and natural selection
25 could build irreducibly complex molecular machinery,

1 which I say cannot be developed by a non intelligent
2 process, then my assertion would be falsified.

3 Q. That is the assertion of irreducible complexity;
4 correct?

5 A. Yes.

6 Q. I am not asking whether you can test the proposition of
7 irreducible complexity. I want you to assume that an
8 aspect of a living organism is irreducibly complex as
9 you have defined it and could not have arisen through
10 natural selection.

11 Explain how you could test the proposition that
12 that aspect of the living organism, the system was the
13 result of Intelligent Design.

14 A. The assertion is the following: The assertion is that
15 the system under consideration could not arise by
16 unintelligent processes, and therefore, there is no
17 competing unintelligent explanation for what we see.

18 If it was shown that unintelligent processes could
19 produce the system, then my claim that intelligence was
20 needed would be falsified.

21 Q. So the test you are talking about is to demonstrate that
22 natural selection could produce the system?

23 A. Yes. The test is essentially that for Darwinists to
24 show that their process can do what they claim for it.

25 Q. And that test is a test of natural selection, but I

1 don't see how it is a test for the positive assertion of
2 Intelligent Design.

3 A. Okay. I am getting a little bit confused. Again, the
4 assertion of Intelligent Design as I have said, the
5 claim of Intelligent Design is based on the structure of
6 the system involved.

7 There is, however, a counterclaim that says
8 Darwinian Evolution says we can explain the appearance
9 of design without intelligence. And if they made good
10 on their claim, in my opinion, then that would both
11 demonstrate the abilities of Darwinian Evolution and
12 falsify the claim that such structures are the hallmark
13 of design.

14 Q. We will try this in a few ways. What I think you are
15 saying is that the case for Intelligent Design is simply
16 that the case for evolution does not work?

17 A. No, that is not it. That is part of it, but that is not
18 all of it.

19 The case for design is, as I have said, the
20 complex functional structure of the system we are
21 looking at. I have said that that claim is based on
22 inductive reasoning. And part of induction is that
23 whenever we see such systems, we have always found them
24 to be the result of Intelligent Design.

25 However, if somebody comes up with a reason to say

1 that that induction is not true, that when we see this
2 complex system which somebody in his laboratory produced
3 by putting a culture of bacteria under selective
4 pressure or something, if we see that this complex
5 system was produced by Darwinian processes, then the
6 inductive reasoning upon which the conclusion of
7 Intelligent Design is based would be shown to be
8 unreliable.

9 Q. Now you say we infer to Intelligent Design in our
10 everyday world all the time; correct?

11 A. Yes.

12 Q. And when we do that, we don't always get it right;
13 correct?

14 A. That's correct.

15 Q. Are you familiar with the example of fairy rings?

16 A. I am a little hazy, but I think I know what you mean.

17 Q. Where a fungus grows, and it kills the grass in a sort
18 of circular fashion?

19 A. Yes.

20 Q. And then I guess has vegetation grow in a circular
21 fashion?

22 A. Yes.

23 Q. And historically was thought to be the work of fairies
24 because there was no other known -- there was no known
25 natural explanation?

1 A. I will take your word for it. I don't know much about
2 the --

3 Q. The inference to Intelligent Design is not always
4 correct; is that fair?

5 A. Historically, there have been inferences to intelligence
6 which have not been correct. But again, they are always
7 in marginal cases.

8 Fairy rings, circles, simple shapes and so on
9 might look provocative, but they are not sufficiently
10 complex in the current modern view of Intelligent Design
11 to reach any definitive conclusion.

12 Coincidences do occur. When you get to things
13 like Mt. Rushmore, it does not matter that people
14 mistook fungus rings for the work of fairies. When we
15 look at Mt. Rushmore, we are in no doubt that that was
16 the result of intelligent activity.

17 Q. Let's suppose that modern science had never come up with
18 the concept of natural selection. Would there still be
19 a scientific argument in your view that molecular
20 systems are intelligently designed?

21 A. Could you repeat that, please?

22 Q. Just assume that Darwin never reared his ugly head.

23 A. I thought he was cute.

24 Q. And the proposition of natural selection as an
25 explanation for the development of life had never been

1 made.

2 A. Okay.

3 Q. Would Intelligent Design Theory still be in your view a
4 scientific theory explaining the origins of molecular
5 systems?

6 A. This, of course, is a hypothetical example, but I think
7 the answer is certainly yes. We don't depend on
8 Darwinian Theory to make conclusions of design for Mt.
9 Rushmore and other such things in our lives.

10 So I think the conclusion of Intelligent Design
11 does not need Darwinian Theory as a foil or any such
12 thing in order to make it a correct conclusion.

13 Q. Okay. If Intelligent Design is a correct scientific
14 conclusion for molecular systems, describe the test for
15 the proposition that a particular molecular system, say
16 the bacterial flagellum, was intelligently designed.

17 What is the test?

18 A. What is the test for showing it is intelligently
19 designed? The test would be to find some other
20 unintelligent means by which it could have been
21 produced.

22 For example, Stuart Kauffman, who is a Professor
23 of Biology at the University of Calgary thinks Darwinian
24 Evolution is wrong. He thinks Intelligent Design theory
25 is wrong. And he proposes something called Complexity

1 Theory in which complex systems self organize.

2 If in this hypothetical example where Darwinian
3 evolution was never proposed. If in such a world one
4 could falsify the proposal of Intelligent Design by
5 showing how an unintelligent process, perhaps the
6 processes studied by complexity theory, how they could
7 have produced something that looked apparently designed.

8 Q. And so am I correct in understanding that that is the
9 only test for the proposition that the bacterial
10 flagellum was intelligently designed, whether someone
11 can identify a nonintelligent process for its creation?

12 A. In brief, yes. Because the conclusion of Intelligent
13 Design is based on inductive reasoning, and our constant
14 experience that such things point to intelligence. In
15 order to show that was incorrect, you would have to come
16 up with an example where the induction did not hold.

17 Q. So that inductive reasoning is effectively the
18 proposition that William Paley articulated 200 years
19 ago?

20 A. If by the proposition that William Paley articulated
21 200 years ago, you mean his argument specifically in
22 regard to a watch that somebody might stumble across
23 when crossing a heat and observing how the parts
24 interacted to produce the function of the motion of the
25 machinery, it's very similar to that, yes.

1 Q. All that has been added to it through the proposition of
2 irreducible complexity is a challenge to the alternative
3 explanation of natural selection?

4 A. No. I wouldn't say that. The watch by itself was
5 irreducibly complex, even though William Paley did not
6 realize it at the time. When he talked about how the
7 parts interact to produce a function, he didn't have the
8 concept of irreducibly complex in mind. And in other
9 parts of his book on this topic, he kind of goes off the
10 depend end and loses track of that insight.

11 That itself points most strongly to design of many
12 examples that he comes up to. So it is not simply an
13 obstacle to Darwinian Evolution. It's the fact that
14 such interactive systems are themselves good examples of
15 interactive functional machinery.

16 Q. In fact, he wasn't challenging Darwinian Evolution at
17 all?

18 A. Yes, that was part of my point. Thank you. I forgot to
19 mention that he made this argument in the absence of an
20 alternative -- chief alternative that we have got these
21 days.

22 So he was saying that you don't need the
23 alternative to somehow understand design. It is an
24 inductive conclusion whenever we see these things.

25 Q. So effectively the inductive reasoning that demonstrates

1 Intelligent Design that we are talking about today, it
2 is Paley's argument?

3 A. Well, he made it -- he made the argument explicitly.
4 But such reasoning I think goes back to the Greek
5 philosophers.

6 Let me add in my comments that in his book, Paley
7 made a number of other arguments which I consider to be
8 unsound, but his watchmaker argument I do consider to be
9 correct.

10 Q. We talked a little bit about your involvement with the
11 Discovery Institute and you serve as a fellow for the
12 Discovery Institute.

13 In that capacity or generally, are you familiar
14 with the document that has been called the Wedge
15 document?

16 A. Yes. I have heard about it. I think I read it once
17 too.

18 Q. When did you first become aware of the Wedge document?

19 A. I am not very sure. I think a number of years ago, the
20 first I heard about it was in hearing that somebody had
21 placed a copy of it on the Internet, and then people
22 were talking about it.

23 Q. I take it you had no involvement in the creation of the
24 document?

25 A. That's correct.

1 Q. But you do understand it to be the product of the
2 Discovery Institute?

3 A. Yes; although, I don't know actually who wrote it.

4 Q. Intelligently written by who?

5 A. The identity of the designer is not clear.

6 (Behe Exhibit 12 was marked.)

7 BY MR. ROTHSCHILD:

8 Q. If we turn to the first page with text in the document,
9 the document talks generally about the problems created
10 by the concept of materialism; is that fair?

11 A. I believe so. I haven't read it recently. I think I
12 remember that is the case.

13 Q. It associates certain thinkers with the ascendance of
14 materialism, and one of those is Charles Darwin?

15 A. I see his name here, yes.

16 Q. Then it goes on to say in the last column here, the
17 Discovery Institute's Center for the Renewal of Science
18 and Culture seeks nothing less than the overthrow of
19 materialism and its cultural legacies; do you see that?

20 A. No. Where is that?

21 Q. In the first paragraph of the last column.

22 A. Yes, I see that.

23 MR. WHITE: I have a general objection to the
24 authenticity since he doesn't know if this is truly the
25 document from the Discovery Institute.

1 MR. ROTHSCHILD: If you have evidence that it is
2 not, I welcome it.

3 BY MR. ROTHSCHILD:

4 Q. Again, this is the organization that you are a fellow --

5 A. Yes.

6 Q. -- with; right?

7 A. That's correct.

8 Q. If we go to the page that says Five Year Strategic Plan
9 Summary at the top, it has got a handwritten paid for on
10 it?

11 A. Yes, I have got it.

12 Q. It talks about the source of materialism being
13 scientific materialism. Do you have an understanding of
14 what that term means?

15 A. Not a very precise one.

16 Q. Any understanding?

17 A. I would suppose it means something like the assumption
18 that matter and energy is all that actually exists.

19 Q. Is that the same as methodological naturalism?

20 A. Well, that question gets into some gray area. Some
21 people claim that methodological naturalism is different
22 because it does not postulate that there is no such
23 actually existing entity which is not matter and energy.
24 But it assumes so for certain purposes.

25 So the question is, however, what is the effect of

1 such assumption on science.

2 Q. Now then the document starts to talk about a
3 metaphorical concept of a wedge splitting the tree trunk
4 of materialism; right?

5 A. Where is that? I am sorry.

6 Q. Same paragraph.

7 A. Yes. I see that.

8 Q. And it describes the thin edge of the wedge as some
9 publications by Phillip Johnson; correct?

10 A. That's correct.

11 Q. And Phillip Johnson is someone you have had some
12 association with?

13 A. Yes.

14 Q. Not a scientist?

15 A. That's right. He is a Professor of law at Berkley.

16 Q. A supporter of the Intelligent Design movement?

17 A. Yes.

18 Q. Doesn't provide any of the scientific concepts of
19 Intelligent Design; does he?

20 A. That's correct.

21 Q. And he has been pretty open about the fact that he views
22 the Intelligent Design movement as primarily directed at
23 furthering religious and philosophical goals; is that
24 fair?

25 A. I would have to see exactly what you meant by that. I

1 certainly think he is interested in philosophical
2 issues.

3 Q. And religious issues?

4 A. He is interested in religious issues as well.

5 Q. He has portrayed the Intelligent Design movement as
6 having -- as furthering religious objectives?

7 A. He has portrayed it as removing obstacles to an
8 objective evaluation of the evidence from science, yes.

9 Q. I don't think that answered my question, and I think you
10 know it.

11 A. Well, again, I am not trying to be difficult.

12 Q. You haven't been all day, but I think you were there.

13 A. To the extent that a prior philosophical commitment
14 impairs people's ability to reach a religious
15 conclusion, I think he sees Intelligent Design as a
16 useful -- as a good argument to show that the impediment
17 should not be there. That's it.

18 Q. In fact, he has been pretty upfront that it is the --
19 that the religious objective, that is his primary
20 motivation for being involved with this issue?

21 A. I am not sure that that is the case. In his first book,
22 Darwin On Trial, I can't recall it very closely, but it
23 did not impress me as making -- as primarily making a
24 case for religion.

25 It primarily concerned showing how weak the

1 evidence for an unintelligent explanation for life was
2 if one did not at the outset assume that an
3 unintelligent mechanism had to be responsible for life.

4 Q. But in other writings or in your interactions with him
5 have you perceived him to be putting the religious
6 aspect of this proposition at the forefront?

7 A. In different -- let me answer that in different venues,
8 he has different concerns. He is, of course, a
9 Christian. And there are many other Christians in the
10 United States, and he shares some of the concerns.

11 And I think that he -- so when he speaks with
12 other Christians or is directing comments to that
13 audience, then he may have such concerns more prominent
14 in his mind. But he also speaks to other groups,
15 including people who simply want to know what is correct
16 about the physical universe unfiltered by something such
17 as scientific materialism which is talked about here.

18 And so in those audiences, I think he genuinely is
19 concerned to tell people that with their shared
20 assumptions, that materialism does not necessarily have
21 to be true, that the evidence for the claims of
22 Darwinism is not very strong.

23 Q. Right after the description of his books, the document
24 says Michael Behe's highly successful Darwin's Black Box
25 followed Johnson's work. Do you see that?

1 A. I do.

2 Q. Do you understand the document to be describing you as
3 part of the wedge, your book is part of the wedge?

4 A. I see that they note my book. I am not sure what you
5 would mean by saying that the book is part of the wedge.

6 Q. It says --

7 MR. WHITE: I object. You are asking him to
8 speculate.

9 BY MR. ROTHSCHILD:

10 Q. It says at the very beginning of this strategy, The Thin
11 Edge of the Wedge was Phillip Johnson's book. Behe's
12 book followed. And then it says right after that, we
13 are building on this momentum, broadening the wedge with
14 a positive scientific alternative to materialistic
15 scientific theories which has come to be called the
16 Theory of Intelligent Design.

17 Do you understand your work to be swept up in that
18 description?

19 A. Again, I didn't write this. I am not even sure who did.
20 I don't really know what they had in mind here.

21 Q. Next sentence says Design Theory promises to reverse the
22 stifling dominance of the materialist's world view and
23 to replace it with a science consonant with Christian
24 and theistic convictions. Do you see that?

25 A. Yes.

1 Q. And when you read this, you were aware of those words?

2 MR. WHITE: Objection. When he read it now?

3 BY MR. ROTHSCHILD:

4 Q. No, he read it before.

5 A. I read it a while back. I am sorry. What is the
6 question?

7 Q. You are aware of that language?

8 A. Did I see the words there?

9 Q. Yes.

10 A. Yes, I saw them.

11 Q. And that particular statement, is that consistent with
12 your own objectives to develop Design Theory to reverse
13 the stifling dominance of the materialist world view and
14 replace it with a science consonant with Christian and
15 theistic convictions?

16 A. No, it is not. My purpose is to try to explain
17 biochemical systems that science has discovered in the
18 cell.

19 Q. If that was a goal of a scientist, would that violate
20 your rule that a scientific theory should not tailor its
21 claims to agree with the scriptures of any religion or
22 with any religious authority?

23 A. I am sorry. Could you repeat that?

24 Q. If that was a goal of a scientist, would you agree that
25 it violates your rule that a scientific theory should

1 not tailor its claims to agree with the scriptures of
2 any religion or with any religious authority?

3 A. There are parts of this that I think I would agree with
4 and parts that I think I would not. It would take me a
5 while to explain it I think.

6 Q. You are talking about this sentence?

7 A. This sentence, yes.

8 Q. The floor is yours.

9 A. If a scientist thought that a preexisting philosophical
10 assumption was in fact limiting the explanations
11 possible for what he sees has been discovered in the
12 natural world, then I think it is a reasonable activity
13 for the scientist to point out and even to try to
14 persuade people that such a philosophical assumption is
15 limiting their view of the world.

16 I would not think it a proper activity to do that
17 simply with the goal of making the scientific hypothesis
18 and theories we entertain more or less congenial to any
19 particular religious or philosophical point of view.

20 Q. To summarize, you have an objection to any scientist
21 whose goal is to develop science consonant with
22 Christian and theistic convictions?

23 A. If by that you mean develop it in that respect no matter
24 what the evidence shows, yes, that's correct. I would
25 have an objection to that.

1 Q. And I mean if I were you and I felt that way and I saw
2 my name associated with that proposition at a Think Tank
3 that I am a fellow of, I would throw a fit.

4 Did you throw a fit?

5 A. I did not. I do not read into it what I think you are
6 reading into it. So I am not -- I don't think it's -- I
7 know the people who are associated with the Discovery
8 Institute. I know none of them want to constrict
9 science to follow Christian or other convictions.

10 The motivating purpose of everybody I know at the
11 Discovery Institute is rather to have science fairly
12 evaluate evidence free of a large number -- as free of
13 philosophical stipulations and presuppositions as
14 possible.

15 Q. Now, this is talking about Intelligent Design Theory,
16 right, Design Theory?

17 A. Okay, yes.

18 Q. That is your gig. You are one of the leading
19 representatives of that; right?

20 A. Yes, I am.

21 Q. And I understand your point about the philosophical
22 convictions entailed in a materialistic world view. I
23 understand your point there.

24 This also says that Design Theory promises to
25 replace whatever else is out there with a science

1 consonant with Christian and theistic convictions.

2 And you are telling me you are comfortable with
3 that language, with your name being associated with that
4 language?

5 MR. WHITE: Objection. You are misrepresenting
6 what he said.

7 A. I did not say I was comfortable with that.

8 BY MR. ROTHSCHILD:

9 Q. You are uncomfortable with it?

10 A. To tell you the truth, I pretty much ignored it because
11 I viewed it as sort of boilerplate written by people who
12 are more concerned with communicating with the broader
13 public than the exact science itself.

14 Q. You didn't shout out what is this, this isn't what I am
15 all about; you didn't protest to the Discovery
16 Institute?

17 A. I am a low key fellow. I don't protest very often.

18 Q. So this document that associates you with that
19 proposition, you just let lay?

20 A. Well, I don't think it associates me. If I went about
21 objecting to every document that included my name in it
22 since my book came out, I would be a busy fellow and
23 wouldn't get to do much else.

24 Q. It's a little different what it is a document prepared
25 by a Think Tank that you are a fellow at; correct?

1 A. Yes, it is. But I don't think this is -- this did not
2 strike me as requiring action.

3 Q. And going back to the handwritten page two under the
4 heading Goals?

5 A. Yes.

6 Q. The second goal listed here in the first column is to
7 replace materialistic explanations with the theistic
8 understanding that nature and human beings are created
9 by God.

10 Is that a goal of yours as a scientist?

11 A. No.

12 Q. Do you agree that that violates your rule that a
13 scientific theory should not tailor its claims to agree
14 with any particular religion?

15 A. That's correct. I don't think here it's arguing about
16 scientific theories, however.

17 Q. You said early in the deposition that you were asked to
18 communicate with Dr. Nilsen, get them to listen to the
19 Discovery Institute's position; is that correct?

20 A. That's correct.

21 Q. Your understanding was the Discovery Institute was
22 trying to convey that Intelligent Design was not
23 sufficiently developed to be presented in the classroom;
24 is that correct?

25 A. That's correct.

1 Q. Are you aware that Stephen Meyer who is the Director of
2 the Discovery Institute stated in a news article that
3 the Dover School Board got it wrong by including
4 Intelligent Design in the curriculum because Intelligent
5 Design --

6 MR. WHITE: Objection, assuming it is in the
7 curriculum.

8 MR. ROTHSCHILD: You must know different facts
9 than me, Ed.

10 MR. WHITE: Continue.

11 MR. ROTHSCHILD: Would you like an exhibit, Ed?

12 MR. WHITE: Sure. I wish you'd taken a break and
13 talk about how much longer you intend to go and what
14 other depositions might be on the seven hours.

15 MR. ROTHSCHILD: Do you want to take a break right
16 now?

17 MR. WHITE: Yes.

18 (An off-the-record discussion was had.)

19 BY MR. ROTHSCHILD:

20 Q. Are you aware that Stephen Meyer took the position that
21 the Dover School Board got it wrong by including
22 Intelligent Design in the curriculum because Intelligent
23 Design isn't established enough yet for that?

24 A. I am not quite sure. I haven't read his explanation for
25 that. I believe I read him saying that he got -- he

1 thinks they got it wrong. I don't remember him saying
2 why exactly.

3 Q. I think you said that you had not seen a newsletter that
4 was circulated to the Dover community; is that correct?

5 A. I don't think so.

6 Q. I am going to have go ahead and have it marked as an
7 exhibit. Then you can tell me whether you still feel
8 the same way.

9 (Behe Exhibit 13 was marked.)

10 BY MR. ROTHSCHILD:

11 Q. Do you recognize this document? I am not suggesting you
12 should have.

13 A. I do not, no.

14 Q. If you look at the left-hand column on the first page,
15 you see there is some frequently asked questions?

16 A. Yes, I see that.

17 Q. Then that continues on to the second page. What I want
18 to focus your attention on is the question what is the
19 theory of Intelligent Design?

20 Let me just ask you to read that to yourself and
21 tell me whether you think that provides an accurate
22 depiction of the Theory of Intelligent Design.

23 A. Just the section What is the Theory of Intelligent
24 Design?

25 Q. Yes.

1 A. Yes. There are parts of that which do described what I
2 understand to be Intelligent Design, and there also
3 seems to be some commentary as well. It has got it in
4 there. It has also got extraneous things, too.

5 Q. Extraneous referring to?

6 A. Comments about Bill Gates and so on.

7 Q. Looking at that, you don't find anything about it to be
8 inaccurate?

9 A. Inaccurate? Well, growing numbers of scientists is in
10 the eye of the beholder. But the last sentence of the
11 first paragraph, its principal argument is that certain
12 features of the universe are best explained by an
13 intelligent cause rather than undirected causes such as
14 Darwin's Theory of Natural Selection, that is my
15 understanding of Intelligent Design, too.

16 Q. And the part about endorsed by a growing number of
17 credible scientists, you can't take a position on that
18 one way or the other?

19 A. That's correct.

20 Q. In your report, you had a fascinating section on the
21 practical utility Intelligent Design might have in the
22 area of the design of antibiotics?

23 A. Yes.

24 Q. And can you explain how Intelligent Design principles
25 would change how scientists approach the subject of

1 antibiotic development in a way that would be helpful?

2 A. My point in that section is that when scientists look
3 for antibiotics, they are looking for compounds which
4 would be toxic to bacteria and which will be beyond the
5 ability of the bacteria to evolve resistance to.

6 It is known that, of course, natural selection can
7 produce antibiotic resistance in some bacteria to some
8 drugs. But apparently, it cannot do so for all drugs.

9 And that if one has reason to believe that there
10 are limits to unintelligent processes to Darwinian
11 selection, then one can be confident that the search for
12 an effective antibiotic which will not be rendered moot
13 by bacteria evolving resistance, one can be confident
14 that such a search may be fruitful. So that is what I
15 intended by that section.

16 Q. And you are not suggesting that anybody -- evolution
17 suggests that the capacity of organisms to develop is
18 limitless; are you?

19 A. The current theory of Darwinian Evolution suggests that
20 organisms over long periods of time have remarkable
21 abilities to develop extremely sophisticated machinery
22 which do things which require much more sophistication
23 and many more components and so on than simply
24 detoxifying an antibiotic.

25 If evolutionary processes can do a more

1 sophisticated task, then it is reasonable to suppose
2 that they would be able to do a less sophisticated task.
3 But nonetheless, if one has reason to think that
4 evolutionary processes can't do sophisticated tasks by
5 themselves, that there are limits to what Darwinian
6 processes can do, then one can search for those limits.

7 And one practical benefit of searching for limits
8 might be to find toxic compounds that bacteria would be
9 unable to respond to.

10 Q. Why would adhering to the Theory of Intelligent Design
11 aid a scientist engaged in this process any more than if
12 a scientist rejected Intelligent Design; wouldn't they
13 still be looking to develop an antibiotic that bacteria
14 can't evolve to defeat?

15 A. A person who was confident that there are such limits to
16 bacterial abilities would be more likely to look for
17 such compounds. One doesn't look for something which
18 one doesn't have good reason to think may be found.

19 Just as an analogy, a person who believes in
20 Einstein's theory that nothing can travel faster than
21 the speed of light is unlikely to spend a lot of time
22 looking for objects that can go faster than the speed of
23 light.

24 If a person assumes that Evolution is extremely
25 powerful, extremely rapid and can do very impressive

1 things, then he is less likely to think that any
2 solution one tries to achieve in terms of antibiotics or
3 other such compounds will be effective for long.

4 Q. You relied in part on an article by Barry Hall for this
5 proposition?

6 A. That's correct.

7 Q. And the article by Barry Hall was addressing the
8 potential limitations of bacteria to evolve to
9 counteract some antibiotic; correct?

10 A. Yes.

11 Q. And there was no indication in this article that Barry
12 Hall was employing Intelligent Design principles;
13 correct?

14 A. That's right. I noted that in my report.

15 Q. And you have no reason to believe that Barry Hall has
16 any affection for Intelligent Design; do you?

17 A. No. But I would point out that Barry Hall is one
18 person. And that if more people had reason to doubt
19 that Evolution could do large changes in bacteria, then
20 maybe there would be a hundred times as many people
21 searching for such things.

22 Maybe people would have more confidence that such
23 a program of action would be fruitful.

24 Q. But so far as we know, Barry Hall didn't need the
25 illumination of Intelligent Design to look for exactly

1 the type of thing you would like to see him looking for?

2 A. He did not need the illumination of Darwin Evolution or
3 Intelligent Design to do what he is doing.

4 Q. He didn't need Intelligent Design?

5 A. He didn't need a lot of different things.

6 Q. In fact, you say he didn't need Darwinian Evolution, but
7 in fact, his article discusses Evolution including the
8 Evolution that had occurred to date for this particular
9 bacteria?

10 A. He didn't need the thesis that Darwinian Evolution can
11 produce complex molecular machinery, that it can do
12 sophisticated tasks.

13 Q. But you are talking about how Intelligent Design can
14 contribute to the develop of antibiotics. I think we
15 are agreeing that Barry Hall was able to do the very
16 same things you would like to see done in the
17 development of antibiotics through the benefit of
18 Intelligent Design without using Intelligent Design
19 principles at all; is that fair?

20 A. That's correct.

21 MR. WHITE: At this point, we are just going to
22 end. You have gone over by like twenty minutes.

23 MR. ROTHSCHILD: You just said five minutes ago we
24 are going to have an hour. I am very close to being
25 done.

1 MR. WHITE: But you didn't guarantee me anything.

2 MR. ROTHSCHILD: I am not going to guarantee you
3 anything because there's the issue of the rebuttal
4 reports. If you allow me to finish, you can have a
5 higher degree of confidence that I'm not going to ask
6 you to come back.

7 I am not going to promise you anything. We got
8 the rebuttal reports two days ago. I am not criticizing
9 anybody for that.

10 Ed, you can take whatever position you want. But
11 when you get in the middle of the deposition of Ken
12 Miller and you want fifteen extra minutes, I don't think
13 you are going to want to set this precedent.

14 MR. WHITE: I am not setting a precedent now. I
15 just want some assurances from you that we are not going
16 to be going way over board here.

17 MR. ROTHSCHILD: I am not going overboard.

18 MR. WHITE: I will give you a reasonable amount of
19 time.

20 MR. ROTHSCHILD: I think you will be rewarded.

21 MR. WHITE: Before you told me all these things
22 were going on, but it turned out they weren't going on.

23 MR. ROTHSCHILD: Let's take a three-minute break,
24 and I should be able to wrap up.

25 MR. WHITE: Okay.

1 (A recess was taken.)

2 AFTER RECESS

3 BY MR. ROTHSCHILD:

4 Q. In the statement that is read to the Dover students, the
5 students are told that Darwin's Theory is a theory, not
6 a fact?

7 A. And I am afraid I have lost that.

8 Q. I don't even know if I have given it to you.

9 A. Okay.

10 Q. I am just going to read it to you. One of the things
11 that is stated is Darwin's Theory is a theory, not a
12 fact?

13 A. Yes.

14 Q. As a scientist, does that statement have any
15 significance to you?

16 A. Yes, it means that Darwin's Theory is a proposed
17 explanation to explain some data that we have at hand.

18 Q. Many facts; right?

19 A. Well, yes. It's applied to many different things, yes.

20 Q. Would you agree that there is no greater degree of
21 certainty or more information that would allow Darwin's
22 Theory to graduate to a fact?

23 A. Yes. Theories are not facts. Facts are not theories.
24 They are a separate thing. However as I state in one of
25 my rebuttal reports, a number of Darwinians have claimed

1 fact hood for the theory.

2 In particular, Michael Ruse, who is a Professor of
3 the Philosophy of Biology, who is now at Florida State
4 University, famously wrote in one of his books that
5 Evolution is a -- quote -- fact, fact, Fact with greater
6 emphasis on the last two facts, italicizing the second
7 one, italicizing and capitalizing the last one.

8 So while I understand that his theory is not a
9 fact, people who read such assertions as Michael Ruse
10 makes -- and other people have made similar assertions
11 -- might be confused about the status of Darwin's
12 Theory.

13 Q. Is it safe to say Michael Ruse is not teaching biology
14 to Dover high school students?

15 A. He is not, but other people whose work is drawn upon
16 in biology textbooks have said similar things.

17 Q. Are you aware of whether in the biology textbook used by
18 Dover students the assertion Evolution is a fact is
19 made?

20 A. I am not, but I assume they get information about
21 Evolution from other sources as well.

22 Q. Okay. But you don't know anything about how Evolution
23 is taught at Dover High School; is that fair?

24 A. That's correct.

25 Q. And putting aside all these things said by the Michael

1 Ruse's of the world, this statement that Evolution is a
2 theory, not a fact is really not a meaningful scientific
3 assertion; is it?

4 A. I think it is a useful clarification of terms for things
5 that often times get confused even by professional
6 academics interested in Darwinian Evolution.

7 Q. Is there any reason to distinguish Darwinian Evolution
8 from anatomic theory or germ theory on the issue of
9 theory, not a fact; none of those are facts; right?
10 They are theories.

11 A. What is germ theory? Can you tell me exactly?

12 Q. You don't know what germ theory is?

13 A. I asked you first.

14 Q. You don't get to ask questions.

15 MR. WHITE: I object because your question is
16 vague.

17 A. I have never seen germ theory written out.

18 BY MR. ROTHSCHILD:

19 Q. Let's use anatomic theory.

20 A. Okay. And the question is again?

21 Q. You would characterize anatomic theory as a theory, not a
22 fact; correct?

23 A. That's correct.

24 Q. And similar to Evolution, there isn't something that
25 would cause anatomic theory to be recharacterized as a

1 fact; is that fair?

2 A. That's correct.

3 Q. And can you think of any reason why it is necessary to
4 point out to students in a statement that Evolution is a
5 theory, not a fact, but not do the same for other
6 theories that they are being presented in their
7 classroom?

8 A. Yes, I can think of several reasons. One is that
9 prominent evolutionary biologists, as well as
10 philosophers of science who should know better, have in
11 fact stated strongly and publicly that Evolution is a
12 fact, fact, fact.

13 And although it may not -- their statements may
14 not be found in the high school of Dover, the teachers
15 there might easily realize that students could come
16 across such statements in other venues and be considered
17 that they have a proper understanding of what Evolution
18 is.

19 And the second reason is that Darwin's Theory is
20 completely different from other theories in science,
21 such as atomic theory, or germ theory, or the theory of
22 gravity because many people in many places, many
23 academics and others have made sweeping statements that
24 it has implications far and wide beyond biology.

25 It affects not only biological systems, it affects

1 how we view ourselves. It can be interpreted to tell us
2 how we should form our political systems, how we should
3 interpret works of literature which I discuss in one of
4 my rebuttal reports.

5 For atomic theory, it has never been stated that
6 atomic theory allows a person to be an intellectually
7 fulfilled atheist, but that has been made -- that claim
8 has been made for Darwin's Theory by a prominent
9 evolutionary biologist by the name of Richard Dawkins.

10 A philosopher of biology whose names escapes me
11 now wrote an article in the Journal of Biology and
12 Philosophy saying that Darwinism makes nihilism a
13 conclusion. It implies nihilism.

14 A philosopher of biology by the name of Daniel
15 Dennet has called Darwin's Theory a universal acid which
16 dissolves our most cherished beliefs.

17 A political philosopher by the name of Larry
18 Arnhart has written a book called Darwinian Natural
19 Right in which he claims that Darwinian Theory supports
20 a conservative political view of governance.

21 A man named Peter Singer at Princeton University
22 has written a book called A Darwinian Left where he
23 argues that Darwinism implies a liberal theory of
24 governance.

25 Kenneth Miller, an expert witness for the

1 plaintiffs, has written in his own textbook Biology that
2 Darwin's Theory leaves no intellectual endeavor -- I am
3 paraphrasing -- untouched. That it is a sweeping
4 theory.

5 Another witness for -- another expert witness for
6 the plaintiffs John Haught has written several books on
7 the theological implications of Darwin's Theory.

8 For no other theory in science are such sweeping
9 claims made. And I think it is a very rational position
10 to say for a theory for which such sweeping claims are
11 made, one should be very careful with the students to go
12 over exactly what the evidence shows, how it is limited
13 and other such things.

14 So I think it is completely justifiable to pick --
15 to make all these extra efforts with Darwin's Theory and
16 not for other theories.

17 MR. WHITE: We are done. We have gone over a half
18 hour.

19 MR. ROTHSCHILD: I didn't ask for that ten minute
20 speech. Let me finish my questions.

21 MR. WHITE: This is the last line of questioning.

22 BY MR. ROTHSCHILD:

23 Q. Would you agree that all statements that you just
24 recited are philosophical or metaphysical or political
25 interpretations of Darwin's Theory and not scientific

1 statements?

2 A. Yes, they go well beyond biology.

3 Q. They are not scientific statements?

4 A. I think they are claims about a scientific theory that
5 students are likely to encounter.

6 Q. Please answer my question so we can finish. Are they
7 scientific? Are they scientific statements?

8 A. No, they are not.

9 MR. ROTHSCHILD: I have no further questions.

10 (The deposition was concluded at 6:15 p.m.)

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COMMONWEALTH OF PENNSYLVANIA :
 :
 COUNTY OF CUMBERLAND :

I, Vicki L. Fox, Reporter and Notary Public in and for the Commonwealth of Pennsylvania and County of Cumberland, do hereby certify that the foregoing testimony was taken before me at the time and place hereinbefore set forth, and that it is the testimony of:

MICHAEL BEHE

I further certify that said witness was by me duly sworn to testify the whole and complete truth in said cause; that the testimony then given was reported by me stenographically, and subsequently transcribed under my direction and supervision; and that the foregoing is a full, true and correct transcript of my original shorthand notes.

I further certify that I am not counsel for nor related to any of the parties to the foregoing cause, nor employed by them or their attorneys, and am not interested in the subject matter or outcome thereof.

Dated at Camp Hill, Pennsylvania, this 22nd day of May, 2005.

Vicki L. Fox
 Reporter - Notary Public

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