

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF COLUMBIA

FRIENDS FOR ALL CHILDREN, INC., as legal  
guardian and next friend of the named 150  
infant individuals, et al.,

Plaintiff

-against-

Civil Action No. 76-0544

LOCKHEED AIRCRAFT CORPORATION

Defendant and Third-Party Plaintiff

-against-

THE UNITED STATES OF AMERICA

Third-Party Defendant

Deposition of:

**JOHN CARROLL**

Wednesday, November 25, 1981

Washington, D. C.

GASDOR REPORTING COMPANY  
General Stenotype Reporting  
499 South Capitol Street, SW, Suite 408  
Washington, D. C. 20003

(202) 484-0016

Deposition of JOHN CARROLL was taken, pursuant to

notice, before Clifton J. Hunt, a Notary Public in and for the District of Columbia, commencing at 10:10 a.m., Wednesday, November 25, 1981, in the law offices of Haight, Gardner, Poor & Havens, Suite 1000, 1819 H Street, N. W. Washington, D. C.

APPEARANCES:

On behalf of the Plaintiff:

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On behalf of Defendant Lockheed:

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Phone: (202) 775-1300

I N D E X

Wednesday, November 25, 1981

Washington, D. C.

DEPONENT:

JOHN CARROLL

DIRECT EXAMINATION

3

E X H I B I T S

FOR. ID.

Carroll Exhibit A

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Carroll Exhibits 1 - 19

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## PROCEEDINGS

MR. DUBUC: This is a continued deposition by order of the court. That is the prior depositions, if you want to put that into your computer. It is continued by order of the court at a hearing October 28, 1981, that is arranged today by agreement of the parties.

Whereupon,

JOHN CARROLL

was called as a witness and, after being first duly sworn by the Notary Public, was examined and testified as follows:

BY MR. DUBUC:

Q      Mr. Carroll, since your last partial deposition on October 28, have you had occasion to review any additional documents, reports or material which you are going to use in connection with your deposition?

A Yes, I have reviewed material just as of this morning.

Q      What did you review?

MR. FRICKER: Mr. Dubuc, if I might, I am not trying to substitute my statement for any testimony Mr. Carroll can give, but there is a large volume of materials

1 that he has previously, or today reviewed. I, in anticipation  
2 of you asking that question, have prepared a list of the →:  
3 materials, and in my handwriting, with his review. We can  
4 do it any way you would like. If you would like to mark  
5 this particular sheet of paper, that is your pleasure.

6 MR. DUBUC: Sure.

7 MR. FRICKER: After doing so, I would appreciate  
8 if I could have it back so I can read from it.

9 BY MR. DUBUC:

10 Q You have reviewed, Dr. Carroll, the Tarbell series  
11 2, 3, and 4 of slides. We showed you some of those when  
12 you were here the last time.

13 A Yes.

14 Q Are there any of those that are particularly  
15 significant to you?

16 MR. FRICKER: Objection. Asked and answered. I  
17 think you showed him the entire series.

18 MR. DUBUC: Did you review those this morning?

19 THE WITNESS: Not those.

20 MR. FRICKER: Mr. Dubuc, if you don't mind. We  
21 haven't marked that sheet of paper. I asked you if I could  
22 have it back. It would be quicker to do it that way as

1 opposed to asking questions. The gentleman will be confused.

2 MR. DUBUC: I am not going to be confused about -  
3 how to do this. I am trying to get in as fast as I can. You  
4 gave me a list. You asked him what he reviewed. I am trying  
5 to ask him what he reviewed on his list. That seems logical  
6 to me.

7 THE WITNESS: The only thing I reviewed today which  
8 are supposedly in that list are the color slides provided  
9 by Allen and the color 8 by 10 photographs, black and  
10 white 8 by 10 photographs that I hadn't seen before, and a  
11 movie that evidently just arrived this morning and I reviewed  
12 for the first time.

13 BY MR. DUBUC:

14 Q Did you bring the things you reviewed today  
15 or since your deposition with you?

16 A No.

17 MR. DUBUC: Mr. Fricker, we have gone through this  
18 before. We have brought with us at every deposition what the  
19 people have reviewed. We brought copies that they reviewed.  
20 If there was something new you would bring it so it would save  
21 time, rather than going through all the slides to see which  
22 ones he reviewed this morning.

1                   MR. FRICKER: Do you want to conduct the deposition  
2 the way you want to? That is your business. I am in position  
3 to try to assist you in that regard if you are interested.  
4 If you are not, ask your questions, Mr. Dubuc.

5                   BY MR. DUBUC:

6                   Q     Which slides by number did you review this morning?

7                   A     I don't know the numbers. There were about -- I  
8 don't know, 60 or 70, more or less, color slides. And among  
9 those were some that showed views that I hadn't seen before  
10 that helped to confirm some of my opinions about the impact of  
11 the upper troop compartment.

12                  Q     You don't know which ones they are?

13                  A     No, I don't.

14                  Q     How about the 8 by 10's reviewed that you hadn't  
15 seen before? Do you know those by deposition number?

16                  A     I don't know by number. They were a lot more  
17 clearer in definition of some of the earlier scenes.

18                  Q     How about the movie you reviewed? Had you seen that  
19 before?

20                  A     I have seen portions of it. There is a large reel  
21 of movie film and it contained some of the scenes that were  
22 on the earlier motion picture films, but also included some

1 additional ones that I hadn't seen before.

2 Q Is that movie something you are going to base part  
3 of your opinion on?  
4

5 A I don't think I need that to base my opinion.

6 Q It is listed as a different movie.

7 MR. DUBUC: Can you tell us what that is,  
8 Mr. Flicker? You also know -- I don't know whether we have  
9 seen or have all the things you have got. We certainly don't  
have a different movie.

10 MR. FRICKER: In my writing at the bottom of the  
11 sheet of paper is a star and check mark on the words,  
12 "different movie". Approximately an hour and 15 minutes ago,  
13 in the course of trying to assemble every piece of photograph  
14 documentation that our office had, our office had to make  
15 sure that Mr. Carroll had at least a brief opportunity to  
16 scan. I walked to Mr. Aaron, Junior's office. He was  
17 absent from it; and lying on the middle of his desk was a  
18 metal film canister, about 12 inches in diameter. How it  
19 got there, when it got there, who put it there, I have no  
20 knowledge. It wasn't there last night when I was in  
21 Mr. Lewis' office. I was in deposition this morning. That  
22 canister has associated with it two Army-Air Force military

1 type transmittal forms, one of which appears to bear the sig-  
2 nature of Col. Washington, bearing a date of 30, July, I believe  
3 1975, transmitting that film to some judge advocate's office,  
4 as best I can recall.

5 The time I discovered it, after arriving here, my  
6 time was spent in viewing the film with Mr. Carroll, with  
7 other attorneys present in our office, talking to Mr. Connors  
8 of your office several times, among other things. That is  
9 what this film is.

10 In my writing this underlining I say, "different".  
11 That is my view, and I believe shared by Mr. Carroll, based  
12 upon films he had earlier seen which were, generally speaking,  
13 the short 150 foot film and the longer 700 plus film.

14 The third film is different in that it contains  
15 brief portions not present in either of the other two films.  
16 We have not had an opportunity to evaluate it beyond that.  
17 That is the sum and essence of what that item means, what  
18 we have and what I know. I will add, at this point, in my  
19 presence and at my request this morning, just before we came  
20 over here, Mr. Carroll also reviewed what we had previously  
21 had produced to us and what I believe your office now has, the  
22 negatives of, namely, the series of 60 plus color, 8 by 10

1       inch prints, the negatives of which had been furnished to us  
2       through Major Trai. r. Mr. Carroll has seen those today. He  
3       has also reviewed all 126 color slides that had been produced  
4       to us from Major Trainor and which are marked the Allen  
5       series. Those are the ones which include briefing slides  
6       that made our tape. You had them in your offices all day  
7       yesterday. I am under the impression from John Connors that  
8       he was at least going to try to have you, Mr. Dubuc, review  
9       those last night. Whether you did or not I don't know.

10                   Mr. Carroll also reviewed today, may have reviewed  
11       before -- I think he indicated he did -- the black and white  
12       8 by 10 inch prints that had been furnished to us on the  
13       evening of Major Traynor - arriving in the country from Germany.  
14       I don't believe Mr. Carroll had seen those before.

15                   In addition, he reviewed, I believe, for the first  
16       time, what has been marked as AFIFC-10, which was an 8 by 10  
17       color print of the inside of the Troop Compartment with  
18       upholstery on the seats, which is the picture that has ob-  
19       tained some notoriety in relationship to the videotape  
20       deposition of Christie Leivermann.

21                   The rest of the items on this yellow sheet of paper  
22       is simply an inventory to make sure for myself and for

1 Mr. Carroll's purposes that he had seen all the other photo-  
2 graphic evidence. This does not include the fact that also,  
3 as he previously testified, he reviewed various documents  
4 associated with the collateral or accident investigation.

5 Is that, Mr. Carroll, to the best of your knowledge  
6 and understanding, given all these numbers?

7 THE WITNESS: That is correct.

8 MR. FRICKER: Did I prepare the sheet in your  
9 presence and with your assistance?

10 THE WITNESS: Yes, you did.

11 MR. FRICKER: I might add one other thing for  
12 clarification purposes. There is an item on the sheet that  
13 says, "Piper", 15 and 18, 3212 to 3213 and 3216. These are  
14 notations done in my handwriting, based upon comments made by  
15 Mr. Carroll as he today viewed for the first or second time  
16 -- I don't know which -- certain color prints that we  
17 obtained from Mr. Piper some time ago; and these designations  
18 are the ones that Mr. John Connors of your office and I have  
19 been using since that production.

20 That should assist you in some way in identifying  
21 materials he has seen and, in certain instances, what he  
22 considers most relevant.

1 MR. DUBUC: Would you mark that Carroll Deposition

2 Number A with today's date?

3 (Whereupon, the above-referred to

4 document was marked as Carroll

5 Deposition Exhibit No. A)

6 BY MR. DUBUC:

7 Q I don't have the movie. You say the movie is not  
8 particularly relevant in your opinion?

9 MR. FRICKER: Objection.

10 BY MR. DUBUC:

11 Q Withdrawn. Is the movie relevant, in your opinion,  
12 which you say today, which you say is the "different movie"?

13 A Yes. It helps me establish the severity of the  
14 impact of the upper troop compartment.

15 Q And what in particular -- what items or depictions  
16 are you referring to?

17 A It contains a series of continuous views obviously  
18 taken from the helicopter looking down on the overall accident  
19 scene and then circling, in as much as a 360 degree circle  
20 the aft troop compartment area, as well as the wing and  
21 body area of the wreckage.

22 Q Anything else you remember about that picture that

1 is of significance to you, the different movie?

2 A Of particular significance was one of the best →  
3 views showing the hummock or a rise of terrain against which  
4 the aft troop compartment is situated in its resting place.

5 Q This is a picture from the helicopter as part of  
6 that movie?

7 A Yes.

8 Q Do you have any idea of the altitude of the heli-  
9 copter?

10 A No.

11 Q Do you have any idea of the camera angle?

12 A Precisely, no.

13 Q Does that make any difference, in your experience?

14 A Certainly.

15 Q Also on this list Mr. Fricker has indicated you  
16 reviewed some slides and some prints from Mark Trainer,  
17 prints and Trainer slides. What is the significance of those  
18 in the items you reviewed today? Do you consider them  
19 relevant, in your opinion?

20 FRICKER: You say the Trainer slides. You mean  
21 the ones you called Alan slides?

22 MR. DUBUC: Whatever you described. You have listed

1 black and white and Trainer slides.

2 MR. FRICKER: Your question referred to prints as  
3 well as slides?

4 MR. DUBUC: Let's take prints.

5 BY MR. DUBUC:

6 Q What of significance in the Traynor prints is  
7 relevant, in your opinion?

8 MR. FRICKER: Objection to the form.

9 THE WITNESS: I looked at so many slides and color  
10 prints in such a short period of time. I just don't recall  
11 exactly whether there was any one thing of particular signi-  
12 ficance. I did note those were probably the photographs of  
13 the greatest clarity I have seen before.

14 Q I am interested in your opinion of this morning.  
15 Now, focusing in particular on the Traynor black and white  
16 and color prints, are they of any significance that you rely  
17 upon, in your opinion?

18 A I think it was among the color prints as well as  
19 among the color slides that I had seen the best views and  
20 angles of the aft troop compartment in relationship to the  
21 terrain elevations.

22 Q Anything else other than that?

1           A     Among the color slides, possibly among some of the  
2           color 8 by 10 prints were much better views of the discolora-  
3           tion of the terrain around, surrounding the cockpit area,  
4           the upper troop compartment and the wing wreckage area.

5           Q     What is the significance of that to you?

6           A     The discolorations would indicate areas of exposure  
7           to fireball deposits of jet fuel and various degrees of  
8           intensity, fire damage to the earth, the terrain surrounding  
9           the various pieces of wreckage.

10          Q     Did you make a determination of what kind of jet  
11          fuel was on the aircraft involved in this accident?

12          A     No, I didn't.

13          Q     You assumed it was JP4? Did you have any familiar-  
14          ity with the characteristics of JP4?

15          MR. FRICKER: I am sorry. Did you ask him to  
16          assume it was JP4?

17          MR. DUBUC: If he assumed it was JP4, my question  
18          is, do you have any familiarity with the characteristics of  
19          JP4?

20          THE WITNESS: I spent several years examining the  
21          various characteristics of the jet fuels, Jet A, B, JP4, 5,  
22          particularly in reference to their flammability and the

1 ignition of flammable fuel mists of various varieties of  
2 jet fuel.

3 BY MR. DUBUC:

4 Q Those jet -- if those jet fuels are spilled or  
5 involved with a spillage of fire, would there be a charac-  
6 teristic odor?

7 A Of all the scenes I have been at, I don't recall  
8 any difference in characteristic of odor.

9 Q Would there be an odor different from air without  
10 jet fuel spill and fumes?

11 A It depends on how soon you arrive at the scene,  
12 how well it has absorbed. But in general, it smells like  
13 kerosene.

14 Q If you spill kerosene, you smell it, don't you?

15 A Yes, but I don't think you can tell if it was a  
16 mixture, JP4, et cetera.

17 Q You would smell the JP4 if it was JP4 or 5?

18 A Unless it was all burned up.

19 Q If it was spilled or present in an area such as a  
20 marshland or rice paddy which has water in it, do you think  
21 you would smell it, in your opinion?

22 MR. FRICKER: Objection.

1 THE WITNESS: I have never been in a rice paddy.

2 I don't know if there is any other overpowering odors that  
3 would dilute the odors of kerosene. I don't know.

4 BY MR. DUBUC:

5 Q Would kerosene tend to float on water?

6 A It should.

7 Q As a floating fuel with an odor, would it give off  
8 that odor if it wasn't burned up?

9 A If kerosene is floating on water, it would give  
10 off odor.

11 Q If you walk through that area, had your clothes  
12 drenched with the water and kerosene, would you expect your  
13 clothes to have the same odor?

14 MR. FRICKER: I object for two reasons. One, it  
15 calls for speculation. It is not a matter of record that  
16 anybody's clothes were drenched that would have been  
17 smelled by some third party, much less this witness.

18 MR. DUBUC: I asked him to assume.

19 MR. FRICKER: To speed this thing up --

20 MR. DUBUC: I can for an answer to the question.

21 MR. FRICKER: He can answer the question. One, I -  
22 state at the outset that which I tried to convey by phone to

1 your associate before coming over here; that is, the scope  
2 of expected testimony of this witness in the trial of the  
3 Otto case or for that purpose or, for that matter, future  
4 cases, so far as we currently intend. Since his last depo-  
5 sition, determination has been made to limit Mr. Carroll's  
6 testimony to the following:

7           He is expected to testify and is prepared to give  
8 today again, an opinion with reasonable scientific cer-  
9 tainty that the crash of the C5A was, by definition, a  
10 non-survivable crash. That opinion is based upon his own  
11 experience in crash investigations as well as being a pilot,  
12 and upon his review of photographic and other documentary  
13 evidence, including reports of Professor Turner, Dr. Morain  
14 and the accident-related reports themselves.

15           He is not being offered as an expert nor is he  
16 expected to testify about G forces in the presence or absence  
17 of fuel spillage, fire, smoke damage, or the like.

18           If I have failed to fully include and exclude in  
19 the statement of his expected testimony, if questions arise,  
20 I will attempt to clarify those matters as you ask about them

21           You may answer the question.

22           MR. DUBUC: The reason for my question, referring

1 to certain prints and slides that he reviewed this morning,  
2 he told me that one of the significant things was the dis- -  
3 coloration he viewed because of the better picture of the  
4 discolors; and this might indicate areas of fire. I might  
5 ask him this question.

6 BY MR. DUBUC:

7 Q The question, Mr. Carroll, is, if we assume  
8 spillage of some kind of get fuel such as JP4-5, Jet A,  
9 whatever, kerosene family of fuels, we have already  
10 established it would have an odor and would float on water.  
11 If there were water, kerosene floating on it, somebody walked  
12 through it 30, 45 minutes after this accident, would you  
13 expect the clothes to be saturated and have the same odor?

14 A How deep is the water? Three, four inches, a foot,  
15 foam?

16 Q Let's say six to twelve inches, so that they would  
17 sink in up to their mid-leg or knee.

18 A Chances are they would absorb both the water and  
19 fuel. The water would probably evaporate and leave residues  
20 of kerosene, JP4 on the pants leg, whatever.

21 Q So until it was cleaned up in some way, it  
22 would have an odor?

1 A It should

2 Q "Should" was your answer?

3 A It should.

4 MR. FRICKER: Objection.

5 BY MR. DUBUC:

6 Q You mentioned the slides. Other than the dis-  
7 coloration you mentioned, is there anything significant about  
8 the slide, the Allen slides you looked at this morning, sig-  
9 nificant to your opinion other than what you have already  
10 told us about discoloration?

11 MR. FRICKER: Or about their clarity.

12 MR. DUBUC: Or their clarity.

13 THE WITNESS: I think when we characterized the  
14 significance of the 8 by 10 prints or slides, that was all-  
15 inclusive.

16 BY MR. DUBUC:

17 Q Mr. Fricker just added to the things apparently  
18 you have reviewed since the last deposition, the reports of  
19 Dr. Turner and Dr. Morain, is that right?

20 A Yes.

21 Q When did you review those?

22 A This morning.

1 Q Did you see them before this?

2 A No.

3 Q In addition to those two documents, have you re-  
4 viewed any other documents since we had your deposition on  
5 October 28, as opposed to slides and pictures?

6 A Nothing else.

7 Q You told us in October that you reviewed the  
8 collateral report, but you had not reviewed the Air Force  
9 accident investigation report. Do you recall that?

10 A Yes.

11 Q Having heard and learned that there is such a re-  
12 port, have you had occasion to review that since your other  
13 deposition?

14 A No.

15 Q Assuming that that report contains some information  
16 as to the sequence of events and the break up of the airplane  
17 and the circumstances of the accident, as an accident investi-  
18 gator in your own experience and also according to your own  
19 published books on the methods of investigation, would you,  
20 in the usual course, review all available accident reports  
21 to keep on the scene?

22 MR. FRICKER: In the usual course of business?

1                   MR. DUBUC: In the usual course of business  
2 analyzing an investigation, would you review all reports of  
3 anybody who was on the scene?

4                   THE WITNESS: If I were conducting, taking part in  
5 an investigation officially, I would want to see everything.

6                   BY MR. DUBUC:

7                   Q     If you were limiting your scope, the scope of your  
8 review to the survivability of the accident, you would want  
9 to review any reports or statements or testimony of people  
10 on the scene or in the airplane if it related or might be  
11 related to survivability accidents, would you not, sir?

12                  MR. FRICKER: Objection, argumentative.

13                  THE WITNESS: I think in order to come to the  
14 conclusions and opinions that I have, based on the collateral  
15 report, its attachments, photographs, I doubt very much if  
16 any additional information, unless it conflicted with what  
17 I had seen, would change my opinion. I just don't think that  
18 I need any more information than I have been afforded to  
19 reach a conclusion.

20                  BY MR. DUBUC:

21                  Q     Whether or not it conflicted or whether it added  
22 additional information, if something added information, you

1 would be interested in it, would you not?

2 A Just like these 8 by 10 prints and color slides  
3 that I reviewed today, it is of added value, yes.

4 Q With respect to survivability aspects, have you  
5 read the facts reported to the extent they are reported in  
6 the aircraft accident report of the Air Force prior to this  
7 deposition?

8 A Collateral report?

9 Q No, the accident report.

10 A I don't think I have seen the Accident Investiga-  
11 tion Board's official report.

12 Q Have you seen the summary of the accident investi-  
13 gation? Have you seen that document?

14 A That I have seen, yes.

15 Q You have seen that. Have you seen any of the  
16 attachments and tabs that document, metallurgical --

17 A I haven't seen metallurgical.

18 MR. FRICKER: May the record reflect what I have  
19 shown him?

20 MR. DUBUC: The record reflects it as D-3.

21 THE WITNESS: As far as I recall, that was the -  
22 only -- this was the summary report, yes. I don't recall

1 seeing any attachments.

2 BY MR. DUBUC:

3 Q How about Tab T, engineering analysis. Did you  
4 see that? Attached to that is also D-9, the records package.

5 A I have seen that.

6 Q You have seen that? You have seen that one?

7 A That summary, aircraft accident incident report.

8 Q D-3? Do you disagree -- did you disagree with any  
9 of the findings of the collateral investigation, factual  
10 report?

11 A Principally the records distribution chart, I  
12 disagree with that.

13 Q Anything else? That is D-9, that record of dis-  
14 tribution?

15 A Yes. I find that inconsistent with the photographic  
16 evidence.

17 Q Did you make any analysis of the photographs or  
18 are you relying upon Dr. Morain?

19 A I didn't make any photo measurement analysis, no.

20 Q Are you relying upon Dr. Morain's report in refer-  
21 ring to your disagreement with certain things on Exhibit D-9,  
22 the records evaluation? Or are you relying on some

1 independent conclusions?

2 MR. FRICKER: I object only so far as we have gone  
3 over this since his last deposition. In fact, mark up D-9.

4 MR. DUBUC: He has read back the Marain report  
5 since then?

6 THE WITNESS: I read Dr. Morain's report today.  
7 That didn't change my opinion. That rather enforced it.

8 BY MR. DUBUC:

9 Q What specifically, if you can recall, do you  
10 disagree with in the wreckage diagram?

11 A We went over that in great detail during the last  
12 deposition.

13 Q As I recall, what you told us, you disagreed  
14 with where the wreckage distribution was and you disagreed  
15 a little bit as to the exact point of impact; and you dis-  
16 agreed as to whether or not there were only two impacts.  
17 Anything else besides that?

18 MR. FRICKER: Objection. I believe the witness has  
19 fully testified to that.

20 MR. DUBUC: That is what he testified to.

21 MR. FRICKER: What he testified to is what he  
22 testified to, not your recollection. You are asking that he

1 agree with your deposition. It has been a month. I don't  
2 know that he has reviewed the deposition.

3 BY MR. DUBUC:

4 Q Have you looked at your deposition transcript?

5 A No.

6 Q You said you may have disagreement on D-9 as to the  
7 burn area depicted on D-9. That was one of the things. Is  
8 that still your conclusion after reading Dr. Morain's report?

9 A That is still my conclusion.

10 Q You indicated that you understood from an initial  
11 analysis that there was a 1400 foot gouge for the track of  
12 the airplane on the west bank of the Saigon River rather than  
13 the 1980 or 2,000 feet depicted on D-9. Is that still your  
14 conclusion?

15 MR. FRICKER: You are characterizing. He doesn't  
16 have benefit of reviewing the testimony. If he can recall  
17 his testimony, that is fine.

18 THE WITNESS: I can't recall. I would have to go  
19 through the chart again.

20 BY MR. DUBUC:

21 Q I have got your chart. I am just trying to find  
22 out, as fast as I can. Mr. Fricker said you reviewed

1 Dr. Morain's report. Dr. Morain has a lot of calculations of  
2 distances, some information on wreckage distribution. I want  
3 to see whether you agree with him or whether you have your  
4 own opinion. If you agree with him, whether you are relying  
5 upon his measurements or doing something independently. That  
6 is the scope of it.

7 A My feeling is essentially that from what I have  
8 read in his report, he agrees with me. It helps to bolster  
9 my opinion there were multiple impacts at different places  
10 than shown on D-9.

11 Q Here is what you showed us last time on D-9. I  
12 think you told us that on the west side of the river -- I  
13 am sorry. I think you told us that on the east side of the  
14 river you had an impact, maybe several impacts, is that  
15 right?

16 A Yes.

17 Q Then you told us that on the west side of the river,  
18 the first point of impact was the dike. Is that still your  
19 opinion?

20 A At or just past the dike in the flight pattern.

21 Q Then you told us that there was an 1100 foot gouge  
22 that you had seen in the pictures, and you disagreed with the

1 indications on D-9 and some of the other testimony to that  
2 effect. Is that correct?

3 MR. FRICKER: If you recall.

4 THE WITNESS: An 1100 gouge? I don't recall that.  
5 It may be.

6 MR. FRICKER: I think it is also important,  
7 Mr. Dubuc, to be sure in this series of questions that the  
8 witness is interpreting the diagram the same as you are in  
9 terms of the marks and whether they show yards or feet.

10 MR. DUBUC: He can look at it. I am sure it has  
11 the scale on it.

12 THE WITNESS: What is your question? What was  
13 the length of the gouge area?

14 BY MR. DUBUC:

15 Q I am trying to shorten this, if I can.

16 October 28th, Page 68, Line 1, "In other words, the gouge,  
17 in your opinion, commences at the dike?" Answer: "Close to  
18 it."

19 Question: "Let's see if you can define it. When  
20 you say close to it, is it a matter," et cetera, et cetera.  
21 "I would say on the order of 1300 foot, from where the scale  
22 indicated in the wreckage distribution chart. One is 1050,

1 the other is 1225 foot, somewhere in the area of 1100 feet,  
2 the gouge." Is that right?

3 A That should have been 1100 yards-wise on this  
4 scale. I think we clarified that later in the testimony.  
5 It is 1100 yards, according to this scale.

6 Q So the gouge marks start 1100 yards from the dike?

7 A Approximately. Maybe, on this scale it looks to  
8 be somewhere around 1100.

9 Q And at 1400 feet you said it came apart? Is that  
10 1400 yards?

11 A Yards.

12 Q Now, I don't think we asked you this before. It  
13 is referred to in Dr. Turner and Mr. Morain's reports. Have  
14 you formed any opinion as to the sequence, as to whether  
15 the tail came off before the wing or the wing came off before  
16 the tail in the break up pattern?

17 A I don't think it is possible to accurately recon-  
18 struct the sequence of the failure. But in broad terms, I  
19 see the aircraft being structurally damaged during the  
20 initial touchdown on the east side of the river.

21 Q You say there would be structural damage there?

22 A Yes.

1 Q In your opinion, to what components?

2 MR. FRICKER: Objection, asked and answered last  
3 session. The record will reflect that he indicated there  
4 was damage to the fuselage structure and that various wheels  
5 and the like came off the plane on the east side of the river.

6 MR. DUBUC: I will tell you why I am asking this  
7 question. Dr. Turner has stated in his report, which you  
8 have read, "The impact -- this is relevant to the east side  
9 of the Saigon River, two pages of report. "The impacts were  
10 of sufficient magnitude to snap down several pieces of gear  
11 to have weakened part or all of the C5A structure." Having  
12 read Dr. Turner's report and made your own analysis, I am  
13 asking the question, with respect to part or all of the  
14 C5A structure, in your opinion, what portions of the struc-  
15 ture would have been damaged at the first impact or impacts  
16 on the east side of the river?

17 THE WITNESS: I would say the gear being  
18 sheared, that the carry through structures of the aircraft,  
19 they would have forces transmitted to them that would  
20 structurally impinge on the integrity of all surrounding  
21 structures.

22 BY MR. DUBUC:

1 Q Which ones specifically, if you know?

2 A I don't know which of those gears were the ones  
3 that sheared in. They weren't identified on the records  
4 distribution chart.

5 Q You don't know which gear sheared? Have you read  
6 any of the testimony of Mr. Edwards or Dr. Turnbow on  
7 various portions of -- where various portions of specific  
8 gear were identified?

9 A No. Any judgment they could offer could not be  
10 corroborated by an accurate records diagram. They may have  
11 made some conclusions as to what those parts were, had other  
12 information I don't have. If they reviewed the same thing  
13 I did, I wouldn't be able to conclude accurately what parts  
14 those are that are on the east side of the river except they  
15 are landing gear, possible scrape marks from the bottom side  
16 of engine pylons, wing-tip, perhaps.

17 Q Some components of some gear were found on the  
18 east side of the river?

19 A That is what the pictures would indicate.

20 Q And if those gears had a particular identifying  
21 criteria or form to an engineer familiar with the aircraft,  
22 would you say -- am I hearing you correctly -- that nobody

1 could identify which gears they were?

2 A If you had that information, you could certainly  
3 begin to establish the sequence of the disintegration. But  
4 I have never seen a wreckage diagram in any accident I have  
5 ever investigated or been connected with that didn't identify  
6 parts of the airplane, nose gear, et cetera.

7 Q In this particular case we had a wreckage diagram  
8 and a great deal of testimony from engineers on the scene who  
9 identified certain parts of certain gear on the east side of  
10 the river. My question is, have you read that testimony?

11 A I doubt it or I would probably have noted what  
12 their opinion was as to what those were. They are normally  
13 identified on the wreckage diagram.

14 Q In your opinion, assuming the identification of  
15 parts is correct, would that add information which might give  
16 you the basis for an opinion as to what additional structural  
17 damage to other components might have occurred if you knew  
18 what specific parts came off of the east side of the river?

19 A If you knew specifically, yes. In the absence of  
20 that, all you have is the gouge marks and some identified  
21 landing gear. And due to the nature and the length and depth,  
22 width, placement of those gouge marks, it is rather simple to

1 conclude what part of the aircraft made those marks.

2 Q It is simple to conclude?

3 A Yes.

4 Q What part did?

5 A One of the landing gear, probably, the aft main  
6 landing gear.

7 Q Assuming it is the aft main landing gear that made  
8 the gouge marks, are you talking about all gouge marks on the  
9 east side of the river that were made by the landing gear in  
10 your hypothetis?

11 A Not all the gouge marks.

12 Q Well, then, what other components? You said it  
13 was relatively easy to tell which components made the gouge  
14 marks. In addition to the landing gear, what other components  
15 made the gouge marks?

16 A Left to right gear housing, the main fuselage. And  
17 some of the photographs indicate symmetrical distances out-  
18 board, additional gouges that may possibly have been from the  
19 underside or trailing edge of the number one and number two  
20 engine cells, possibly number one, the left wing tip.

21 Q Assuming all of those components you have just  
22 named did make either a gouge mark or an impression, would

1 you expect, in your hypothesis, to have some structural  
2 damage to the engine pylons, the wing or wing tip, the gear,  
3 and the fuselage, because as suggested by Dr. Turner --

4 A Yes.

5 Q Any other comments?

6 A I would suspect that the right wing would also have  
7 sustained some damage, if indeed those palm trees were  
8 clipped off.

9 Q What kind of damage would you expect the wing to  
10 sustain?

11 A I would expect the leading edge damage on the right  
12 wing, some under-surface damage, and perhaps damage to the  
13 trailing edge of the control components, flaps, slats, what  
14 have you.

15 Q Did you make any determination what the diameter  
16 of those trees were?

17 A No.

18 Q I asked you before, in the last deposition, if  
19 you knew the weight of the aircraft at the time of first  
20 impact. You didn't know that. Have you had occasion to  
21 check that since then?

22 A No, I haven't.

1 Q Would that make any difference?

2 A No.

3 Q The mass and weight would not make any difference  
4 relative to the trees as far as damage?

5 A That is a different question. If that is a hypo-  
6 thetical question, the mass in this case would make little  
7 difference.

8 Q In your opinion?

9 A Yes. If you are comparing it to a Piper Cub flying  
10 into trees, the mass makes a considerable difference.

11 Q It would? If the Piper Cub hit those trees, you  
12 would expect a different type of structural damage than you  
13 would with the C5A?

14 A Yes.

15 Q In your opinion --

16 A If the wing was torn off, it would.

17 Q In your opinion, the wing was not torn off?

18 A No, it wasn't.

19 Q You mentioned in your deposition short pause, high  
20 magnitude impact force. Do you remember that?

21 A Yes.

22 Q Page 51. You mentioned it with respect to possible

1 mechanism, having some effect on passengers as a result of  
2 short pause, high magnitude forces on other parts of the  
3 airplane. Is that a fair statement of your concept of your  
4 prior discussions?

5 A Yes.

6 Q Would you also have short pause, high magnitude  
7 impact forces operative on this aircraft in connection with  
8 the impact or impacts on the east bank of the Saigon River?

9 A Possibly.

10 Q In your opinion, were any of those forces operative  
11 on any of the occupants of the troop compartment in the  
12 cockpit?

13 MR. FRICKER: If you have an opinion.

14 THE WITNESS: I haven't formed an opinion on that.  
15 It is possible.

16 BY MR. DUBUC:

17 Q Let's break it down. Would any of those short  
18 pauses, high magnitude impact forces have any effect on the  
19 possible weakening in part or all of the C5 structure as a  
20 result of the impact or impacts on the east side of the  
21 Saigon?

22 A Yes. When you say structural damage, all degrees

1 of structural damage, yes, I would say in the upper troop  
2 compartment it is possible short peaks of those forces were  
3 sustained.

4 Q How about the wing?

5 MR. FRICKER: I would object to the form. What  
6 about the wing?

7 MR. DUBUC: How about the effect of those short  
8 pauses, high magnitude impact forces on the wing?

9 THE WITNESS: I just -- I just don't know.

10 BY MR. DUBUC:

11 Q How about on the fuselage base near the wheel  
12 mounts?

13 A I would say most definitely yes, it would be  
14 carried through as structural damage.

15 Q How about the cargo compartment area located above  
16 that?

17 A I would expect to have some degree of upward thrust  
18 force buckling, jolting any of the occupants that might have  
19 been on that deck.

20 Q I am talking in terms of the aircraft. You told  
21 us you didn't have an opinion of the occupants, or I mis-  
22 understood. My question goes to the effect of short pause,

1 high magnitude impact forces on the weakening of part or all  
2 of the C-5 structure as described by Mr. Turner in his  
3 reports. We talked about wheel mounts. You said wheels,  
4 yes. You also said the fuselage structure plus the wheels;  
5 the wings you are not sure of. That is the context. I am  
6 talking about with respect to structure.

7 I thought you told me you didn't have an opinion as  
8 to the effect on the passengers.

9 A You don't have to guess at that. That wouldn't be  
10 very scientific or accurate.

11 Q Would you expect short pause, high magnitude  
12 impact forces operative on the aircraft as a result of impacts  
13 or impact on the east side of the Saigon River to have had any  
14 weakening of the C-5A structure left, say, in the aft fuselage  
15 area?

16 A You mean the empennage or the aft cargo compartment?

17 Q The empennage that is in that general area. Let us  
18 say where the empennage joins the fuselage behind the troop  
19 compartment.

20 A From the evidence, I visualize that aircraft, in

1 effect, rebounding out of the ground area where whatever  
2 gear it was was torn off, actually came off. And that could  
3 cause structural deformation around the tail cone, the for-  
4 ward portion of the empennage. It could begin to bend or  
5 fail components simply due to the mass in the air loads  
6 that would be riding on the horizontal stabilizer and ele-  
7 vators.

8 Q You would have air loads?

9 A I would expect to.

10 Q You would have inertial load?

11 A Yes.

12 Q You would have vertical, lateral and shear loads,  
13 would you not? Let me withdraw that. Let me tie it to  
14 something else.

15 You told us at your last deposition that you  
16 thought that this airplane had a yaw somewhere after passing  
17 over this dike on the west side of the river. Do you  
18 remember that?

19 A Yes.

20 Q If you had such a yaw, you would have lateral  
21 shear loads, would you not?

22 A Yes.

1 Q And if you had any similar yaw or deviation  
2 between the first impact or during the first impact en route  
3 to the west bank, you would also have lateral shear load,  
4 wouldn't you, anytime you got the airplane yawed?

5 A I would have to speculate on that, because of the  
6 nature of the flight pattern being angular at the time. It  
7 may have struck a glancing blow in which the aerleron was  
8 torn off and it could have caused downward loading on the  
9 empennage, or because of the air loads. These could have  
10 offset impact loads. I don't know. You would have to guess  
11 at that.

12 Q The downward loading would be vertical as opposed  
13 to a lateral load?

14 A I don't know.

15 Q You certainly would have lateral shear loads in  
16 the yaw situation, wouldn't you, on the empennage?

17 A If the air loads are such that they could offset  
18 those, you would have to speculate on that.

19 Q I am assuming, of course, the circumstances of the  
20 accident which I was trying to save time on. We know we  
21 didn't have any rudder or horizontal stabilizer control.

22 A Right.

1           Q     If we had a yaw situation, due to some kind of  
2     differential power or differential control by use of dif-  
3     ferential spoilers, anything that is going to yaw that air-  
4     plane under those circumstances, you are going to have a  
5     lateral shear load on the empennage    are you not?  
6

7           A     Probably.  
8

9           Q     If you had a similar force operating as a result  
10    of that condition, with no horizontal stabilizers upwards or  
11    downwards in a semi-uncontrolled condition, you would have  
12    a vertical shear load, wouldn't you?  
13

14          A     You should have.  
15

16          Q     And would you agree you would also have torsion  
17    loads?  
18

19          A     You should have.  
20

21          Q     All those loads would be relevant to a determina-  
22    tion of what kind of forces were operating on, let's say,  
23    the empennage, for example?  
24

25          A     That is right.  
26

27          Q     Now, sir, I want to go back again. Is there any-  
28    thing other -- I don't think we finally got this answer --  
29    other than the two reports of Dr. Morain and Dr. Turner, by-  
30    way of documentation, that you reviewed, photographs, since  
31

1 the last deposition?

2 A Since the last deposition, those two reports, the  
3 movie.

4 Q Except for the movies and the pictures and the  
5 slides.

6 A That is all.

7 Q You reviewed those this morning?

8 A Yes.

9 Q Where was that?

10 A In the offices of Lewis, Wilson, Lewis and Jones.

11 Q Who were you reviewing them with?

12 A Various attorneys who were present.

13 Q Who was present?

14 A John was present.

15 Q John Fricker?

16 A John Fricker, Dr. Cohen; I don't recall who the  
17 others were. There were two others in and out.

18 Q Attorneys or experts?

19 A I would probably recognize them in connection with  
20 the law office.

21 Q Have you had occasion to talk with Dr. Turner about  
22 his report or his preliminary report?

1 A NO.

2 Q How about Dr. Morain? Did you talk to him? ←

3 MR. FRICKER: Before or after filing the report by  
4 Dr. Morain?

5 MR. DUBUC: Either before the report or after.

6 THE WITNESS: I met them both before their reports.

7 BY MR. DUBUC:

8 Q This was on October 27 or 28?

9 A About that time.

10 Q I think you told us last time you had one meeting  
11 on October 21 and another one on the 27th or 28th.

12 A I believe that is right.

13 Q Any meetings subsequent to that prior to this  
14 morning?

15 MR. FRICKER: With either of those gentlemen?

16 MR. DUBUC: Yes.

17 THE WITNESS: No, I left here --

18 BY MR. DUBUC:

19 Q On the 28th?

20 A Yes.

21 Q Have you conferred by telephone with any of those -  
22 gentlemen?

1 A No.

2 Q Have you conferred by telephone since your depo-  
3 sition with any other experts, Dr. Busby, Dr. Cromack,  
4 Dr. Nice, Dr. Timm?

5 A No.

6 Q Dr. Moo?

7 A No.

8 Q Did you prepare any draft report or any notes as  
9 to your review of these reports, slides, pictures, any of  
10 the documentation?

11 A No, I haven't.

12 Q You have no reports?

13 A That is right, no written report.

14 Q You have no written?

15 A That is right.

16 Q Do you have any notes?

17 A Just some of the documents that you reviewed.

18 Q You have notes on the documents?

19 A No.

20 Q No notes on any of the documents you reviewed?

21 A No.

22 Q No underlining?

1 A No. I think the only thing I have marked is the

2 D-9 when I was here.

3 Q Have you ever marked any other D-9?

4 A No.

5 Q Have you seen a copy of the other records diagram  
6 that was prepared by Dr. Morain?

7 MR. FRICKER: You mean the one attached to his  
8 report?

9 MR. DUBUC: Yes.

10 THE WITNESS: There is one that I saw, yes, that  
11 is the last date I was before you.

12 BY MR. DUBUC:

13 Q You reviewed that?

14 A Yes. That looked more accurate and consistent with  
15 the photographic evidence.

16 Q You agree with that, is that correct?

17 A I haven't studied it in detail. I went over it  
18 once quickly this morning. It looked like it gave a more  
19 accurate portrayal of the accident scene as viewed from photo-  
20 graphs.

21 Q Did you see -- is this the one you saw? Have you  
22 seen that one before, Dr. Morain's report?

1 A I saw that.

2 Q This is the one you saw?

3 A Yes.

4 MR. FRICKER: For the record, the one attached to  
5 the Morain report, as furnished to Lockheed counsel.

6 MR. DUBUC: This has been marked as a Morain  
7 exhibit. Is that the revised wreckage diagram that you are  
8 referring to that you have seen?

9 A I guess the one that I had had this stapled last  
10 page on it.

11 Q That is the one you are referring to, is that right?

12 A Yes.

13 Q Now, do you agree with what is depicted on there?

14 A Perhaps I can answer in terms of what I might tend  
15 to disagree with. It would be, there is only one indication  
16 of burned area. I think there are many more other burned  
17 areas in the crash pattern.

18 Q You disagree with them?

19 A Yes, perhaps more superficial in appearance than  
20 the extensively burned area that is identified as burned area.  
21 I do agree with the chart that is burned area. I agree with  
22 the representation.

1       burned area. Do you want to change that now?

2       A      I haven't been asked to.

3       Q      Was there anything on there other than the burned  
4           area information that you disagreed with?

5           MR. FRICKER: I shall specify whether he is going  
6           to be giving an opinion. That is the difficulty.

7           BY MR. DUBUC:

8       Q      You are going to be giving an opinion on some dis-  
9           tances travelled, are you not, and the wreckage distribution,  
10          are you not? Is either of those relevant to the opinion you  
11          are going to be giving or are they irrelevant?

12       A      The distances would be relevant. If this was  
13          spread out over a mile, it would be different.

14       Q      The distances as represented on Dr. Morain's dia-  
15          gram are relevant to your opinion, is that right?

16       A      Yes.

17       Q      Is there anything under distances that he repre-  
18          sented that you disagree with?

19       A      No.

20       Q      Referring to his report itself, at the bottom of the  
21          first page -- have you got that in front of you? He states \_it  
22          will be demonstrated later that the C-5A came to a complete  
          stop at a shorter distance, 1900 feet. Do you agree with that?

A      Shorter distance than what? Where is this?

1 Q Bottom of Page 1. I am sorry. You have got  
2 Morain.

3 MR. FRICKER: You are referring to Turner?

4 MR. DUBUC: I am referring to Turner.

5 BY MR. DUBUC:

6 Q You read Dr. Turner as well? He has the same dia-  
7 gram attached to his. That is the one you were looking at  
8 when you saw it this morning?

9 A Yes.

10 Q You looked at Dr. Turner's report?

11 A I saw Dr. Morain's report, too.

12 Q You mentioned you had seen one where the only  
13 attachment was the diagram. That is Dr. Turner's?

14 A That is the last page.

15 Q That is the one you are referring to?

16 A It doesn't have Dr. Turner's name on the cover. I  
17 didn't recognize it.

18 Q I notice he did not sign it. That has been marked  
19 as Exhibit what? Turner Exhibit 5. You have seen that before  
20 have you not, sir?

21 A This morning.

22 Q This has attached to it the same records diagram

1 that apparently was prepared by Dr. Morain and attached to  
2 Dr. Turner's proposal that we have been talking about.

3 MR. FRICKER: You have been talking about  
4 Dr. Turner's report.

5 MR. DUBUC: They are the same.

6 THE WITNESS: It looks like the same document.

7 BY MR. DUBUC:

8 Q I assume it is. That is what we received. With  
9 respect to distances, Dr. Turner has stated in his report  
10 with respect to comparison, I gather, in some prior testi-  
11 mony with his own analysis, that it would be demonstrated  
12 later that the C5A came to a complete stop in a shorter  
13 distance, 1900 feet shorter than what is described in other  
14 data.

15 Do you agree with that?

16 MF. FRICKER: Object to the characterization. You  
17 started quoting language and then you editorialized. Is  
18 your question whether he agrees with your characterization or  
19 what is typed on the report?

20 MR. DUBUC: I am dealing with distances. He says  
21 distance is relevant to his considerations. Dr. Turner has  
22 made some statements in his report on distances. That is --

1 I am asking whether he agrees with Turner.

2 THE WITNESS: It says, "came to a complete stop" →  
3 in a shorter distance than it does when it makes a normal  
4 landing."

5 BY MR. DUBUC:

6 Q Do you agree with that?

7 A There is no basis to disagree with it.

8 Q Now, with respect to -- we have already covered  
9 something he said on Page 2. I think you mentioned the ruts,  
10 gouges on the east side of the river. You said engines,  
11 wing tips, and he mentioned some of the same things. Then  
12 he has got, on Page 3 and 4 of his report, some discussion of  
13 what happened on the west side of the river. You have re-  
14 viewed that, have you not, sir?

15 A I read it one time this morning.

16 Q There is a statement in there, the middle of Page 3,  
17 relevant to C5A travelling 150 yards braking in 4 seconds.  
18 Do you see that?

19 A Yes.

20 Q Do you agree with that?

21 A As I said before, I would have to speculate on the  
22 precise mechanism of disintegration, time and distance-wise.

1       But in general I would agree with what he has here.

2       Q      In your opinion, is some degree of speculation -  
3       :necessary for this conclusion to be reached?

4                    MR. FRICKER: For the distance or sequence of  
5       breaking up, or both or either?

6                    MR. DUBUC: For the distance and the sequence of  
7       breaking up.

8                    MR. FRICKER: Object to the form.

9                    THE WITNESS: I would have to agree with what he  
10      has here.

11                    BY MR. DUBUC:

12       Q      My question, in your opinion, does that require  
13      some speculation or is that factual on the basis of what you  
14      reviewed?

15       A      Up to what point, what area?

16       Q      The C5A travelled 150 yards, broke into four  
17      separate sections, named in detail the flight deck, complete  
18      wing structure.

19       A      I agree with that. I would say it has been  
20      structurally weakened starting at the initial touchdown point  
21      and that the major separation of those four separate sections  
22      finally began at that point to separate from each other.

1 Q Then it also states, this is also the area, this  
2 point of separation, at this point or impact large amounts  
3 of debris were found on a large section, the area where  
4 almost all the dead were located.

5 A I have seen no data to tell me where the dead were  
6 located.

7 Q So you don't have any opinion on that, is that  
8 right?

9 A No.

10 Q Would there be some speculation in that as far as  
11 your knowledge is concerned?

12 MR. FRICKER: Objection.

13 THE WITNESS: I don't know anything about that.

14 BY MR. DUBUC:

15 Q Then there is a statement that it appears that the  
16 flight deck travelled 150 yards in the air and skidded to a  
17 stop in the remaining 250 yards. Do you agree with that?

18 A I will look at the scale again. Yes.

19 Q On the next page, Page 4, he states, "the aft  
20 troop compartment became detached from between the wing  
21 section and the tail and was," et cetera. Some lift force-  
22 Do you agree with that?

1 A I might characterize it as rebounding rather than  
2 propelled, but it is essentially the same thing.

3 Q You agree with it?

4 A Yes.

5 Q What would the lift force be, in your opinion?

6 A I think some lift force that would be created by  
7 an aerodynamic characteristic of the air foil, shape of the  
8 under surfaces in particular of the aft troop or upper troop  
9 compartment.

10 Q Lift requires some sort of air foil, does it not?

11 A Or thrust.

12 Q Thrust would be described a thrust rather than  
13 lift, would it not?

14 A In order to make an air foil give lift, it must  
15 have either thrust or airflow of some sort.

16 Q Lift force would result in some upward force on  
17 the component?

18 A Yes.

19 Q As a result of differential pressure between the  
20 top surface and the bottom surface?

21 A Yes.

22 Q Would that affect the signature of that component

1 on the ground, in your opinion?

2 A Possibly. It could explain the gouge marks that  
3 lead to the final resting place of the troop compartment as  
4 being in a pitched up attitude. It doesn't necessarily have  
5 to be lift force, clean aerodynamic lift force as you would  
6 expect on an air foil, but rather from the velocity at which  
7 it is moving through the air. It could scoop it up from its  
8 under surface.

9 Q Am I right after that, the troop compartment began  
10 digging into the ground approximately 175 yards from the  
11 point of last impact? Do you see that?

12 A Yes.

13 Q Would the lift force possibly affect the signa-  
14 ture of when it appears it was digging into the ground?

15 MR. FRICKER: Object to the form of the question.

16 MR. DUBUC: In your opinion.

17 MR. FRICKER: You are now taking lift force as a  
18 certainty and asking whether that could cause something else  
19 Lift force was defined by the witness.

20 MR. DUBUC: That is the context in which the  
21 question was asked.

22 THE WITNESS: It is my opinion that that is about

1 the only thing that could explain that signature on the  
2 ground.

3 BY MR. DUBUC:

4 Q Then there is a statement the aft compartment  
5 troop compartment came to a sudden stop after hitting an  
6 elevation. Have you made any determination as to the height  
7 of that suggested elevation in this hypothesis?

8 A This morning I reviewed Morain's report where he  
9 gave an estimate of the height of that elevation, and I had  
10 no quarrel with that until I saw the color slides for the  
11 first time, and they more clearly depicted a greater eleva-  
12 tion than any of the other photographs I have seen before.

13 Q Was there any foilage in front of the troop  
14 compartment that you saw?

15 A Yes.

16 Q Can you give me an estimate as to the height of  
17 that foilage?

18 A From the data that I reviewed previously, I would  
19 say it was somewhere in the order of two or three feet higher  
20 than the elevation of the main crash pattern. But photos  
21 I have seen today plus the movies would indicate that it is  
22 more on the order of five or six feet.

1 Q The foliage?

2 A The terrain.

3 Q My question was the foliage.

4 A I don't know how tall the foliage is, but I would  
5 say the terrain is about, could be double what I estimated  
6 it to be from earlier evidence.

7 Q But you do admit there was foliage there?

8 A Certainly.

9 Q Is the foliage dense?

10 A I don't know how to define density of foliage.

11 Q Can you see the ground through the foliage in the  
12 pictures you have seen that are airborne pictures?

13 A The latest pictures, to put it in better perspec-  
14 tive with the surrounding terran, shows a definite rise in  
15 terrain and more dense foliage perhaps than the surrounding  
16 area.

17 Q I realize your opinion is it is a rising terrain.  
18 My question -- I think you have answered it. The foliage is  
19 more dense than the surrounding area?

20 A It is a different type of foliage. I don't know  
21 if it is more dense.

22 Q Is it dense enough you can't see the full ground

1 through the foilage?

2 A I didn't look at it for that purpose. -3

3 Q Then there is another statement here, The total  
4 distance the troop compartment dug into the ground was  
5 approximately two lengths of the structure or about 40 yards.  
6 Do you agree with that?

7 A Yes.

8 Q How long is the troop compartment?

9 A I think it is 120 feet. I am not sure.

10 Q Forty yards?

11 A One hundred twenty feet. No, it wouldn't be 40  
12 yards.

13 Q One hundred twenty feet is not 40 yards?

14 A It is probably half of that. I don't know.

15 Q I am not talking about the length of the fuselage.  
16 I am talking about the length of the troop compartment.

17 MR. FRICKER: The aft troop compartment?

18 MR. DUBUC: Yes, the one referred to on Page 4.

19 I would like the record to reflect he is referring to  
20 Mr. Morain's report.

21 MR. FRICKER: D 1217, sir.

22 MR. DUBUC: I gather he is referring to Figure 2,

1 which is Exhibit D 1217.

2 THE WITNESS: I can't read the numbers on this. →

3 The fuselage station is given in inches, 47 through -- I  
4 can't read the other number.

5 MR. FRICKER: Mr. Carroll, if you don't know the  
6 answer to his question, simply tell him you don't know the  
7 answer.

8 THE WITNESS: I don't know.

9 BY MR. DUBUC:

10 Q There is a statement there that at the time of the  
11 break up the velocity, the structure of the aircraft before  
12 break up, at the break up point was 338 feet per second.

13 Do you agree with that?

14 A I think that is reasonable.

15 Q And then there is an estimate as to "G" forces.  
16 Are those relevant to your analysis of survivability or not,  
17 your estimate of "G" forces? Mr. Fricker said you are not  
18 going to testify on "G" forces. I am trying to find out  
19 whether this has anything to do with your opinion.

20 A Well, yes and no. If the structural disinte-  
21 gration had not been as extensive as it was in this case, then  
22 the "G" forces would come into play to determine whether, for

1 instance, an intact structure may have transmitted forces  
2 in excess of those that would normally be expected to be  
3 tolerable. So, yes and no. It is of interest. →

4 Q Tolerable by whom?

5 A Human beings.

6 Q What are the human tolerances of "G" forces in  
7 terms of X, Y, G?

8 A It is in range.

9 Q Let's say XX, what is the human tolerability?

10 A It is a complex thing. It is measured in terms  
11 of magnitude; direction, direction of application; whether  
12 the person is prone or seated, standing, what have you; the  
13 duration of the force and the peak pulse shape. And those  
14 have been defined in very broad terms as somewhere in the  
15 order of 40 G transverse to the spine at somewhere in the  
16 order of 1300 G's per second rate of onset, duration,  
17 approximately two milliseconds, 18 hundredths to 20 hundredths.

18 Q This would be an XX transverse to the spine?

19 A I don't know. I don't use the X. Parallel verti-  
20 cal to the spine, 6 G, approximately the same rate of onset  
21 and duration.

22 Q That is 1300 G's per second onset, two milliseconds

1 or microseconds?

2 A Yes. And the transverse which I described first-<sup>1</sup>  
3 would either be fore and aft, as far as the body is con-  
4 cerned, or side to side.

5 Q All right.

6 A And some envelope that would be described by the  
7 vectors of those forces and rates of onset duration. And the  
8 peak shape of the pulse would make a difference, too, because  
9 at an exceedingly high rate of onset, 2000 G's per second, it  
10 is possible to survive as much as 200 G's as demonstrated  
11 by free fall in victims.

12 Q Okay.

13 A And, of course, these data were derived from a  
14 fully restrained seated person. If the person to whom these  
15 forces were subjected were in other than a fully restrained  
16 seated position, tolerable levels would probably be lower.

17 Q When you say, "fully restrained", what do you mean,  
18 sir?

19 A Lap belt, shoulder harness.

20 Q That is for forward?

21 A The experiments were done forward facing.

22 Q Would these numbers change, be different in any way

1 for a rearward facing seat?

2 A I think Major Stapp's tests showed that these are  
3 the tolerance levels with minimal injury, minimal serious  
4 injury and transverse to the spine wouldn't make any difference  
5 whether it is forward or aft facing.

6 Q The rearward facing seat would make a difference  
7 as far as a shoulder harness is concerned, wouldn't it,  
8 because with the rearward facing seat --

9 A It wouldn't change the tolerance levels.

10 Q It would be the same?

11 A Yes.

12 Q But a rearward facing seat without shoulder harness  
13 in a Plus-X forward direction, which is G deceleration  
14 would have the same tolerance levels as the forward facing  
15 seat?

16 A Fully restrained, yes.

17 Q For that purpose they would meet that definition?

18 A That is right. Of course, I might add the  
19 relationship to this accident, these tests and the criteria  
20 that were developed from these, the determinations are  
21 applied to passengers seated in commercial and military air-  
22 craft on the basis of 170 pound occupant for each seat.

1 Q If somebody weighed less, the "G" forces would be  
2 less, wouldn't it, or would it? How about a 100 pound -- →  
3 would "G" forces be less or more, tolerance forces?

4 A If you applied 20 G's to a feather or block of  
5 lead, it is 20 G's.

6 Q It doesn't make any difference?

7 A No.

8 Q What is the relevance of 175?

9 A That is where they use these figures as a basis  
10 for determination of the strength of the seats and tiedown.

11 Q But not on tolerances?

12 A No.

13 Q Have you been asked or are you going to give any  
14 opinion on the seats in this aircraft, or is that part of  
15 your opinion?

16 MR. FRICKER: The answer is no.

17 BY MR. DUBUC:

18 Q Relevant to survivability or non-survivability,  
19 the condition of the seats or the occupants is not a relevant  
20 factor in your opinion, is that right?

21 A The condition of the seats?

22 A I just asked if you were going to give an opinion

1 on seats. Mr. Fricker said no.

2 MR. FRICKER: Maybe I was hasty. If you were —  
3 asking if he was going to give an opinion as to what the  
4 G's were to pull a seat out, structure, design of seats, et  
5 cetera, that is what I understood your question to be. He  
6 is clearly not offered for that.

7 THE WITNESS: The failure of a tiedown doesn't  
8 limit the determination as to the survivability of the  
9 accident.

10 BY MR. DUBUC:

11 Q What, if anything, relevant to seats is part of  
12 your testimony, the seats in the C5A?

13 A I don't know what you mean by the question, what  
14 is relevant.

15 Q In determining, giving your opinion as to surviv-  
16 ability of this accident, are you going to make any reference  
17 or have you done any analysis, read any testimony or reports  
18 relavant, for example, to the seats of the crew members in  
19 the flight deck that had any effect on the opinion you are  
20 going to give?

21 A No.

22 Q The same question with respect to the relevance of

1 the seats in the troop compartment. Any opinion?

2 MR. FRICKER: Objection.

3 THE WITNESS: As far as determining whether it was  
4 a survivable accident?

5 BY MR. DUBUC:

6 Q Yes.

7 A No.

8 Q And "G" forces themselves, for example the 6 to 8  
9 range "G" forces operative on the flight deck as reported by  
10 Dr. Turner, is that relevant to your opinion?

11 A As I explained, in the absence of structural  
12 disintegration or collapsing in the areas normally occupied  
13 by a human being, this wouldn't apply in this case. I just  
14 don't see it.

15 Q The flight deck had substantial damage, did it not?

16 A It appeared to, yes.

17 Q And, in your opinion, was the flight deck a sur-  
18 vivable envelope or atmosphere for crew members?

19 A Without being there to see the full space that  
20 remained that would support a living human being, it would  
21 be impossible to say.

22 Q You don't know?

1 A I haven't seen any pictures that would allow me to  
2 make that statement.

3 Q The ability to view the actual parts would be  
4 relevant in that particular area of question, would it not?

5 A It is a relatively confined area. The only pic-  
6 tures that I saw of that were one or two views taken close to  
7 the side, and it doesn't change the overall determination  
8 that this was not survivable.

9 Q The average "G" forces estimated horizontal in the  
10 troop compartment, in Dr. Turner's report on Page 5, during  
11 the deceleration from 7 to 13. Do you see that?

12 A I can't disagree with that.

13 Q You agree with that?

14 MR. FRICKER: I don't know that we have got an  
15 answer. He said he didn't disagree.

16 BY MR. DUBUC:

17 Q Do you agree with it?

18 A I see things that I agree with. It is an average.

19 Q Considering that average estimated horizontal "G"  
20 forces, with your knowledge of the troop compartment, is that  
21 a survivable envelope or atmosphere for occupants in rearward  
22 facing seats?

1 MR. FRICKER: Object to the form of the question.

2 Do I understand you to be asking whether it was a survivable  
3 crash based on that one sentence?

4 MR. DUBUC: It is part of the report, yes.

5 MR. FRICKER: That one sentence?

6 MR. DUBUC: It is a pretty clear question.

7 THE WITNESS: Well, if it was just a straight-  
8 forward -- the simplest thing, the average horizontal "G"  
9 forces range was 7 to 13. You would have one answer. If  
10 you could go a step further and say, what were the possible  
11 ranges and durations and magnitudes of forces within that  
12 average, there is not enough information in that sentence to  
13 say, to be able to answer your question.

14 BY MR. DUBUC:

15 Q Let me put it this way. If the average estimate  
16 ran between 7 and 13, including peaks in that envelope --

17 A It couldn't include seats if it is an average.

18 Q If the average has a range and the peaks were at  
19 13 and the point was 7--I am asking you to assume this --  
20 would that be a survivable impulse per occupants for survival,  
21 in your opinion?

22 MR. FRICKER: I object to the question. It is

1 ignoring everything else. It is talking about the decelera-  
2 tion period of time.

3 MR. DUBUC: I understand you object to the question.  
4 Please don't coach the witness.

5 MR. FRICKER: I am not trying to coach him. He  
6 doesn't need coaching.

7 MR. DUBUC: I take your objection to the form of  
8 the question. If I need an explanation, I will ask for it.  
9 If I don't need an explanation, we will not need it.

10 THE WITNESS: The only way I can answer that  
11 question is to say that if the average peaks were 7 to 13,  
12 this should fall within the tolerance levels of a 170 pound  
13 occupant fully restrained.

14 BY MR. DUBUC:

15 Q Could it fall within the range of 180 pound  
16 occupant fully restrained? I thought we said it didn't make  
17 any difference whether they were 100 pounds or 170 pounds.

18 A Yes.

19 Q Would it fall within the range of a 40 pound  
20 occupant?

21 A Yes. I would have to clarify that. I can't  
22 truthfully say yes, because there have been no experiments

1 done on 40 pound occupants, people.

2 Q But using the prints that you know of in your  
3 experience, I thought you just told me a few minutes ago,  
4 as far as survivability or as far as human tolerances are  
5 concerned, a "G" force is a "G" force whether you weigh 170  
6 pounds or 40 pounds.

7 A I don't think anybody knows that. There haven't  
8 been any experiments that I know of that involve 40 pound  
9 occupants. I think the philology of the 40 pound human  
10 being would be considerably different from 170 pounds, and  
11 therefore the ceiling restraint would make a difference.

12 Q What would the reasons for that be, sir?

13 A Well, there were experiments done with dummies that  
14 didn't accurately represent --

15 Q How much did the dummies weigh?

16 A 170 pounds.

17 Q My question is, why would there be a difference  
18 between 170 pound occupants and a 40 pound occupant as far  
19 as human tolerances to "G" forces are concerned?

20 A It would be my opinion that the response to  
21 accelerative forces would have to be different in a 40 pound  
22 human being than they would be in a 170 pound human being.

1 Q For what reason?

2 A Philology, length of bones, muscular structure,  
3 masses of the body.

4 Q Would you agree with me that the shorter the  
5 fulcrum arm, whether it be a physics experiment or a  
6 physiological fact of length of arm, the shorter it is, the  
7 more compact it is and probably the less effect from, say,  
8 a transverse "G" force on the spine or body is concerned?

9 MR. FRICKER: Objection. You are asking this man  
10 a matter of physics. He is not qualified.

11 MR. DUBUC: He gave an opinion. I am trying to  
12 find the basis for it.

13 THE WITNESS: The only opinion I gave, it is only  
14 reasonable to expect a response of a 40 pound human being  
15 would be different from a 170 pound human being.

16 BY MR. DUBUC:

17 Q I am asking the reasons, specific.

18 A Again, the difference is philology. And the  
19 specific reason for that I couldn't, I wouldn't be qualified  
20 to explain, except to say that it is perfectly obvious that  
21 the response would have to be different for those two hypo-  
22 thetical situations.

1 Q Then is your reason, to that effect, a reasonable  
2 scientific certainty or not, if you don't know the difference  
3 physiologically?

4 A That it would be different?

5 Q Yes.

6 A Yes.

7 Q That is your scientific certainty?

8 A It would be different.

9 Q In your opinion?

10 A Yes.

11 Q But you don't know why specifically, physiolo-  
12 gically, you don't know why?

13 A Physiologically why to describe the different parts  
14 of the anatomy that might respond differently, I couldn't  
15 explain that. You would need someone qualified.

16 MR. FRICKER: I have to ask a matter of personal  
17 courtesy to take a short break. Can we do that?

18 MR. DUBUC: As long as you don't talk to him. You  
19 are not going to discuss this line of questioning on the  
20 break, are you?

21 MR. FRICKER: I am going to go to the bathroom. I  
22 am going to tell him how I think he has been doing, yes.

1 You don't have a pending question.

2 MR. DUBUC: I have a pending line of questioning.

3 MR. FRICKER: Your whole line of questioning has  
4 been pending.

5 MR. DUBUC: Not all of it.

6 MR. FRICKER: I am not going to speak to him.

7 MR. DUBUC: Let the record reflect the counsel is  
8 going to talk to the witness on this line of questioning.

9 (Short recess taken.)

10 BY MR. DUBUC:

11 Q Mr. Carroll, in Dr. Turner's report he has got a  
12 reference, the POIW reference to the hill, according to his  
13 hypothesis estimated horizontal "G" force ranges of 240 to  
14 280. Do you object to that?

15 MR. FRICKER: Objection. Are you asking for his  
16 opinion? It assumes that he either has to disagree or agree.

17 THE WITNESS: I have no basis to disagree with it.

18 BY MR. DUBUC:

19 Q As part of your basis for your agreement, is it  
20 the fact that there was, under this hypothesis, some point  
21 of impact with a hill as opposed to a metal surface?

22 A I would have to agree that there was a final,

1 abrupt deceleration.

2 Q If the deceleration was not abrupt, for the purpose  
3 of this question, if you assume that there was no elevation  
4 or hill, then the "G" force range of 220 to 480 would have  
5 to be lapsed, would it not?

6 A If there was no hill, the stopping distance under  
7 those circumstances would probably be greater.

8 Q Does the time of onset with respect to that "G"  
9 force range have any bearing on the survivability of occu-  
10 pants?

11 A The time or the rate of onset?

12 Q The rate of onset, time of onset.

13 The question is whether the rate of onset has any  
14 effect on survivability and in the "G" forces in those  
15 ranges, 420, 480.

16 A If the rate of onset was extremely high, up to  
17 about 200 G's survival has been experienced.

18 Q Beyond 200, it is not too high?

19 A I don't know that it has been tested.

20 Q Is the duration of the "G" forces in the range of  
21 220 to 480 a factor as far as survivability?

22 A According to the definition, yes.

1 Q In your opinion, if the "G" forces, as described  
2 by Dr. Turner at the time of impact with the hill, under his  
3 hypothesis, was 220 to 480 G's in the range of survivability  
4 parameters given, would anybody in the troop compartment  
5 have survived?

6 A Could you repeat that? Read back the question.

7 (The pending question was read back by the Court  
8 Reporter.)

9 MR. FRICKER: I will have to object on rehearing  
10 it, to the form. And what do you mean by "a range of  
11 survivability factors"?

12 MR. DUBUC: Do you understand the question?

13 THE WITNESS: I don't. That is the problem.

14 BY MR. DUBUC:

15 Q Let me try it again. In Dr. Turner's report, he  
16 has indicated a hypothesis of the troop compartment impacting  
17 with the hill, which he assumed was in existence. And he  
18 has stated his opinion, with which you have disagreed, that  
19 the "G" forces were 220 to 480 G's. My question is, in the  
20 human tolerance parameter that you have given us today, with,  
21 as I understand it, a 200 G outside limit for human tolerance,  
22 would anybody in the troop compartment have survived if the

1 range was 220 to 480 G's, as Dr. Turner states?

2 A Again I don't know of any experiment conducted

3 that has conclusions on which to basis an answer to that.

4 Extremely high rates of onset, it has been shown that sur-  
5 vival is possible with exposures up to 200 G's.

6 Q This range is beyond 200, is that correct?

7 A His estimates are beyond 200.

8 Q You agree with those, is that right?

9 MR. FRICKER: I object. You asked the question  
10 before. He told you he had no reason to disagree. I objected  
11 to the form of the question. I object to it anytime it is  
12 characterized other than he has testified.

13 BY MR. DUBUC:

14 Q You have no reason to disagree with that, you have  
15 told us. Is that correct

16 A That is correct.

17 Q Based on that, and your opinion, you have no  
18 reason to disagree with ranges he stated. In your opinion,  
19 based on the human tolerance factors you have already  
20 described of 200 G's being a subject of test, could anybody  
21 have survived this?

22 A I don't know.

1 Q You don't know?

2 A No.

3 Q Do you know how many people survived in the troop  
4 compartment?

5 A I don't recall the exact number.

6 Q Do you know how many people were fatalities in the  
7 troop compartment?

8 A I don't think anybody really knows. There seems to  
9 be disagreement on how many people were in the troop com-  
10 partment.

11 Q In reaching your conclusions, have you reviewed any  
12 of the medical records of the troop compartment?

13 A No.

14 Q Have you reviewed information or testimony relevant  
15 to the physical condition of anybody in the troop compartment  
16 in reaching your opinion as to survivability?

17 A Just what was in the various statements given by  
18 the survivors.

19 Q You read those, did you?

20 A Those that were attached to the collateral report.

21 Q There were a lot of survivors, were there not?

22 A Yes.

1 Q Did you ever determine, from reading either the  
2 collateral report or the accident report, how many children  
3 in the troop compartment who did not give statements actually  
4 survived?

5 A I have seen those figures. I don't recall what  
6 they were.

7 Q There were a lot of survivors, weren't there?

8 A A lot? I don't know what "a lot" is. I would have  
9 to review the figures again.

10 MR. FRICKER: We will stipulate there were a lot  
11 of survivors, if that is your point, Mr. Dubuc.

12 BY MR. DUBUC:

13 Q The accident report summary, which you said you had  
14 reviewed, Exhibit D-3 for identification, you said you had  
15 seen it -- that shows 143 infant survivors in the troop  
16 compartment. Do you see that?

17 A It has an asterisk, yes. These were figures which  
18 were difficult to verify.

19 Q It shows also two non-survivors, decedents, with  
20 an asterisk also.

21 A Yes.

22 MR. FRICKER: Two orphan decedents.

1 BY MR. DUBUC:

2 Q Is that correct?

3 A Yes.

4 Q It also shows, does it not, as far as the attendants  
5 in the troop compartment, six survivors and one deceased, is  
6 that correct?

7 A Six and one, yes.

8 Q And that is out of, as far as those two figures  
9 are concerned, that is 143 out of 145 orphans and six out of  
10 seven attendants, is that correct?

11 A Yes.

12 Q Would you say that is a fairly high percentage of  
13 survivors in a component of an aircraft involved in this kind  
14 of accident?

15 A Yes.

16 Q In your opinion, based on your experience and what  
17 you have just been telling us, could that have occurred if  
18 the external "G" forces were 220 and 480 G's?

19 MR. FRICKER: Objection.

20 THE WITNESS: I don't know.

21 BY MR. DUBUC:

22 Q You still don't know?

1 A No.

2 Q I think you told us last time this was a  
3 non-survivable accident, is that correct, sir?

4 A Yes.

5 Q And that is your opinion despite the fact that  
6 there were a lot of survivors, is that correct?

7 A That is correct.

8 Q Can you tell us, sir, scientifically, what the  
9 basis of your opinion is that this is a non-survivable  
10 accident, scientifically?

11 MR. FRICKER: Objection. Asked and answered, and  
12 a series of debates the last time around.

13 MR. DUBUC: There is no date.

14 MR. FRICKER: That is not the question. You are  
15 asking him to explain, define a non-survivable accident  
16 scientifically. He gave, the last session, a definition of  
17 that term and what went into it.

18 MR. DUBUC: I know that. He reviewed Dr. Turner's  
19 report. He said he doesn't disagree with the "G" forces of  
20 220 to 420 G's, and he told us, as far as his knowledge, there  
21 is a high degree of members of survivors in this troop com-  
22 partment. I am trying to relate what he told us last time to

1 those facts. That is the basis of my question, scientific  
2 relationship to those facts.

3 BY MR. DUBUC:

4 Q Can you tell us what the basis of your opinion is,  
5 scientifically, as to why you believe this is a non-survi-  
6 vable accident, given the information you had before and the  
7 information you have obtained since, including Dr. Turner  
8 and Dr. Morain's report, the basis for your opinion that this  
9 is a non-survivable accident as it pertained, for example,  
10 to the troop compartment?

11 A I don't know that you can really separate it out  
12 and take different sections of the airplane and say, you know,  
13 the largest area of inhabitability in the airplane is totally  
14 disintegrated although some small portions like the cockpit  
15 or the aft troop compartment still retain the shape that  
16 would support survivability, that it changes the definition  
17 of the accident. In my opinion, it is a non-survivable  
18 accident. The fact that survival did occur is a chance thing.

19 There are a lot of if's that would change this  
20 picture entirely.

21 Q Such as?

22 A If the troop compartment was ground up by the wing

1 travelling forward in the crash, it would be the same as the  
2 rest of the airplane.

3 Q That didn't happen, did it?

4 A No.

5 Q Anything else?

6 MR. FRICKER: You mean, anything else --

7 BY MR. DUBUC:

8 Q Is there anything else? There is a lot of if's.

9 That was one of the if's. Are there any other if's?

10 A The schematics of the break up, the sequence of  
11 time. If they had been any different, if the airplane had  
12 landed upside down, for instance, there are an infinite  
13 number of if's.

14 Q That didn't happen, did it?

15 A No.

16 Q Is your opinion as to non-survivability based upon  
17 the if's?

18 A It is based on what I see in the wreckage remains,  
19 estimates of "G" forces.

20 Q Despite the statistics as to the number who sur-  
21 vived?

22 A Survival or non-survival, in actuality it doesn't

1 enter into the definition.

2 Q Now, sir, with respect to -- I asked some of these  
3 questions before but I don't think I asked you these par-  
4 ticular ones. You were employed by the NTSB, and the person  
5 that got you that job was Bernie Doyle, wasn't he?

6 MR. FRICKER: Object to the form of the question.

7 THE WITNESS: I thought I got the job myself.

8 BY MR. DUBUC:

9 Q Did you work for Mr. Doyle at the NTSB?

10 A No, I worked for Mr. Doyle at the Civil Aeronautics  
11 Board in 1961.

12 Q And were you at the NTSB when Mr. Doyle was at  
13 the NTSB?

14 A On and off. I spent some time with the FAA.

15 Q Did you ever work for Mr. Doyle?

16 A I did work for Mr. Doyle in the CAB.

17 Q Not at the NTSB, is that your testimony?

18 A As I recall.

19 Q Is it your testimony that Mr. Doyle did not get  
20 you the job?

21 MR. FRICKER: I object to the form of the question.

22 What are we trying to do?

1 MR. DUBUC: Trying to find out some facts.

2 MR. FRICKER: I object to the tone and the tenor  
3 of the question. You may certainly ask him, but if you have  
4 got something in mind, why don't you be gentlemanly candid  
5 and straightforward and let him know what you have in mind?

6 THE WITNESS: I was hired by Governor John Reed  
7 and Ernie Wise at NTSB.

8 BY MR. DUBUC:

9 Q Who did you work for? I notice your resume doesn't  
10 show that. The resume I have and the additional information  
11 you have provided shows, in some instances, who you worked  
12 for, but it doesn't show NTSB.

13 A It shows I worked as the chief of the accident  
14 prevention branch. Then later I worked as assistant to the  
15 director.

16 Q Who was the director?-

17 A C. L. Miller.

18 Q And did you work for C. L. Miller until he termina-  
19 ted his employment at the NTSB?

20 A I remained at NTSB when C. L. Miller left.

21 Q I note from this summary that you gave us that --  
22 I withdraw that.

1                   After the Civil Aeronautics Board in 1961 -- 1966,

2    you say you did work for Mr. Doyle later?

3    A    After 1966 I went to the FAA office of Super Sound  
4    Transport Development.

5    Q    While you were at the CAB, you worked for Mr. Doyle,  
6    is that correct?

7    A    At first I think he moved to some other position  
8    while I was there.

9    Q    And you moved from CAB to the FAA?

10   A    Yes.

11   Q    What was the reason for that?

12   A    I had an opportunity to apply my experience to  
13   the great new project of developing American Supersonic  
14   Transport, flight safety and operations safety.

15   Q    You were at the FAA, I think --

16   A    From 1968.

17   Q    You moved in 1968 to --

18   A    NTSB.

19   Q    NTSB, is that correct?

20   A    That is when Governor Reed and Ernie Wise prepared  
21   me for very extensive testing, examinations, and selected me  
22   for that position.

1 Q You moved from the NTSB to flight safety in 1974,  
2 is that correct?

3 A I was assigned on an intergovernmental personal  
4 account assignment to the safety flight foundation to serve  
5 as their executive director. And within 6 months, they  
6 elected me as the executive vice president. So it became  
7 both titles, executive vice president and managing director.

8 Q Who did you work for at flight safety?

9 A Basically the Board of Governors and the president,  
10 who was Dr. Harold Sherman.

11 Q And then you terminated that and went back to the  
12 NTSB in 1978, is that right?

13 A Yes.

14 Q What was the reason for that?

15 A The assignment was completed and couldn't be  
16 extended. I had used the maximum allowable period of assign-  
17 ment, and I had to go back to the government.

18 Q Was Mr. Doyle at the NTSB when you went back there  
19 in 1978?

20 A I am not sure. I think he was. He retired some-  
21 time after that.

22 Q Did you work with Mr. Doyle at all when you went

1 back to the NTSB in 1978?

2 A I don't think so. I think Frank Taylor was the  
3 director then. I was assigned as assistant to Frank Taylor.

4 Q And you worked there until you retired?

5 A Yes.

6 Q Which was in 1979?

7 A I think it was September, 1979. I can't recall  
8 what position Mr. Doyle was in at the time. He retired  
9 somewhere in there.

10 Q Now, I am almost done. You mentioned some photo-  
11 graphs which, I think, were black and white, and also color,  
12 that were kept in Traynor's photographs that you looked at,  
13 you said, this morning.

14 A Yes.

15 Q I think these are the Traynor pictures. Are there  
16 colored pictures of Traynor, too? Those are the black and  
17 whites. Would you take a look at those and tell me which  
18 ones -- the slides have been sent back. We don't have those.  
19 My note is we have the black and white slides that Major  
20 Traynor produced. They were sent back to the Lewis file.

21 MR. FRICKER: They are not black and white slides.

22 MR. DUBUC: The slides were sent back. We have the

1 black and whites.

2 MR. FRICKER: There was mutual agreement between  
3 your office and ours.

4 MR. DUBUC: We don't have them for this deposition  
5 even though I know you reviewed them yesterday. I think the  
6 agreement was you bring what was looked at for the basis of  
7 his opinion, which is what I mentioned at the beginning of  
8 this deposition.

9 THE WITNESS: Do you want me to review those?

10 MR. DUBUC: Just tell me which ones have any  
11 relevance to you.

12 MR. FRICKER: While he is doing that, how do you  
13 propose to identify those? Are you proposing to xerox them?

14 MR. DUBUC: Yes.

15 MR. FRICKER: Mr. Dubuc, are you able to represent  
16 that these black and white 8 by 10's that Mr. Carroll is now  
17 going through comprise the total number of Traynor prints?

18 MR. DUBUC: All I can represent is the note that is  
19 on, "Slides from Traynor have been sent back to Lewis."

20 MR. FRICKER: I asked that not because I am doubting  
21 it. They are unnumbered, unmarked.

22 MR. DUBUC: I am not aware they have been marked

1 by number, have they?

2 MR. FRICKER: The copy of these prints that were  
3 furnished to us through Major VanNuys and Mr. Piper we have  
4 caused to be marked, and we have a total count of them. I  
5 haven't endeavored to count the number that you are showing  
6 Mr. Carroll here. Mr. Carroll has gone through a file of  
7 probably in excess of 100 black and whites and picked out  
8 19.

9 MR. DUBUC: Will you mark those Carroll 1 through  
10 19? Just put a number of them.

11 (Whereupon, the above-referred to  
12 documents were marked Carroll Deposition  
13 Exhibits 1 through 19 respectively.)

14 BY MR. DUBUC:

15 Q I am showing you what we have marked as Carroll 1.

16 Would you tell us what relevance or significance to your  
17 opinion that picture depicts?

18 Withdrawn. Let me get this clearer.

19 Can you tell me, sir, first based upon what  
20 Mr. Fricker has told us and some of the limitations that have  
21 been framed by objections today, is your opinion limited to  
22 the issue of whether or not this was a survivable or

1 non-survivable accident or is it a little broader?

2 A Essentially that is what it includes.

3 Q When you say "essentially", is there any sub-  
4 divisions or sub-parts of this?

5 A Based on the basis of my experience --

6 Q I am not asking you for the basis yet. I am asking  
7 the scope of your opinion, basically what you have told us  
8 survivable or non-survivable, that is the scope?

9 A That is the scope.

10 Q You have no opinion as to a reasonable scientific  
11 certainty of anything else?

12 A That is all at this point.

13 Q Are you doing any ongoing or continuing studies  
14 or been asked to do anything else?

15 A Not that I know of.

16 Q Based on that, then, tell me what Carroll Exhibit 1,  
17 the photograph from one of the Traynor black and white set  
18 of photographs, has with respect to relevance to your  
19 opinion.

20 A First I would have to state that all of the photo-  
21 graphs have some relevance. Others may have more.

22 Q Before we go on, I asked you to go through this

1 pile and pick up the ones that had relevance. I thought you  
2 picked out 19. Are there more than 19?

3 A All of the hundreds and hundreds that I looked at,  
4 all have some relevance.

5 Q I realize that. I am talking about those in this  
6 group of Traynor black and white photographs. You went  
7 through those. There are 19. Am I correct the 19 you  
8 picked out have specific relevance to your opinion and the  
9 others don't have specific relevance to your opinion?

10 A They all have relevance to my opinion.

11 Q Every single one of them?

12 A Yes, to look at the degree of destruction.

13 Q What is the degree, criteria you used for picking  
14 out the 19?

15 A These pictures I saw for the first time today would  
16 have to do with one aspect of the severity of the impact  
17 of one of the few substantial sections of the fuselage that  
18 remain identifiable.

19 Q Which one is that?

20 A Namely, the troop compartment.

21 Q The troop compartment? Looking at Carroll Exhibit 1,  
22 what specific relevance, if any, does that have to your

opinion?

A Up until I saw those pictures, the other ones didn't give as clear an indication as to the rise or the hummock that the upper troop compartment is resting against. All of these 19 pictures give some better perspective of that rise, which would lead to the overall conclusion that the final impact at this resting point is just not a straight line deceleration.

Q Where does that show on that Carroll Exhibit 1?

A It shows the upper troop compartment.

Q Is a rise shown in that picture, in your opinion?

A What appears to be a rise shows in that picture.

When you put that in perspective with all of the others at different angles, they all give a clearer picture of the rise in terrain.

Q Can you tell me what relevance, what specific relevance, in your opinion, Carroll Exhibit 2 has?

A The same thing, when put in perspective with the rest of the 19 photographs.

Q The same thing, that shows a rise, in your opinion?

A Yes.

1 Q And can you tell me what specific relevance  
2 Carroll Exhibit 3 has to your opinion?

3 A The same thing.

4 Q The rise is shown there, in your opinion, is that  
5 correct?

6 A The increase in elevation at that point at the  
7 forward end of the troop compartment.

8 Q This is an airborne photo?

9 A It appears to be.

10 Q As are 1 and 2?

11 A I think all of them are. Maybe not all. Some of  
12 them are.

13 Q Do you have any expertise in interpretation of  
14 airborne photos in your professional experience?

15 A I don't understand what you mean by "expertise".

16 Q Have you had any training in taking airborne  
17 photos, looking at them and telling, as a matter of an  
18 opinion of scientific, reasonable scientific certainty, that  
19 terrain is either up, down, crossways? You have had training?

20 A I have had no training of that sort. I have taken  
21 thousands of aerial photographs themselves.

22 Q After you have taken the photographs, you say you

1 know what it is after you have taken the photograph, you know  
2 from having seen it on the ground?

3 A Or having flown around it.

4 Q Having been there?

5 A Yes.

6 Q In this case you weren't there?

7 A Right.

8 Q In the prior circumstances where you took a lot of  
9 airborne photographs flying around and were there so you knew  
10 the terrain, did you also check with any people who were on  
11 the ground as to the terrain if you were making an inter-  
12 pretation?

13 A I didn't have occasion to.

14 Q You just made the interpretation by eye, without  
15 any specific training?

16 A Right.

17 Q You considered that adequate for your purposes?

18 A I considered that to be an aerial photograph.

19 Q You considered your method of interpreting terrain  
20 from aerial photographs, not having been in the locality  
21 yourself, without any training, to be adequate for scientific  
22 purposes in rendering an opinion. Is that correct?

1 MR. FRICKER: I object to the form of the question.

2 THE WITNESS: I don't think one can tell from  
3 looking at a single photograph. You can tell from the various  
4 angles, interpret the rise in the terrain.

5 BY MR. DUBUC:

6 Q The rise in the terrain, is that a key element, in  
7 your opinion, as to survivability?

8 A I don't know that I could characterize it as a  
9 key element.

10 Q Is it an important element?

11 A It is important.

12 Q If there were no rise, would that change your  
13 opinion as to whether this was a survivable accident?

14 A No.

15 Q So whether there is a rise or not doesn't make any  
16 difference in your opinion, is that correct?

17 MR. FRICKER: Objection.

18 THE WITNESS: I didn't say that.

19 BY MR. DUBUC:

20 Q I thought you just told me that whether or not there  
21 was a rise doesn't make any different to your opinion as to  
22 whether there is a rise. Do I understand you correctly?

1           A    This is one small aspect of the overall accident  
2    that is of interest and of value.  In the absence of a rise,  
3    I would have to question the abrupt final deceleration that  
4    has been calculated.

5           Q    And the magnitude of the "G" forces?

6           A    Yes.

7           Q    Would you look at Carroll 4 for identification and  
8    tell me what specifically in that picture is relevant to your  
9    opinion?

10          A    The same thing as the others.

11          Q    The rise?

12          A    The perspective of the others, different angles.

13          Q    You can see the rise?

14          A    It shows a rise in the terrain.

15          Q    How much of a rise?

16          A    I can't tell from the single photograph, but putting  
17    it in perspective with the other objects around it, a heli-  
18    copter is parked on the ground and the slopes that would be  
19    indicated from this angle.  Other photographs didn't show  
20    that helicopter.

21          Q    What is the significance about the helicopter on

22    the ground you are referring to in Carroll 4?

1 A It is shown that there are variations in the slope  
2 of the terrain there.

3 Q In which direction, looking at the photograph?

4 A Where the helicopter is it appears to be slightly  
5 up to the left of the helicopter. It appears to be slightly  
6 down.

7 Q The helicopter looks like it is slightly nose-down?

8 A Yes -- nose-up.

9 Q Nose-up in Carroll Exhibit 4, is that correct?

10 A Yes.

11 Q Did you make any estimate in your analysis as to  
12 how far that helicopter is from the troop compartment?

13 A I didn't analyze it.

14 Q Would that make any difference?

15 A I think you would have to get someone qualified to  
16 take measurements for you.

17 Q You don't consider yourself qualified?

18 A No. I consider myself qualified to look at the  
19 photographs and tell which is up, which is down.

20 Q Looking at Carroll Exhibit 4, in your opinion is  
21 the helicopter at an elevation on the ground higher or lower  
22 than the troop compartment?

1 A I can't tell that.

2 Q You can't tell that?

3 A No.

4 Q I understood you to say that one end of the heli-  
5 copter was lower than the other. Can you tell that from the  
6 photograph?

7 A It appears the helicopter is sitting on the ground  
8 very slightly nose-up, to indicate an incline.

9 Q Is the helicopter some distance from the troop  
10 compartment?

11 A Yes.

12 Q Is the helicopter perpendicular to the longitudinal  
13 axis of the troop compartment?

14 A I can't tell that.

15 Q Is it parallel?

16 A It is not parallel.

17 Q You can't tell whether it is perpendicular?

18 A No.

19 Q How would you describe the relationship in  
20 longitudinal axis of the helicopter to the troop compartment  
21 looking at Carroll Exhibit 4?

22 A They are in a perpendicular fashion.

1 Q So it is approximately perpendicular, isn't it?

2 A I can't tell that.

3 Q It is just a perpendicular fashion?

4 A Yes.

5 Q That is as exact as you can be?

6 A Yes.

7 MR. FRICKER: It is about five minutes to four.

8 Approximately five of three I asked how much longer you would  
9 be.

10 THE WITNESS: I didn't know we had the photographs.

11 MR. FRICKER: I will ask you again for your esti-  
12 mate. We have to at some point bring an end to this. How  
13 much longer do you estimate you will be?

14 MR. DUBUC: I will finish the photographs. After  
15 I finish the photographs, I have about two questions on  
16 another subject and we will be done.

17 BY MR. DUBUC:

18 Q Carroll Exhibit 5, tell me what relevance, if any,  
19 that has to your opinion?

20 A That shows a little more clearly the troop compart-  
21 ment behind the hummock.

22 Q Behind what?

1 A Hummock.

2 Q Hummock?

3 A Yes.

4 Q You are using the word "hummock" for rise or  
5 elevation?

6 A Yes.

7 Q I think you told us before there was vegetation  
8 around the forward end of the troop compartment, was there  
9 not?

10 A There was vegetation all over.

11 Q You weren't sure of the height?

12 A No. Some of the additional photographs would  
13 give better indications of that.

14 Q You can't tell the height of the vegetation there,  
15 can you?

16 A No.

17 Q If that is vegetation of a height of 2 to 3 feet,  
18 what, if anything, would that tell you as far as your opinion  
19 that there is a hummock?

20 MR. FRICKER: From that one picture?

21 MR. DUBUC: Yes.

22 THE WITNESS: You can't tell from that one picture.

1 BY MR. DUBUC:

2 Q You can't tell? Is the helicopter in Exhibit,  
3 Carroll 5, does that have any relevance as to your opinion  
4 as to a hummock?

5 A No.

6 Q Is that helicopter roughly perpendicular to the  
7 longitudinal axis of the troop compartment?

8 A Roughly.

9 Q Can you tell me what in Carroll Exhibit 6, if  
10 anything, is relevant to your opinion?

11 A Again, it appears that the troop compartment is  
12 resting against the rise in terrain that extends from  
13 slightly to the right of the troop compartment, as it appears  
14 in this picture, to considerably left of the troop compart-  
15 ment.

16 Q This is some distance away, is it not?

17 A Yes.

18 Q Do you have any idea how far?

19 A No.

20 Q Do you have any idea of the height from which the  
21 picture was taken?

22 A No. I don't know what focal length lens was being

1 used.

2 Q I think I heard you say earlier that does make a  
3 difference, the height of the cameras.

4 A Makes a difference in what?

5 Q In interpreting what you see.

6 A Certainly.

7 Q Would the same be true--do you have any idea, of  
8 the height of the camera in Carroll 5?

9 A That could almost have been taken from the ground  
10 as opposed to airborne.

11 Q Do you know?

12 A No.

13 Q If it was taken from the ground, it might depict  
14 one thing. If it was taken from 200 feet, would it be fair  
15 to say the angle of the camera might indicate something  
16 different?

17 MR. FRICKER: I object.

18 THE WITNESS: It would have to. It would have  
19 to be a different picture.

20 BY MR. DUBUC:

21 Q Would you tell me what relevance to your opinion  
22 Exhibit Carroll 7 is?

1       A     The same thing. It appears that the troop com-  
2 partment lies behind a hummock or rise in the terrain.

3       Q     Anything else? Is that it?

4       A     It gives an indication as to what the difference  
5 in elevation might be between the bottom of the wreckage of  
6 the troop compartment and the height of the rise in terrain  
7 forward of it.

8       Q     Anything else relevant to Carroll Exhibit 7?

9       A     It just lends confirmation with respect to other  
10 photographs that there is a rising terrain.

11      Q     Is that it?

12      A     Yes.

13      Q     That is all you get from Carroll 7, is that  
14 correct?

15            MR. FRICKER: I object. What do you mean, "all  
16 you get"?

17            MR. DUBUC: Is there anything more in there that  
18 is relevant to your opinion? Are you telling us about the  
19 hummock?

20            MR. FRICKER: I object to the entire line of  
21 questions. It was clarified several questions ago that when  
22 he reviewed the entire series of Traynor prints, he found

1 all of them to be relevant and interesting, but these 19 are  
2 of particular interest to one aspect of his opinion, and it  
3 is in that context that he has been answering. And we had  
4 understood you were asking questions about relevance or  
5 significance. Now you are seemingly trying to broaden the  
6 scope of the questioning.

7 I think it is objectionable in form.

8 MR. DUBUC: I am not broadening anything. I asked  
9 him if there was anything besides the hummock descriptions  
10 that he is going to describe in Carroll Exhibit 7 relevant  
11 to his opinion.

12 MR. FRICKER: That is my point. I made my point.

13 MR. DUBUC: You just said there is more than one  
14 aspect to his opinion. I asked him earlier what his opinion  
15 was. It was as to survivability, which is more than that. If  
16 there is more than that to his opinion, I would like to know  
17 about it.

18 You said there was one aspect, more than one aspect.

19 THE WITNESS: In this aspect, the other portion  
20 of the aircraft is totally disintegrated, as far as any  
21 survivable atmosphere.

22 BY MR. DUBUC:

1 Q Do you know what portion that is?

2 A Not specifically. It appears to be center section,  
3 high center section of the wing attachment area.

4 Q That is another aspect. Is there anything else in  
5 Carroll Exhibit 7 that is relevant to your opinion other than  
6 what you have just told us?

7 A It just shows more portions of the aircraft which  
8 are disintegrated.

9 Q You just told us that. Is there anything else?

10 A Just that there is smoke coming from some fire.

11 Q What portion of the aircraft is the smoke and fire  
12 coming from?

13 A I believe that would be what has been described  
14 as the main wing section.

15 Q Is there any smoke and fire coming from the section  
16 that is identified as the troop compartment?

17 A I didn't see any in this photograph.

18 Q Is that of any significance to you?

19 A What?

20 Q The fact the smoke is coming from the troop com-  
21 partment?

22 A The only significance it has to me is that there is

1 smoke and fire coming from the wing section.

2 Q Is the fact there is none shown coming from the  
3 troop compartment of any significance?

4 A Just the fact there is no fire or smoke coming  
5 from the troop compartment. That is the significance.

6 Q Do you want to tell -- look at Carroll Exhibit 8  
7 and tell me what significance that has to your opinion.

8 A The same as the earlier ones, showing what appears  
9 to be a rising in the terrain forward of the troop compart-  
10 ment.

11 Q Anything else?

12 A A lot of helicopters flying around.

13 Q Is that relevant to your opinion?

14 A No.

15 Q Anything else relevant to your opinion?

16 A The same as Number 7, with the smoke coming from  
17 the fire further along the crash pattern.

18 Q Can you identify the part of component of the air-  
19 plane from which the smoke and fire is coming?

20 A Not from this photograph.

21 Q Is the troop compartment identified in that photo-  
22 graph?

1 A It is identifiable.

2 Q Are smoke and fire coming from the area around  
3 the troop compartment?

4 A Not in this photograph.

5 Q That is Carroll Exhibit 8, is that correct?

6 A Yes.

7 Q Look at Carroll Exhibit 9. Tell me what, if any,  
8 significance you find in that photograph to your opinion?

9 A This is a much longer distance than the photograph  
10 in which the troop compartment that we identified, the  
11 appearance of a hummock, rising terrain, considerably to the  
12 left of it.

13 Q And have you got any idea of the altitude or angle  
14 of the picture in Carroll Exhibit 9?

15 A Only that it is a long distance shot taken from  
16 the river, above the river.

17 Q Do you have any idea of the time when this picture  
18 was taken?

19 A The time?

20 Q Have you considered that factor?

21 MR. FRICKER: Talking about time of day or time  
22 after impact?

1 MR. DUBUC: Time after the accident.

2 THE WITNESS: I think one could reasonably presume  
3 it was sometime after the accident because there is no smoke  
4 or fire shown in this photograph.

5 BY MR. DUBUC:

6 Q Is there any hummock in the area of the empennage  
7 in that photograph, Carroll Exhibit 9?

8 A In the photograph it doesn't appear to be.

9 Q Is there any foilage in that photograph, Carroll  
10 Exhibit 9, to be identified in your opinion as foilage rather  
11 than terrain difference?

12 A Obviously the palm trees, the grass, other sorts  
13 of foilage all throughout the area.

14 Q Does it vary in height, density, in your opinion?

15 MR. FRICKER: I am going to object.

16 MR. DUBUC: Carroll Exhibit 9 --

17 MR. FRICKER: For the record, I want to describe  
18 this shot as what Mr. Carroll is describing, namely, an aerial  
19 shot appearing to have been taken over the water and a view  
20 of the west bank, in my personal opinion, from several  
21 hundred feet up, and showing the entire crash scene on the  
22 west bank. And to be asking questions at ten of four on the  
evening of Thanksgiving, whether he can see foilage in that

1 kind of shot, strikes me as nearly an intentional waste of  
2 time on the part of the questioner. I object most strongly  
3 to it. This is the second go-round of depositions. We are  
4 just dragging it out with the restriction of the expected  
5 testimony of Mr. Carroll to have taken this long to conclude  
6 what was basically thought concluded a month ago is really  
7 highly objectionable.

8 MR. DUBUC: Mr. Fricker, I disagree with you, and  
9 there is no intent to drag this out. But this witness  
10 apparently, without reliance on Dr. Morain but from his own  
11 interpretation of photographs, has apparently formed an  
12 opinion as to terrain condition. And I certainly have the  
13 right to test his credibility and his ability to tell me  
14 from definite photographs, whether he can make similar dis-  
15 tinctions as to other components and areas of the accident  
16 scene.

17 If that is the basis of his opinion as he testified  
18 under oath today, I certainly have a right to proceed and  
19 determine whether he has that ability or not. I frankly don't  
20 think he does.

21 THE WITNESS: I can't tell you how dense that  
22 foliage is.

1 BY MR. DUBUC:

2 Q All right. Take a look at Carroll Exhibit 10.

3 Tell me what, if any, significance appears or is depicted in  
4 that photograph?

5 A The same thing as the earlier photographs. It  
6 appears to be a rise in terrain at the forward end of the  
7 troop compartment.

8 Q Is there anything else of significance in that  
9 photograph?

10 MR. FRICKER: With respect to his opinion about  
11 the rise in the terrain?

12 MR. DUBUC: Yes, or any other component of his  
13 opinion, as you put it.

14 THE WITNESS: Well, it is an aerial photograph.  
15 I think one could reasonably deduct it was taken sometime  
16 after the accident because there is no longer any layer of  
17 smoke in the wing section.

18 BY MR. DUBUC:

19 Q Is that the section separated by some distance from  
20 the troop compartment in Photograph 10?

21 A Yes.

22 Q Is there any foliage depicted in the forward end of

1 the troop compartment in Carroll Exhibit 10?

2 A There is foilage all over the picture.

3 Q Do you have an opinion as to the height of that  
4 foilage in front of the troop compartment?

5 A Not so much from this photograph; but from one of  
6 the additional ones that I looked at, it appeared to be  
7 between a foot and possibly two feet high.

8 Q And from that photograph, Carroll Exhibit 10, how  
9 high is the elevation of the hummock?

10 A Well, if you put it in perspective, the people who  
11 are shown standing to the right of the troop compartment at  
12 approximately the same distance away from the camera, that  
13 perspective makes it appear that the hummock would be as much  
14 as 6 or 8 or 10 feet high.

15 Q And the foilage, in your opinion, is another foot  
16 or two on top of that?

17 A Yes.

18 Q You are drawing a perspective from the people  
19 standing, firmly depicted on the side of the photograph?

20 A It is in the right in this photograph.

21 Q How high do you think those people would be?

22 A Five and a half to six feet.

1 Q What basis do you base that? What kind of people  
2 are they?

3 A Most people generally are.

4 Q Caucasians?

5 A Caucasians, Asiatics are normally six inches,  
6 maybe a foot shorter.

7 Q If a foot shorter, how high would the foilage be  
8 and how high would the hummock be?

9 MR. FRICKER: If you have an opinion.

10 THE WITNESS: I can't give an accurate opinion.

11 BY MR. DUBUC:

12 Q Do you see the foilage beside the tracks of the  
13 troop compartment as viewed from the rear of Carroll Exhibit  
14 10?

15 A Yes.

16 Q How high would you say that is?

17 A Immediately adjacent to those slash marks?

18 Q On the left and right side of the slash marks.

19 A It is approximately flat. Maybe just a few inches  
20 above the water.

21 Q The foilage is a couple of inches above the water,  
22 in your opinion?

1 A That is what it appears to me to be.

2 Q How about the clumps that appear on the right-hand  
3 side of the foliage near the bottom of the picture? How high  
4 would you say those clumps of foliage are?

5 A They appear to be tall grass, maybe two or three  
6 feet tall, mostly blown over, washed down.

7 Q Do those clumps appear to be higher than or lower  
8 than the hummock that you referred to?

9 MR. FRICKER: In perspective or in reality?

10 MR. DUBUC: As they appear to him from the photo-  
11 graph.

12 MR. FRICKER: Object to the form of your question.

13 THE WITNESS: They appear to me to be lower than  
14 the rising terrain in front of the troop compartment?

15 BY MR. DUBUC:

16 Q Do they appear to be higher or lower than the  
17 foliage that we previously discussed in the front end of the  
18 troop compartment that you think is on top of the hummock?

19 A The grass appears to be higher elevation than the  
20 water and the troves there.

21 Q Maybe you misunderstood my question. I am not  
22 talking about the water in the troughs. I am talking about the

1 forward end of the troop compartment and the foliage we were  
2 talking about there. Are those clumps higher or lower than  
3 the forward end of the troop compartment, in your opinion,  
4 based on Carroll Exhibit 10?

5 A From this perspective, they would appear to be  
6 about the same, maybe two feet.

7 Q Take a look at Carroll Exhibit 11 and tell me what,  
8 if any, significance there is to that picture relevant to  
9 your opinion.

10 A It isn't quite as clear, but it has the same  
11 appearance as the other ones. There is a rise in the terrain  
12 forward of the troop compartment.

13 Q Does there appear to be any rise in terrain or  
14 foliage behind the troop compartment?

15 A Possibly on the left side of the crash pattern of  
16 the troop compartment.

17 Q Does the cockpit area appear in that picture?

18 A It is just a blur.

19 Q Does there appear to be any rises in the cockpit  
20 area between the point of the camera and the cockpit area?

21 A It appears the rise of the troop compartment is,  
22 again -- diminishes in height on the right of the troop

1 compartment, the crash pattern down to a level terrain.

2 Q How about to the left of the troop compartment  
3 and crash pattern, in your opinion. Does Exhibit Carroll  
4 show any rise or hummock between the point of the camera and  
5 the location of the cockpit?

6 A That is a little too blurry to discern in this  
7 photograph.

8 Q You can't tell?

9 A No.

10 Q Would you take a look at Carroll Exhibit 12 and  
11 tell me what, if any, relevance that has to your opinion as  
12 depicted?

13 A The same thing. This appears to show a simiar  
14 rise in the elevation forward of the troop compartment,  
15 extending somewhat to the right of the crash pattern, con-  
16 siderably to the left of the crash pattern in the troop  
17 compartment section.

18 Q And does it show in your opinion any rise between  
19 the troop compartment and the cockpit relevant to the crash  
20 pattern of the cockpit?

21 A It is a little too blurry to discern entirely, but  
22 from the direction of the troop compartment left of that main

1 impact site, it looks like it traverses fairly flat terrain.

2 Q You don't see any rises?

3 A That is correct.

4 Q Will you look at Carroll Exhibit 13 and tell me  
5 what, if any, relevance that has to your opinion?

6 A This was interesting because it gave some idea as  
7 to the terrain, the foliage adjacent to and forward of the  
8 crash pattern and the troop compartment and also behind it,  
9 showing what appears to be more of a variance in the terrain  
10 than was seen in other photographs.

11 Q How high -- this picture would be taken from the  
12 ground, wouldn't it, Carroll Exhibit 13?

13 A That is what it appears to be.

14 Q And based on your examination of the picture, can  
15 you tell us if you have an opinion as to how high that foliage  
16 is beside the troop compartment?

17 A It appears in this photograph to be about a foot  
18 or two. There are some very thin growths with no leaves on  
19 it. You can see right through. It seems to be taller.

20 Q Anything else of any significance in that picture  
21 to your opinion?

22 A Just that the tail section shows a dismantled

1 center of the picture, some depth of perspective.

2 Q How tall would you think he was in your opinion?

3 A I don't know.

4 Q If you don't know how tall he is, what is his  
5 significance to depth perspective?

6 A One thing. Where you see the water and what  
7 appears to be the right-hand track of the crash pattern of  
8 the troop compartment, it appears to be lower than the  
9 terrain on which that person is standing.

10 Q And this person is standing actually to the right  
11 of the crash pattern, right?

12 A Of the crash pattern? No --yes, he would be  
13 standing to the right of the crash pattern, that is right.

14 Q The crash pattern in your opinion is lower as far  
15 as that water is concerned than where the person is standing?

16 A That is what the picture appears to be.

17 Q The person is standing some distance behind the  
18 troop compartment, is he not?

19 A Yes.

20 Q Do you have any idea how far?

21 A Not too far.

22 Q Would you say he is standing on a hummock?

1 A It appears that there is a bank slope going down  
2 to that right-hand trough the troop compartment crash  
3 pattern.

4 Q The trough is where the troop compartment gouged  
5 the area?

6 A Yes.

7 Q Any significance in that Carroll 13?

8 A No.

9 Q Take a look at Carroll 14 for identification. Tell  
10 me what, if any, significance that has to your opinion.

11 A That is a long distance higher view of the overall  
12 scene. It appears that the crash pattern loads along a  
13 relatively flat level area until the position of the troop  
14 compartment, where it is stopped.

15 Q Do you see anything in the Carroll Exhibit 14 which  
16 would be attributable or relevant to the rise on the left  
17 side of the crash pattern of the troop compartment you  
18 described in 13?

19 A No.

20 Q You can't see that in 14?

21 A No. 14 is taken from much further away, much higher  
22 angle.

1 Q Higher camera angle?

2 A Right.

3 Q Higher altitude?

4 A Right, both.

5 Q That does affect what you can see relevant to  
6 ground terrain. Is that not true?

7 A True.

8 Q Comparing Exhibits 13 and 14, for example --

9 MR. FRICKER: I am going to object.

10 MR. DUBUC: Is that true, sir?

11 MR. FRICKER: I object on the basis that the record  
12 should reflect that Exhibit 14 is clearly a photograph  
13 of a photograph, among other things; whereas 13 appears to be  
14 a photograph. Subject matter. That may or may not affect  
15 the clarity of the perspective or anything else, the subject  
16 matter of Exhibit 14.

17 MR. DUBUC: He has already told me.

18 BY MR. DUBUC:

19 Q Is that not true, sir, the camera and altitude and,  
20 in fact, time of day does affect what you see from aerial  
21 views, for example, ground level view of terrain as far as  
22 level of terrain or the existence of rises or hummocks? Would

1 that be a fair statement, if you compare those two?

2 A I think we have agreed to that a number of times.

3 Q Please, take a look at Carroll Exhibit 15 and tell  
4 me what relevance, if any, that has to your opinion.

5 A Again, that is a photograph of a photograph, and  
6 it simply shows the nature and the type of terrain in the  
7 aft troop compartment. There is no way to determine the  
8 height.

9 Q How about the height of the foliage? Do you have  
10 any idea of the height of the foliage in Carroll 15?

11 A There is no way to determine that.

12 Q Do you have any idea how high the troop compartment  
13 is from the bottom to the top?

14 MR. FRICKER: You mean the measurements of the  
15 troop compartment irrespective of the photograph?

16 MR. DUBUC: Measurement of the troop compartment  
17 from the bottom to the top.

18 THE WITNESS: I don't know how much of the wreckage  
19 extended down into the surface of the terrain. I don;t know  
20 what that would represent.

21 BY MR. DUBUC:

22 Q Would this be a ground level photograph in your

1 opinion?

2 A It appears to be.

3 Q Would that foilage be more than one or two feet  
4 high, in your opinion?

5 A I have nothing to judge that by.

6 Q Take a look at Carroll Exhibits 4 and 5. Would  
7 you say that the foilage at the aft end of the troop com-  
8 partment is substantially more in height than the foilage at  
9 the forward end, as compared to Carroll 15?

10 MR. FRICKER: While he is making that comparison, I  
11 would like to also note for the record that several instances  
12 among the 19 exhibits that we are going through, we have  
13 substantially duplicate images by which we are having detailed  
14 questions. A case in point is the Exhibits 5 and 4. It  
15 strikes me as in some instances an additional waste of time  
16 to be going through this litany. We are looking at  
17 virtually the same subject matter.

18 THE WITNESS: Five and four, I have no way to judge  
19 the height of the foilage in those pictures. Therefore, no  
20 basis of comparison to Number 15.

21 BY MR. DUBUC:

22 Q So you don't know how high the foilage is in 15?

1 A That is correct.

2 Q Will you take a look at Carroll 16 for identifica-  
3 tion and tell me what, if any, significance that has rele-  
4 vant to your opinion?

5 A The right-hand side is the aft end of the troop  
6 compartment, which appears to be aimed against the rise in  
7 terrain, with an intervening terrain of some higher elevation.

8 Q Anything else?

9 A No.

10 Q Take a look at Carroll 17 for identification. Tell  
11 me what, if any, relevance that has to your opinion.

12 A Approximately the same as Number 16, in that it  
13 shows intervening terrain that appears to be slightly higher  
14 than the terrain of the aft end of the troop compartment.

15 Q That also depicts the cockpit, does it not?

16 A In the right-hand side, yes.

17 Q In your opinion, as depicted in that picture,  
18 would the cockpit be on a higher or lower terrain than the  
19 troop compartment?

20 MR. FRICKER: If you know.

21 THE WITNESS: I can't tell from the picture.

22 BY MR. DUBUC:

1 Q You can't tell?

2 A No.

3 Q Are you able to tell from that picture whether or  
4 not the distances represented between the troop compartment  
5 and the cockpit by Dr. Turner on his new wreckage chart  
6 are accurate or inaccurate?

7 MR. FRICKER: I object to the form of the question.

8 It is not Dr. Turner's record chart. It is Dr. Morain's.

9 MR. DUBUC: It is the one attached to Dr. Turner's

10 report.

11 THE WITNESS: I can't tell from the picture.

12 BY MR. DUBUC:

13 Q You can tell there is a hump in the picture. You  
14 can't tell that the height of the cockpit relevant to the  
15 troop compartment --

16 A I didn't say you can tell there is a hummock there.  
17 I can say there is apparent difference in the elevation of  
18 the terrain, going from the fore part of the picture going  
19 slightly up and then going slightly downward the aft end of  
20 the troop compartment.

21 Q Would you agree with me that it appears that the  
22 cockpit area is slightly higher in elevation relevant to the

1      troop compartment as      depicted in that picture, Carroll 17?

2      A      No.

3      Q      You wouldn't?   Okay.   I am showing you Carroll 18  
4      for identification.   Would you tell me what, if anything, is  
5      relevant to your opinion in that picture?

6      A      Again, the relationship with the apparent height  
7      of the foliage.

8      Q      How high is the foliage in that picture?

9      A      That would appear to be anywhere from about ankle  
10     deep to about two or three feet high.

11     Q      Looking at that picture and looking at Carroll  
12     Exhibit 15, would that give you any indication of the height  
13     of the foliage in Carroll 15?

14     A      No.   I can't see anything from that would help me  
15     to determine the apparent height of that foliage.

16     Q      Take a look at Carroll 19 for identification.   Tell  
17     me what, if any, relevance this has to your opinion.

18     A      This is just another photograph, which appeared to  
19     be slightly undulating terrain between where the picture  
20     was taken and where the aft troop compartment is.

21              In other words, it is just not clearly flat ground.

22     Q      Would there be any undulation as appears from

1 Carroll Exhibit 19 in the accident track of the cockpit  
2 between the area of wreckage distribution back around the  
3 cargo area to where the cockpit is located?

4 A Up to the point of the aft end of the troop com-  
5 partment, it appears to be fairly flat.

6 Q I am talking about the projected accident pattern  
7 of the cockpit, sir.

8 A The cockpit?

9 Q Is there any undulating terrain between that  
10 pattern and the cockpit?

11 A The aft pylon of the helicopter seems to have  
12 blocked a portion of that area and it is just not clear  
13 enough to see.

14 Q Talking about the area between the cockpit and the  
15 area where the other area is located, back around the cargo  
16 compartment?

17 A It is not very sharp. It appears to be slightly  
18 undulating terrain.

19 Q Between that point and where the cockpit came to  
20 rest?

21 A Between the two helicopters.

22 Q Now, sir, with respect to your publications, I

1 don't recall if we asked you this before. Do you have  
2 copies of the quote, "books that you have published"?  
3 Apparently they deal with accident analysis and survivability.  
4  
5 I think they are listed in these documents, Handbook for  
6 Aircraft Accident Investigators, April 1962.

7  
8 A Yes. I have a copy of that somewhere. I moved my  
9 library up to the Shenandoah Valley and it is in boxes.

10  
11 Q Would you have a copy of the flight foundation  
12 analysis, January 1961?

13 A I probably have several copies of that.

14 Q Do you have copies of Crash Injury Investigators  
15 School Program of Instruction, March 1, 1960?

16 A I don't know if I have copies of that.

17 Q Would you have a copy of Crash Injuries Investi-  
18 gators Manual Textbook 58-59-60-61?

19 A I should have.

20 Q I would like to ask for those to be produced, unless  
21 they are out of print, for review and possible copy of  
22 portions that may be relevant to his opinion.

MR. FRICKER: Is that all of your questions?

MR. DUBUC: Yes. Can you respond to that?

MR. FRICKER: We have not typically responded to

1 those requests, either side, regardless of who is asking for  
2 them.

3 MR. DUBUC: Yes. We produced a lot of this.

4 MR. FRICKER: You misunderstand. We have not  
5 typically responded nor have your colleagues when such  
6 request is made during the course of the deposition, but ask  
7 that it be followed up in writing. And at the same time, the  
8 party being requested to try to determine what the facts are,  
9 so that reasonable response can be given. That is the  
10 approach I would take in this.

11 MR. DUBUC: Thank you.

12 (Whereupon, the deposition was concluded at 4:39  
13 o'clock p. m.)

## CERTIFICATE OF NOTARY PUBLIC/REPORTER

I, Clifton J. Hunt, a Notary Public in and for the District of Columbia, the officer before whom the foregoing deposition was taken, do hereby certify that the witness whose testimony appears in the foregoing deposition was duly sworn by me; that the testimony of said witness is a true and accurate transcription of the stenographic notes taken by me and thereafter reduced to written form by me and/or under my direction and supervision.

I further certify that I am neither counsel for, related to, nor employed by any of the parties to this action in which this deposition was taken; and, further, that I am not a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this litigation.

IN WITNESS WHEREOF, I have hereunto set my hand and  
affixed my notarial seal this 21st day of December,  
1981.

Notary Public in and for  
the District of Columbia

My Commission expires:

July 31, 1984