

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:

**Y. KING LIU, Ph.D.**

Monday, November 30, 1981

Washington, D. C.

GASDOR REPORTING COMPANY  
General Stenotype Reporting  
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Washington, D. C. 20003

(202) 484-0016

Deposition of Y. KING LIU was taken, pursuant to notice, before Albert J. Gasdor, a Notary Public in and for the District of Columbia, commencing at 9:55 a.m., Monday, November 30, 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 Plaintiffs:

STEPHEN A. HORVATH, ESQ.  
Lewis, Wilson, Lewis & Jones, Ltd.  
2054 North 14th Street  
Arlington, Virginia 22216  
Phone: (703) 527-8800

On behalf of Defendant Lockheed:

JOHN J. CONNORS, ESQ.  
Haight, Gardner, Poor & Havens  
Suite 1000  
1819 H Street, N. W.  
Washington, D. C. 20006  
Phone: (202) 775-1300

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Monday, November 30, 1981

Washington, D. C.

DEPONENT:

DIRECT EXAMINATION

Y. KING LIU, Ph.D.

7

## EXHIBITS

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1 MR. HORVATH: Before we get started, I would like  
2 to make a few statements.

3 First, we have provided counsel for Lockheed with a  
4 list of documents Doctor Liu has reviewed in order to expedite  
5 the deposition.

6 We have also provided a current copy of his CV.

7 Doctor Liu has been asked to testify in three  
8 essential areas, just for your own information, to speed  
9 things along.

10 First, he has been asked to testify to the reports  
11 by Doctor Turner and Doctor Conners.

12 Second, he was asked to discuss the additive or  
13 synergistics effect of the hypoxia.

14 And, third, he was asked to give an opinion and  
15 discuss the effects or secondary impacts which might be  
16 involved in the crash.

17 So it is essentially in those three areas that we  
18 have asked Doctor Liu to give an opinion. I am just giving  
19 that to you at this time to help you formulate the areas of  
20 your questioning.

21 We are going to impose a limit on his deposition of  
22 four hours. We feel that is reasonable and I am giving you

1 this data in order to help expedite matters.

2 I believe counsel for Lockheed has also attended  
3 a seminar given in March of 1980 at which Doctor Liu spoke so  
4 he is not a totally new witness that you are dealing with.  
5 There has been an opportunity to listen to him.

6 MR. CONNORS: State the second area again.

7 MR. HORVATH: The additive or synergistics effect  
8 involving hypoxia. Doctor Liu might be able to give you a  
9 better phrase as the questions are presented, but I wanted  
10 to give you the general area of questions so you would not be  
11 surprised.

12 MR. CONNORS: Since you have just listed the items,  
13 the first document I would like to have marked for identifi-  
14 cation is Liu Exhibit No. 1 with this date, November 30, 1981.

15 [Document marked Liu Exhibit No. 1  
16 for identification.]

1 Whereupon,

2 Y. KING LIU

3 was called as a witness and, having been duly sworn by the  
4 Notary Public, was examined and testified as follows:

5 DIRECT EXAMINATION

6 BY MR. CONNORS:

7 Q I would like to ask you if you will look at that and  
8 identify that.

9 A Yes. It is a copy of my CV as of September, 1981.

10 MR. HORVATH: One further point.

11 Do the usual stipulations apply in this case? No  
12 objections are waived except as to the form of the question?

13 MR. CONNORS: Certainly.

14 THE DEPONENT: May I make a request?

15 My name is pronounced Lu.

16 BY MR. CONNORS:

17 Q The second document we have marked as Liu Exhibit  
18 No. 2 as of this date and ask you if you can identify that.

19 A Yes. It is a list of the reports shown to me by  
20 the law firm of Lewis, Wilson, et al.

21 [Document marked Liu Exhibit No. 2

22 for identification.]

1 BY MR. CONNORS:

2 Q Doctor Liu, who wrote this?

3 A This is in my handwriting.

4 MR. CONNORS: I would like to pose a question to  
5 Mr. Horvath.

6 Your statement as to what Doctor Liu will testify  
7 to is different than the proffer contained in either of the  
8 Marchetti pretrial briefs or the Otto pretrial briefs.

9 Do I understand it is plaintiff's intention to  
10 modify that by your statement?

11 MR. HORVATH: At the present time we are asking  
12 Doctor Liu for the basic areas I have outlined inasmuch as  
13 that may vary from the statement given in the Marchetti or  
14 pretrial briefs. It is a modification. I am not saying at  
15 some date in the future we might not offer him for that point  
16 but that would be the subject of other matters. At this time  
17 Doctor Liu is only asked to give his opinions for essentially  
18 these three areas.

19 MR. CONNORS: For the record then, we have made a  
20 copy of a page from the Otto brief which contains the proffer  
21 pertaining to Doctor Liu. I am going to ask that that be  
22 marked as Liu Exhibit No. 3, this date.



for identification.]

THE DEPONENT: Is it possible for me to take a look at what is contained in that?

MR. CONNORS: Let me give you a copy.

I apologize for the condition of the copy but I believe it is readable.

MR. HORVATH: I don't know the areas I have proffered Doctor Liu on this point really modify what is given in the pretrial brief. I don't want to be on the record as saying we have modified it. I wanted to make it clear at the beginning of the deposition what questions would be presented to Doctor Liu.

MR. CONNORS: That presents a difficulty but we will try to work within it.

BY MR. CONNORS:

Q Doctor Liu, looking at your CV, which we have marked as Liu Exhibit No. 1, I notice you have a Ph.D. in biomechanics; is that correct?

A Yes.

Q What is biomechanics?

A Biomechanics is the study of forces on biological

1 tissue.

2 Q Is it discrete as to any particular tissue or is it  
3 any body tissue.

4 A It is any body tissue so in that respect the field  
5 is comprehensive.

6 Q I don't see an address for you. Would you state  
7 your home and office address.

8 A My office address is Center for Materials Research,  
9 College of Engineering, University of Iowa, Iowa City, Iowa  
10 52242.

11 My home address is Rural Route No. 6, Iowa City,  
12 Iowa 52240.

13 Q You said your CV was up to date through September  
14 of 1981?

15 A That is correct.

16 Q Could you tell us, since that time have there been  
17 any significant changes which would normally appear on your  
18 CV?

19 A Not really. I have two additional abstracts which  
20 have been accepted for presentation in the proceedings of  
21 different conferences.

22 Q Could you give us the titles of those, please, and

1 where they will either be published or presented.

2 A One is called -- I am paraphrasing -- I don't know  
3 exactly the title.

4 I have a document, if you will excuse me a minute,  
5 and then I can give you the exact title.

6 The title of the paper is "An In Situ Study of the  
7 Influences of Sclerosing Solutions and the Media Laterals  
8 and its Junction Strength.

9 This will be presented at the Orthopedic Research  
10 Society meeting in New Orleans on January 19, 1982.

11 I don't remember the second one.

12 Q The subject matter will be sufficient. Do you  
13 remember the subject matter?

14 A The subject matter is on the impact between a ball  
15 and a racket to be presented at the meeting of the American  
16 College of Sports Medicine, I think, in Minneapolis in May  
17 of 1982.

18 Those would be the two additional items on my CV.

19 Q Is that on the physics of the ball striking the  
20 racket or the biomedics of the effect it would have on the  
21 tissue.

22 A On the impact physics between the ball and the

1 racket.

2 Q I guess we don't have to go into that one, unless  
3 it has something to do with this case.

4 Is there anything else that would normally be  
5 added to your CV that does not appear in the document that  
6 we have hear today?

7 A I don't think so.

8 Q Have you brought with you today any other documents  
9 which relate in any way to the accident on April 4, 1975.

10 A I have brought along my file.

11 Q Can we see that, please?

12 A Yes.

13 MR. HORVATH: Counsel, I am looking through this  
14 file. It consists of various reports which were produced  
15 by your experts for our experts.

16 Let me have the Doctor review the file to make sure  
17 he has everything that is in the file.

18 MR. CONNORS: I am not going to make copies of all  
19 of these because it would duplicate other reports.

20 I would just like to recite some of these.

21 BY MR. CONNORS:

22 Q Doctor, I will recite some of these documents and

1 ask you if they are part of your file.

2 The first is an accident report prepared by Doctor  
3 Turner; is that correct?

4 A Yes, together with an attached wreckage diagram  
5 of the same incident.

6 Q That was the wreckage diagram prepared by Doctor  
7 Morain?

8 A Yes.

9 Q Next is a document entitled, "Photogrammetric  
10 Measurements and Soil/Vegetation Interpretations Related to  
11 the C5A Incident," prepared by Stanley A. Morain.

12 Is this also part of your file?

13 A Yes, that is correct.

14 Q Third is a copy of a document entitled, "Crash  
15 of AF86-218 C5A on 4 April 1975," by John Edwards and  
16 bearing the exhibit stamp of 12-98.

17 Is that part of your file?

18 A Yes.

19 Q Next is a document on the letterhead of James D.  
20 Gown, M.D., a letter to Mr. Carroll Dubuc of this law firm  
21 bearing Defendant's Exhibit stamp D-1502.

22 Is that part of your file?

1 A That is correct.

2 Q Have you reviewed all of those reports, Doctor?

3 A Yes.

4 Q I notice there is some underlining of certain  
5 portions of certain reports. Did you keep any separate notes  
6 on your review of these reports?

7 A No.

8 Q Next is a document entitled, "Composite of Troop  
9 Compartment Injuries." I will ask you, is that part of your  
10 file of this accident?

11 A Yes.

12 Q Do you know who prepared that document, Doctor?

13 A It was prepared by Lewis, Wilson, et al.

14 MR. CONNORS: I will ask that that document be  
15 marked as Liu Exhibit No. 4.

16 [Document marked Liu Exhibit No. 4  
17 for identification.]

18 BY MR. CONNORS:

19 Q Doctor, the next document is what appears to be a  
20 paper entitled, "Subcortical EEG Changes in Rhesus Monkeys  
21 Following Experimental Hyperextension-Hyperflexion (Whiplash)."  
22 It appears to be authored by yourself, K. B. Chandran, R. G.  
Heath and F. Unterharnscheidt.

1 At the top of the page in green in handwriting is  
2 "Revised Version." Is this part of your file with regard to  
3 this accident?

4 A Yes.

5 Q You were mentioning in a conversation off the  
6 record that there is another version of this; is that correct?

7 A The version with the green corrections as noted in  
8 this paper together with the figures which is on deposit  
9 with the Lewis, Wilson, et al.

10 MR. CONNORS: I will ask that this document be  
11 marked as Liu Exhibit No. 5 for identification.

12 [Document marked Liu Exhibit No. 5  
13 for identification.]

14 BY MR. CONNORS:

15 Q Do you mind if we stamp the original?

16 A I would rather not since this is an older version.  
17 I would much rather send you the corrected version with the  
18 figures if that is what you would like.

19 MR. CONNORS: I will have to make a copy of this  
20 and mark a copy of it and then we can get the later version  
21 at another time.

22 I will also call for the production of the report

1 that the Doctor said he gave to your office.

2 MR. HORVATH: Can we go off the record a moment?

3 [Off-the-record discussion.]

4 BY MR. CONNORS:

5 Q Doctor, let me return to you now a copy of the  
6 subcortical EEG changes article and also a file which, I  
7 believe, contains miscellaneous documents.

8 MR. CONNORS: I am going to ask that a copy of the  
9 "Subcortical EEG Changes in Rhesus Monkeys Following Experi-  
10 mental Hyperextension-Hyperflexion (Whiplash)" and co-authors  
11 be marked as Liu Exhibit No. 5 for identification.

12 [Liu Exhibit No. 5 previously marked.]

13 BY MR. CONNORS:

14 Q Have you ever seen that document?

15 A Yes.

16 Q Is that part of your file with regard to this  
17 matter?

18 A That is right.

19 Q Doctor, the next group of documents were taken  
20 from the folder.

21 The first one I would like to show you is entitled,  
22 "The Etiology, Pathogenesis and Clinical Findings in 34 Children



1 Involved in the C5A Airplane Crash: A Preliminary Report,"  
2 and ask that that be marked as Liu Exhibit No. 6 and ask if  
3 you can identify that, please.

4 A Yes.

5 [Document marked Liu Exhibit No. 6  
6 for identification.]

7 BY MR. CONNORS:

8 Q What is that document, Doctor?

9 A That document is the agenda for the meeting that  
10 took place in March of 1980.

11 Q Did you attend that meeting?

12 A Yes, I did.

13 Q Is that part of your file?

14 A Yes.

15 Q Next is a two-page document consisting of two  
16 pages of handwritten notes, which I will ask be marked as  
17 Liu Exhibit No. 7 this date, and ask if you can identify  
18 that.

19 A Yes. These are the notes that I took at that  
20 symposium on March 8, 1980.

21 [Document marked Liu Exhibit No. 7  
22 for identification.]

1 BY MR. CONNORS:

2 Q Is this also part of your file on this matter?

3 A Yes.

4 Q Next is a single-page document entitled, "Wreckage  
5 Diagram, C5A SN 68-218 4 April 1975," which I will ask be  
6 marked Liu Exhibit No. 8. I will ask if you can identify  
7 that, please.

8 A Yes. This is the diagram furnished me by the law  
9 firm of Lewis, Wilson, et al.

10 [Document marked Liu Exhibit No. 8  
11 for identification.]

12 BY MR. CONNORS:

13 Q Is that part of your file on this matter?

14 A Yes.

15 Q The next is a Xerox copy of a clipping from a  
16 newspaper which is entitled, "Crash Victim Vietnamese Orphan  
17 Awarded \$500,000." I will ask that that be marked Liu Exhibit  
18 No. 9 and ask if you can identify that.

19 A That is correct.

20 [Document marked Liu Exhibit No. 9  
21 for identification.]

1 BY MR. CONNORS:

2 Q What is that document?

3 A That document is, as you said, the newspaper  
4 account of this settlement, the Schneider settlement with  
5 respect to this particular case.

6 Q Do you know the difference between a settlement  
7 and a verdict?

8 A Yes, I do.

9 Q Is this a settlement or verdict? Is that part of  
10 your file in this matter?

11 A Yes, it is.

12 Q How did you get that particular clipping from that  
13 newspaper?

14 A My very capable administrative assistant cut it  
15 out and put it in my file. She thinks I did not have to  
16 come to Washington any more and she was wrong.

17 Q What newspaper was that taken from, Doctor?

18 A I think it is from the local newspaper, The Iowa  
19 City Press.

20 Q Doctor, other than the document we have marked here  
21 this morning and have recited for the record, do you have any  
22 other notes, articles, documents, reports of any kind which

1 in any way relate to the C5A accident?

2 A No.

3 Q I notice there is a reference in the handwritten  
4 note reflecting those documents that you reviewed -- the  
5 report by Doctor Conners; is that correct?

6 A That is correct.

7 Q I notice there is a copy of that report in front  
8 of Mr. Horvath.

9 Have you had access to that report?

10 A Yes.

11 Q Have you read that report all the way through?

12 A To the extent that I cursorily glanced at the data  
13 gathering sheets but I read through the summary of Doctor  
14 Conners' findings. I did not go into detail on the methodology  
15 which he and his colleagues did the scoring, but I read his  
16 summary letter with great care.

17 Q The letter you are referring is to Charles R.  
18 Work, dated August 21, 1981; is that correct?

19 A Yes.

20 Q Other than those documents, do you have any other  
21 documents relating to this case?

22 A No.

1 Q Doctor, looking at your CV, I note there is a  
2 reference to a one-year stay at Stanford University as a  
3 visiting assistant professor, aeronautics and astronautics;  
4 is that correct?

5 A Yes.

6 Q What were you doing at Stanford during that time?

7 A I was awarded a fellowship by the National Institutes  
8 of Health to study anatomy, physiology at Stanford University.

9 Q Were you teaching at that point?

10 A I was doing some guest teaching.

11 Q What subjects were you teaching?

12 A A course in biomechanics and a course in human  
13 dynamics, hemodynamics, the study of blood flow.

14 Q What was your research at Stanford?

15 A The injuries to the human spine.

16 Q Were you doing any research in the area of hypoxia?

17 A No, I was not.

18 Q Have you ever done any research in the area of  
19 hypoxia?

20 A No, I have not.

21 Q Further down in the first page of your CV under  
22 Industrial Experience, category B, consulting, you have

1 listed consulting for various attorneys.

2 A Yes, that is right.

3 Q Have you had occasion to consult with the Lewis  
4 firm on other than the C5A accident?

5 A No.

6 Q Have you ever given sworn testimony either in  
7 deposition or courtroom testimony of any kind?

8 A Yes, I have.

9 Q On what occasions have you given sworn testimony?

10 A The list is almost too long to recite.

11 Q Have you given testimony in any cases involving  
12 issues similar to those in the C5A crash?

13 A Not specifically with respect to aircraft?

14 Q You have never testified before with respect to  
15 an aircraft accident?

16 A No.

17 Q Have you ever testified before with respect to  
18 any kind of impact trauma?

19 A Yes.

20 Q Any which involved injury to children?

21 A No. That is to the best of my recollection.

22 Q Have you ever given sworn testimony in cases

1 involving alleged damage to the brain or central nervous  
2 system?

3 A Yes.

4 Q Could you identify those cases for us, please.

5 A It would be a little bit difficult to identify all  
6 of the cases, but let me give you a sample.

7 In the most recent case, it is Bedan versus Rollins  
8 on a football helmet impact trauma case which was tried in,  
9 I believe, Franklin, Indiana. It is outside of Indianapolis.  
10 The result of the impact trauma was paraplegia on a 14-year-  
11 old boy.

12 Q Doctor, do you have a list or a source you could  
13 go to so that you could identify the cases in which you  
14 have testified previously?

15 A I have two file drawers.

16 Q The question I would normally put to you would be  
17 to identify the cases and courts and dates in which you  
18 testified. If I can get a representation that these will be  
19 produced, I will be happy to forgo these questions.

20 MR. HORVATH: I need to talk to Doctor Liu off the  
21 record.

22 [Counsel consults with deponent.]

1 MR. HORVATH: Counsel, am I to understand from  
2 your representation that you are asking him to list the  
3 names of every case he has testified in?

4 MR. CONNORS: Cases in which he has given sworn  
5 testimony. Obviously, I don't want confidential medical  
6 information other than the information he testified to in  
7 some sort of open hearing or deposition or courtroom case.  
8 I would like the name of the case and the courtroom where it  
9 was tried or where the deposition was noticed and the dates.

10 MR. HORVATH: I don't believe your request for  
11 production of documents requested anything like that. I am  
12 hesitant at this point to have him produce a lengthy list  
13 of cases where he has testified. He can testify to areas in  
14 which he has testified. The purpose is not to have him go  
15 back and do research for you.

16 MR. CONNORS: The alternative is then I have to  
17 ask him and go through in detail his present recollection of  
18 those cases. All I am asking is the list of cases testified  
19 to. We can go back and look at the testimony to review these  
20 matters but if you can't give me the list, then at some point  
21 I will have to go through with him and ask these questions.

22 MR. HORVATH: My hesitancy is requiring the Doctor



1 to produce such a list for you.

2 MR. CONNORS: I can do it here by questions and  
3 answers, taking a great deal of time which none of us wants  
4 to waste, or it can be provided later.

5 MR. HORVATH: You have a four-hour limitation.

6 MR. CONNORS: That is your limitation. The Court  
7 has not imposed that limitation.

8 MR. HORVATH: The Court has imposed reasonableness.

9 Why don't we proceed and I will consider this. I  
10 am very reluctant to go back and do that. He can testify  
11 to general areas of testimony.

12 MR. CONNORS: I am looking for where he has  
13 testified and it is a routine question with regard to experts  
14 testimony.

15 MR. HORVATH: I am afraid in future depositions  
16 you will be questioning experts on very lengthy requirements  
17 so I will not agree at this point.

18 MR. CONNORS: I will move on at this point but I  
19 reserve the right to return to his knowledge.

20 BY MR. CONNORS:

21 Q Doctor, are you being compensated for your services  
22 in this case?

1 A Yes.

2 Q What is your rate of compensation?

3 A I charge \$800 a day for my compensation.

4 Q Does that vary depending on the nature of the work  
5 that is involved, such as courtroom testimony versus something  
6 else?

7 A That is my flat charge.

8 Q Is that for an 8-hour day?

9 A Yes.

10 Q Just to complete that one question, in the Bedan  
11 versus Rollins case, do you recall approximately when you  
12 gave that testimony?

13 A Three or four weeks ago.

14 Q So that would be in October of this year?

15 A Yes.

16 Q Was that a trial in Franklin, Indiana?

17 A Yes.

18 Q Doctor, approximately how much of your time during  
19 any given period, a week a month, a year, is devoted to  
20 either consulting or giving testimony in litigation?

21 A At most, half a day a week. That is a maximum.

22 Q Doctor, when was your first contact with this case?

1 A In March of 1980.

2 Q Do you recall who contacted you?

3 MR. HORVATH: Objection.

4 What relevancy does that have to the facts or  
5 opinions held by this witness?

6 MR. CONNORS: It is getting to the area of where  
7 he got his information.

8 BY MR. CONNORS:

9 Q Do you recall who contacted you?

10 A Ms. Lena Natole.

11 Q At that time were you furnished any information  
12 regarding this case?

13 A She described the outlines of the case to me. I do  
14 not recall if she said someone at NIH said that I was the  
15 appropriate expert on whiplash injuries.

16 Q You say she provided you some information on the  
17 litigation?

18 A Yes.

19 Q Did she provide you any facts regarding the nature  
20 of the accident?

21 A No, she did not. She invited me to come to the  
22 symposium that was to be held.

1 Q Did you receive any factual information regarding  
2 the accident prior to the time that you attended the symposium?

3 A No, I did not. She told me that would be the best  
4 place to get the facts in this case.

5 Q Did you receive any factual information other --  
6 prior to the symposium or meeting of plaintiffs' experts, did  
7 you have occasion to come to Washington, D. C. for the purpose  
8 of this litigation?

9 A No.

10 Q When you met with plaintiffs' other experts, that  
11 was your first visit to Washington for purposes of this  
12 litigation?

13 Yes.

14 MR. HORVATH: I don't believe he met with other  
15 experts. Objection. He attended a symposium.

16 MR. CONNORS: I know that is a nice word for a  
17 meeting.

18 MR. HORVATH: Counsel was present at that meeting,  
19 too.

20 If you want to characterize it as a meeting with  
21 experts and counsel for Lockheed present, fine.  
22

1 BY MR. CONNORS:

2 Q Doctor, other than the information that was presented  
3 orally at that meeting, did you receive any other factual  
4 information regarding the accident at that time?

5 A No, other than, I guess, I have had meetings  
6 subsequent to that date, yes, but not prior to that time.

7 Q Were you provided with any written information at  
8 the time of that meeting?

9 A There was a package that came with the agenda, and  
10 so on, but that was all.

11 Q Do you recall what was in that package?

12 A The package was, I guess, essentially the agenda  
13 for that meeting.

14 Q Were there any outlines or descriptive material  
15 describing the accident?

16 A I don't recall.

17 Q You indicated that there were other occasions where  
18 you met with individuals regarding this case. Before we go  
19 into that, though, did you have any individual meetings in  
20 Washington at the time of that first meeting of plaintiffs'  
21 experts?

22 A No.

1 Q You just came and heard the meeting and then left?

2 A Yes.

3 MR. HORVATH: For the record, I have a continuing  
4 objection to using the term "just a meeting" with plaintiffs'  
5 experts.

6 BY MR. CONNORS:

7 Q What other meetings or visits have you had to go to  
8 Washington regarding this litigation?

9 A I came here -- I do not recall the exact date --  
10 probably four or five weeks ago and met with Doctor Morain,  
11 Mr. Cromack and Doctor Michael Cohen.

12 Q Had you had any contact regarding this case from  
13 March of 1980 to the meeting you just described?

14 A Yes. I requested many times over the telephone to  
15 Ms. Natole to return my film because I needed it. On those  
16 occasions, she gave me a verbal report on the status of the  
17 case.

18 Q At any time did she provide you with any factual  
19 information regarding the accident?

20 A Let's see. Not with respect to the factual infor-  
21 mation in the case. She told me one more of these cases was  
22 getting settled and that she was hoping that the entire case

1 would be settled before I needed to come again, but apparently  
2 that is not the case.

3 Q The meeting that occurred four or five weeks ago  
4 would have been late September?

5 A Late September or early October.

6 Q Prior to that time, had you received any information  
7 either verbally or orally other than the agenda for that one  
8 conference which in any way related to this accident?

9 A In arranging for that meeting, Doctor Cohen told me  
10 over the telephone about what he characterized as new evidence  
11 concerning the movies, the still photographs that they would  
12 be able to get from Lockheed that was very important in this  
13 particular case.

14 Q The meeting you are referring to is the one in late  
15 September or early October of this year?

16 A That is correct.

17 Q Prior to that time, had you had any information at  
18 all regarding the facts of the accident?

19 A No, except what I learned at that symposium.

20 Q Have you received any telephone calls from anyone  
21 besides Ms. Natole and the call from Doctor Cohen?

22 MR. HORVATH: I am going to object to this. He

1 has already testified to what facts he received. The limiting  
2 of the scope is Rule 26, which is facts known and opinions  
3 held. You have asked him what sort of facts he obtained and  
4 he has already testified to that.

5 BY MR. CONNORS:

6 Q Doctor, can you answer the question?

7 A No.

8 Q Did Doctor Cohen during the phone call preceding  
9 the meeting in late September or early October of 1981  
10 describe any factual information to you?

11 A He gave a brief synopsis of the new material he  
12 has received from Lockheed.

13 Q What did he tell you?

14 A That they have moving pictures of the tracks and  
15 that they have a lot of still photographs and all the sort  
16 of information which we requested which we told him was  
17 necessary during the symposium which at that time apparently  
18 was not available but was available then.

19 Q Did he describe to you what was shown in those  
20 movies or still photographs?

21 A No, he did not.

22 Q You stated that you met with Doctors Morain, Cromack



1 and Cohen in late September or early October. Aside from that  
2 meeting and the meeting in March of 1980, have you had  
3 occasion to meet with any other experts engaged by plaintiffs'  
4 counsel?

5 A No.

6 Q Where was the meeting in late September or early  
7 October?

8 A In Lewis, Wilson's law offices.

9 Q Was anyone else beside Doctors Morain, Cromack and  
10 Cohen there?

11 A No.

12 Q What was the purpose of that meeting?

13 A To bring together the three people with the appro-  
14 priate expertise to look at the new evidence.

15 Q Were you conferring with these other doctors or  
16 simply in the same room reviewing pieces of evidence?

17 A We did that as well as talked to one another.

18 Q There was an exchange of information among the three  
19 doctors?

20 A Well, to the extent we looked over the movies  
21 together, we saw the still photographs together, and there  
22 were commentaries made about all sorts of things. There were

1 times when we were together and there were times when we  
2 were apart.

3 Q What did Doctor Cohen relate to you?

4 A Relate to me? He narrated the film that was shown  
5 to us, and he made commentaries on the photographs.

6 Q Are you aware of how many films there are?

7 MR. HORVATH: At the present time or at that time?

8 MR. CONNORS: At any time.

9 THE DEPONENT: We saw three films. It was three  
10 rolls, cans about 6 to 6 inches in diameter.

11 BY MR. CONNORS:

12 Q Can you describe each of the three in general terms?  
13 I am trying to distinguish what you saw. All I am looking  
14 for is what you distinguished from the films.

15 A All three films were different versions of films  
16 taken by various people after the accident. One film in  
17 particular was a helicopter -- taken from a helicopter in  
18 which they retraced the course of the accident, showing the  
19 various tracks, the debris, the location of different parts  
20 of the aircraft, and so on.

21 Q That was a film of approximately how long a duration?

22 A I would say 45 minutes.

1 Q Was there a second film which incorporated that  
2 film, that is, flying over the track of the aircraft into a  
3 larger film?

4 A There was another film taken at a much higher ele-  
5 vation, showing the lay of the land, as it were, rather than  
6 following the tracks.

7 Q What was the third film?

8 A The third film was a melange of many things. It  
9 did not stick in my mind as much.

10 Q Was it a ground level or aerial film?

11 A It was more a ground film showing a lot of people  
12 running all over the place.

13 Q Was it a video tape or motion picture?

14 A The version I saw was a motion picture.

15 Q Were the people running all over Vietnamese as far  
16 as you could tell or Americans?

17 A They were both Vietnamese and Americans.

18 Q Was this a film of the accident scene?

19 A Yes.

20 Q Were you able to tell or were you advised as to  
21 approximately when the film was taken in terms of the accident?

22 A I do not recall but I presume it was soon after the

1 accident because you could still see the smoke from the fire.

2 Q You saw this was definitely a motion picture and not  
3 a video tape?

4 A Yes, because I helped to load the reels.

5 Q Do you recall approximately how long that film was?

6 A Which one are you referring to?

7 Q The last one you have been referring to.

8 A Also about 45 minutes.

9 MR. CONNORS: I am going to call for the production  
10 of that motion picture film.

11 MR. HORVATH: You have all the films we have.

12 MR. CONNORS: I don't think we have what the document  
13 just described. If you are representing that that is one of  
14 the ones we have, I would like to know which one it is.

15 Do you know which one it is that he is talking about,  
16 a motion picture film and not a video tape?

17 MR. HORVATH: Counsel, it is my understanding you  
18 have every single document we have and certain motion pictures  
19 of the crash and you have seen them all.

20 MR. CONNORS: I will represent to you we do not have  
21 a motion picture film of the description given by Doctor Liu.

22 MR. HORVATH: You have no motion picture of people

1 standing around?

2 MR. CONNORS: Not where there is smoke.

3 MR. HORVATH: Any indication that we are withholding  
4 a film is offensive.

5 MR. CONNORS: I am only calling for production of  
6 the film.

7 MR. HORVATH: Put your request in writing.

8 BY MR. CONNORS:

9 Q You stated Doctor Morain narrated the films.

10 A No. Doctor Cohen narrated the films.

11 Q What did Doctor Cohen tell you during the narration?

12 A He made remarks concerning, "Here is the point of  
13 the first impact and here is the location for the second  
14 impact." It was pretty well summarized in that wreckage  
15 diagram that was finally prepared.

16 Q Did he make any comments describing the accident  
17 during the film?

18 A No. I think the film pretty much spoke for itself.

19 Q I am concerned with what Doctor Cohen stated. To  
20 the best of your recollection, can you tell us what Doctor  
21 Cohen told you and the other doctors?

22 A He didn't say that much. He said, for example,

1 "This is an aerial view following the tracks of the incident,  
2 the east side or west side of the Saigon River." It was that  
3 sort of thing.

4 Q Did he make any comments about the nature of the  
5 track marks?

6 A No, he did not.

7 Q Did he make any remarks about the severity of the  
8 impact?

9 A He did not.

10 Q Did he make any comments regarding the color or  
11 discoloration of any soil or vegetation?

12 A He did not.

13 Q Did Doctor Morain make any comments during your  
14 meeting with him?

15 A In fact, that was the purpose of the meeting so that  
16 we could look at it and form our own opinions. After all,  
17 supposedly we are the experts, not Doctor Cohen.

18 Q I understand that.

19 Did Doctor Morain say anything during the meeting?

20 A No, he did not. His task was to study the tracks  
21 and the topography, the soil conditions, the water, and mine  
22 is confined to my area of expertise.

1 Q I realize that. I am trying to find out if any  
2 information was exchanged at that meeting. I am trying to  
3 find out whether Doctor Morain made any statements?

4 A No.

5 Q Did Doctor Cromack make any statements?

6 A No.

7 MR. HORVATH: You have asked for statements. He  
8 has already testified there were statements and he was in the  
9 room together with them.

10 BY MR. CONNORS:

11 Q Did any of the doctors make any presentation  
12 regarding the accident?

13 A Not presentations, no.

14 Q Did any of the doctors make any comments on either  
15 the film or any of the still photographs they saw?

16 A Obviously we made comments.

17 Q That is what I want to know.

18 What comments, if any, that you can recall did  
19 Doctor Morain make -- anything at all? I am only asking  
20 for your recollection.

21 A He made comments on the significance of the water  
22 levels, the nature of the soil, which was part of the Saigon

1 River Delta, how similar it was to the ones he studied in  
2 Thailand. It was a typical chitchat between reasonably  
3 knowledgeable people about these things, giving impressions  
4 as we looked at the film on what we saw.

5 Q You stated Doctor Morain thought the water level  
6 and the soil were significant. Did he state that anything  
7 else was significant to him, to the best of your recollection?

8 A Things like the length of the tracks, and the  
9 different obstructions in the path of the aircraft, what  
10 luck it was that the airplane didn't dive into the Saigon  
11 River -- all sorts of remarks like that. It is really hard  
12 for me to recall at the moment everything that was said.

13 Q What comments did he make regarding obstructions  
14 that the aircraft encountered?

15 A That at any given spot he would say, "This hit a  
16 dike here and it dug a hole this deep," and how you can tell  
17 how deep it is by the water level -- pretty much the things  
18 that finally came out in his report, but that was his first  
19 impression.

20 Q Did he have any measurements at that time?

21 A No, he didn't have any measurements at that time.  
22 We were all looking at the film for the first time.



1 Q Did Doctor Cromack make any statements or comments  
2 indicating anything that was of particular significance to  
3 him?

4 A No. He was rather quiet.

5 Q Other than the films and the photographs, did you  
6 review any other materials at that meeting?

7 A We discussed briefly in a sense the documents that  
8 were available and which documents in a sense would be germane  
9 to our own considerations.

10 Q Did you make any requests for documents?

11 A Yes.

12 Q What documents did you request?

13 A I requested most of the documents that were ultimately  
14 furnished to me.

15 Q Did you request anything else which either we  
16 furnished or were marked today?

17 A No.

18 Q Prior to that time had you requested any materials?

19 A No, I did not.

20 Q Did some of the materials that you have listed as  
21 having reviewed includes reports from defendant's experts?

22 Did you specifically request copies of defendant's

1 reports?

2 A Yes.

3 Q Did you ask for any particular experts' reports?

4 A I think I requested the report on the deceleration  
5 characterizations. I did not know at that time who defendant's  
6 experts were.

7 Q You were ultimately furnished with the reports of  
8 Mr. John Edwards and Doctor Gown?

9 A That is correct.

10 Q Were you furnished any other reports of defendant's  
11 experts?

12 A No.

13 Q Were you advised that there is a report from a  
14 Doctor Charles Berry?

15 A No.

16 Q Have you ever heard of Doctor Berry?

17 A I don't believe so.

18 Q If, in fact, Doctor Berry, who I will represent to  
19 you is the former head of medicine at NASA, had written a  
20 report which included an opinion regarding the deceleration  
21 forces, would you have wanted to see that?

22 MR. HORVATH: I will object to that question.

Your line of questioning is on facts known or

1 opinions held by this witness. That question is directed at  
2 simply trying to exclude this doctor's testimony or making  
3 some statements saying this doctor has not reviewed everything  
4 possible under the sun and therefore he can't testify because  
5 we don't have all the sufficient facts. If you can ask if he  
6 has enough data to review it, why don't you do it that way  
7 but going through the back door for a motion to exclude, which  
8 I am sure will be coming after this deposition, I will object  
9 to it. I object to the form of the question and I don't think  
10 it is a proper question under the scope of Rule 26.

11 MR. CONNORS: I will ask the reporter to read the  
12 question back, please.

13 [Whereupon, the reporter read the pending question.]

14 THE DEPONENT: Yes, I would have wanted to see that.

15 BY MR. CONNORS:

16 Q Doctor, were you advised among defendant's experts  
17 there is also a Doctor Jefferson Davis and Doctor Garrett Dun?

18 Were you aware of that fact?

19 A No.

20 Q Are you familiar with either of those names?

21 A No.

22 Q At the meeting you described attended by Doctor Morain,

1 Cromack and Turner, how many meetings were there? Was it  
2 simply a one-day affair or were there more meetings?

3 A It was a one-day meeting.

4 Q Since that time, have you had occasion to meet with  
5 those same experts or other experts at a different time?

6 A No, I have not.

7 Q Since that time, have you been furnished any factual  
8 information other than as contained in the documents that we  
9 have listed or marked here today?

10 A No.

11 Q When you were first contacted back in March of 1980,  
12 were you given any description of your role or the purpose  
13 for which you were going to serve in this litigation?

14 A It was more to be information for me than anything  
15 else, because I am consulted quite often by attorneys and  
16 other agencies to give my opinion concerning any given case.  
17 The normal procedure is that I be furnished all the materials  
18 which I requested, but in this case, it was too complex and  
19 I think that was the reason why the symposium was organized.

20 Q At some point were you advised that you would be  
21 expected to testify at either deposition or trial?

22 A That is usually my decision to make. I am called in

1 as a consultant and I give them my opinion and then I tell  
2 them pretty much what I am willing to agree to in any given  
3 case.

4 Q When did you give your opinion to plaintiffs'  
5 counsel?

6 A After this meeting that we just alluded to concern-  
7 ing the new evidence.

8 Q Prior to late September or early October 1981, you  
9 had not furnished an opinion to plaintiffs' counsel; is that  
10 correct?

11 A Yes, I gave an opinion. I always give opinions  
12 concerning particulars in a case, yes.

13 Q When did you first furnish plaintiffs' counsel with  
14 an opinion with regard to the matters involved in this  
15 litigation?

16 MR. HORVATH: Objection.

17 If you ask, when did you formulate an opinion, that  
18 is one matter, but when did he first give an opinion to  
19 plaintiffs' counsel is objectionable.

20 You are limited under Rule 26. You have to remember  
21 that. Rule 27 says facts known and opinions held, not when  
22 he furnished to plaintiffs' counsel. That is calling for an

1 Q Prior to the meeting in March of 1981, had you  
2 formed an opinion with regard to the events on April 4, 1975?

3 A I didn't even know about the case prior to that.

4 Q You had been advised at least there was an accident  
5 and you were being invited to a meeting?

6 A That is right.

7 Q But prior to this meeting, you had no opinion?

8 A Obviously not. I did not know any particulars about  
9 the case.

10 Q As a result of that meeting in March of 1980, did  
11 you form any opinions relating to the events which occurred  
12 on April 4, 1975?

13 A I thought the preliminary data was quite convincing  
14 that these children did have minimum brain damage. I was  
15 very impressed with the data.

16 Q Had you formed an opinion at that point with regard  
17 to the cause of any problems in the children?

18 A No, not at that point, but the medical data was very  
19 convincing, yes.

20 Q At the time of the meeting in March of 1980, were  
21 you provided with any facts or information which indicated  
22 that any of the children on the C5A had any problems or

1 or displayed any symptoms of MBD while in Vietnam?

2 A I do not recall that. That is quite some time ago.

3 Q Have you ever requested any information on the  
4 condition of the children on the C5A prior to the time of the  
5 accident on April 4, 1975?

6 A That was not my area of concern.

7 Q When did you first form an opinion relating to the  
8 cause of the problems in the children aboard the C5A?

9 A Would you repeat that question?

10 Q Let me go back a little further.

11 What do you understand to be the problems of the  
12 children on the C5A?

13 A That there was some central nervous system sequela  
14 as a result of the entire accident environment.

15 Q Do I understand correctly that your premise when  
16 you began your study of this accident was that there was  
17 sequela resulting from the accident?

18 A No, but the evidence I heard at the symposium was  
19 quite remarkable, I thought, especially the twin study. I  
20 was very impressed with that.

21 Q What twin study are you referring to?

22 A I don't recall the name. I think it is Renolds or

1 attorney-client privilege and I will ask this witness not to  
2 answer that question as to when he first furnished plaintiffs'  
3 counsel with an opinion. That is not among the discoverable  
4 opinion. You can ask him when he formulated the opinion but  
5 not when he furnished it to plaintiffs' counsel.

6 BY MR. CONNORS:

7 Q Can you answer the question, Doctor?

8 A As I said earlier, I gave opinions all along. I  
9 don't need to add anything further. I have had opinions all  
10 along.

11 Q Are you able to answer the question as it was asked?

12 MR. HORVATH: He has just given an answer to the  
13 question.

14 THE DEPONENT: I stand by what I said.

15 BY MR. CONNORS:

16 Q When did you first form an opinion regarding the  
17 accident which occurred on April 4, 1975.

18 A Opinions evolve. If you are asking at what particu-  
19 lar point in time did I form an opinion, I had an opinion  
20 after I attended the symposium. I had an opinion when I  
21 saw the new evidence. I mean, I had opinions all along. They  
22 are deliberations in my own mind.



1 something like that, which is one of these classic examples.

2 We would all like to do twin studies in humans and here was  
3 certainly an example of a twin study.

4 Q In this case, this is a case where one twin was on  
5 the airplane and one was not?

6 A That is right.

7 Q You say that is a classical-type experiment?

8 A Not classic. It is something you would like to do  
9 but there are few occasions when such studies can be done.

10 Q Was it your understanding that the child Nathan  
11 Reynolds was not on the aircraft while his twin brother James  
12 was on the aircraft?

13 A I do not recall who was on what.

14 Q Do you recall the condition, that is, the mental  
15 and physical condition of the twin who was on the aircraft  
16 while in Vietnam, that is, prior to the accident on April 4,  
17 1975?

18 A I do no.

19 Q You have no information regarding his condition in  
20 Vietnam?

21 A No.

22 Q Would it make a difference to you if that child had

1 been hospitalized for a month in Vietnam for a high fever  
2 believed to be meningitis?

3 MR. HORVATH: I will object to that question. It  
4 does not include the entire facts of what happened to James  
5 Reynolds while in Vietnam. If you want to ask him a hypothetical  
6 with respect to all of the children on the C5A or the healthiest  
7 children on there and the facts of what his actual condition  
8 was prior to the plane, you can ask him that.

9 MR. CONNORS: That is your version.

10 MR. HORVATH: That must be your version, too. You  
11 settled the case.

12 You can go ahead and answer, Doctor.

13 I have to make these objections.

14 THE DEPONENT: I have lost track of the question.

15 Please read the question.

16 [The Reporter read the pending question.]

17 THE DEPONENT: That particular case was impressive,  
18 particularly impressive for me, but the remainder of the data  
19 in the non-twin category was equally impressive.

20 One does not base one's opinions on one single  
21 isolated incident. This is a very complex situation in which  
22 you can say that the available evidence was very, very much

1 collaborated by all of the remainder of the evidence.

2 MR. CONNORS: I appreciate your comment but the  
3 question was somewhat different. I will ask the Reporter to  
4 read that question back again.

5 THE DEPONENT: You don't need to read it back.

6 In isolation, yes, it would make a difference.

7 MR. HORVATH: Are you asking him to make a diagnosis  
8 because the child was sick for one month in Vietnam before the  
9 accident? This child has minimal brain dysfunction. That  
10 seems to be what your question is going to if that is what you  
11 are trying to do.

12 MR. CONNORS: I think the Doctor understood the  
13 purpose for it -- understood the question and the purpose for  
14 it.

15 BY MR. CONNORS:

16 Q Doctor, I believe the area we were directing our-  
17 selves to prior to that little excursion on the Reynolds case  
18 related to when you formed your opinion and I will restate  
19 what I believe is the question we are working on.

20 At some point, did you form an opinion as to the  
21 cause of any central nervous system dysfunction in the children  
22 who were aboard the C5A?

1 A I felt that deceleration was definitely a factor.

2 Q When did you reach that conclusion, Doctor?

3 A The general notion that, in fact, deceleration would  
4 be a most likely cause I think I formed right after the  
5 symposium, because the symptoms that were catalogued during  
6 that symposium agreed rather well with the data which I have  
7 on Rhesus monkeys subject to whiplash.

8 Q The basis of your opinion was based on these  
9 monkey studies; is that right?

10 A The symptomatology is similar.

11 Q At the time you formed your opinion, you had no  
12 information relating to the condition of the children prior  
13 to boarding the aircraft; is that correct?

14 A I guess only what was brought out at the symposium.

15 Q What was brought out at the symposium?

16 A That there was a preponderance of evidence to  
17 indicate that there was a statistical difference between  
18 the group that was subject to the trauma and the group that  
19 was not in sort of a paired T test.

20 Q Do you recall who the children on the aircraft  
21 were being compared to?

22 A Yes, I believe peers out of the orphanages, those

1 who were on the plane and those who were not on the plane.

2 Q It is your understanding that at the symposium some  
3 sort of study was presented comparing the children on the C5A  
4 with a comparable peer group of children who had not been seen;  
5 is that correct?

6 A I believe so.

7 Q Do you have any knowledge from reviwieing any records  
8 or statements from anyone, information from any source which  
9 relates to the particular condition of the specific children  
10 on board the C5A?

11 A Do you want me to recall right now?

12 Q Yes. Have you received any information in a docu-  
13 mentary or oral source which related to you the condition of  
14 the children on the C5A prior to the time of the accident?

15 A Prior to the accident?

16 Q That is right.

17 A I do not recall, but I can try to refresh my memory  
18 by looking at my notes.

19 Q Please look at your notes.

20 A No. My notes do not include any inforatmion regard-  
21 ing the children prior to the accident.

22 Q Would it be of interest to you to know the prior

1 condition of the child?

2 MR. HORVATH: Objection. Your question is objection-  
3 able for a number of reasons.

4 First of all, it assumes there is an abnormality. I  
5 think the Doctor can make an assumption the children adopted  
6 were normal. Lockheed's contentions are that the kids were  
7 not injured' --

8 MR. CONNORS: You were not listening to the question-  
9 ing.

10 MR. HORVATH: Maybe I have not.

11 Again, I object to the underlying basis for the  
12 question.

13 Secondly, I object to it inasmuch as it is to be  
14 made a part of your motion to exclude this witness from  
15 testifying.

16 THE DEPONENT: Yes, it would be of interest to me  
17 but the control group in my opinion vis-a-vis the group in  
18 the crash was very adequately controlled.

19 BY MR. CONNORS:

20 Q Describe the control group, please.

21 A The control group was the peer group of children  
22 who were not on the C5A and subsequently had similar

1 immigrations to the western world.

2 Q I want to know your specific understanding of the  
3 peer group with which the C5A children were being compared,  
4 regarding the specifics of where they were, where they came  
5 from, when they came to the United States.

6 A The specifics in each case are not nearly as important  
7 as the patent of the corroborative evidence.

8 Q Doctor, do you know the specifics of the peer group  
9 that you just referred to? Do you know when that peer group  
10 came to the United States?

11 A Specifically with respect to when they came to the  
12 United States, I think, is not so important as the fact at what  
13 age they came and that there is an essential similarity between  
14 the peer groups.

15 Q Do you know when they came?

16 A No.

17 Q Do you know what age the children were when they  
18 came?

19 A No. I was told -- again, I am trying to recall  
20 something about -- anywhere from 13 to 18 months and then  
21 some were older than that, but it was quite a melange.

22 Q Do you recall where those children came from in

1 Vietnam? I am speaking now of the children in the peer group  
2 that you have been comparing the C5A children to.

3 A They were all adopted children from various sources,  
4 various orphanages in Vietnam. That is what I recall.

5 Q Do you know whether they were from the orphanages or  
6 Friends For All Children?

7 MR. HORVATH: He has already answered your question.

8 THE DEPONENT: I don't know the specifics.

9 MR. HORVATH: Can we go off the record a moment?

10 [Off-the-record discussion.]

11 BY MR. CONNORS:

12 Q In reaching a conclusion regarding the cause of any  
13 problems allegedly existing with the children on the C5A,  
14 would it be important for you to consider the prior condition  
15 of those children?

16 MR. HORVATH: I object to the form.

17 THE DEPONENT: In the best of all words, yes, in  
18 which I have a controlled experiment, yes, I would. This is  
19 an uncontrolled experiment, unfortunately.

20 Q What is your understanding of the health and condition  
21 of the children aboard the C5A prior to the time the accident  
22 on April 4, 1975 occurred?



1 A That they are no different than the peer group that  
2 they are compared to.

3 Q Was the peer group healthy?

4 A Yes.

5 Q So your assumption is that the children on the air-  
6 craft were healthy?

7 A If the peer group was unhealthy-- and that is a big  
8 if -- if the peer group were unhealthy, then the control group  
9 was equally unhealthy. There is no statistical difference  
10 between the two groups a priori.

11 Q If the children on the C5A were displaying minimal  
12 brain dysfunction prior to the accident on April 4, 1975,  
13 would that change your opinion?

14 MR. HORVATH: I object. It is a vague and ambiguous  
15 question.

16 THE DEPONENT: I agree with counsel.

17 I have already answered that question. I said the  
18 two groups are comparable and, therefore, what happened in  
19 one group that is different and distinct from the other group  
20 is the key to the comparison.

21 BY MR. CONNORS:

22 Q Doctor, what you told me -- and please correct me

1 if I am wrong -- but what you told me was, it was your assump-  
2 tion that the children aboard the C5A were healthy prior to  
3 getting on board the aircraft; is that correct?

4 A No, that is not what I said at all.

5 Q My question was, what was your understanding of the  
6 health condition of the children aboard the C5A. I want your  
7 understanding of their condition.

8 A That whatever it was that afflicted them was also  
9 the same affliction with the peer group, statistically speaking

10 Q Doctor, I am not looking for a statistical answer.  
11 I am looking for your understanding of the health, physical  
12 and mental condition of the children aboard the C5A prior to  
13 April 4, 1975.

14 MR. HORVATH: Counsel, he has given you an answer.

15 He says they are comparable to the peer group.

16 MR. CONNORS: He does not know the condition of the  
17 peer group.

18 THE DEPONENT: Whatever the condition of the peer  
19 group -- I don't care how you wish to characterize it -- they  
20 are sick, they are healthy -- but they are comparable groups.  
21 That is what I am trying to say.

1 BY MR. CONNORS:

2 Q I appreciate what you have stated and the group you  
3 are trying to refer to. But if there is something wrong with  
4 that comparison, then what we are talking about here would be  
5 of no use to us later on, to either side. I am trying to get  
6 your understanding of their condition.

7 MR. HORVATH: He has testified to his understanding.

8 MR. CONNORS: He keeps referring to the peer group.  
9 That is not my question.

10 The question is, what is Doctor Liu's understanding  
11 of the health, physical and mental, of the children who  
12 boarded the C5A on April 4, 1975 while they were in Vietnam  
13 before they boarded the aircraft?

14 THE DEPONENT: Let me answer it this way.

15 Let me just say I don't know.

16 BY MR. CONNORS:

17 Q In reaching a conclusion about the cause of any  
18 problem which may have existed in those children, wouldn't  
19 it be essential to know what their prior condition was?

20 A In a controlled experiement, yes.

21 Q In fact, you don't know if the children boarded  
22 the aircraft with the same problems that are now alleged, do

1 you?

2 MR. HORVATH: Objection.

3 He has testified that he compared it to a peer group

4 BY MR. CONNORS:

5 Q Doctor, can you answer that question?

6 A Repeat the question, please.

7 [The Reporter read the pending question.]

8 THE DEPONENT: Most unlikely.

9 BY MR. CONNORS:

10 Q The question is, do you know?

11 A I know only the statistical comparisons, which I  
12 have heard given.

13 Q Doctor, how many of the children aboard the C5A  
14 had polio?

15 A I haven't the slightest idea.

16 Q How many were blind?

17 A I have no idea.

18 MR. HORVATH: Objection.

19 BY MR. CONNORS:

20 Q How many children aboard the C5A were considered  
21 delayed development while in Vietnam?

22 MR. HORVATH: I am going to object to these questions.

1 I don't believe there is any relationship between being blind  
2 and having a central nervous system disorder.

3 BY MR. CONNORS:

4 Q Doctor?

5 A I told you, I have no idea.

6 Q Do you have any knowledge of any of the children  
7 prior to boarding the aircraft in displaying any symptoms of  
8 any kind?

9 MR. HORVATH: Objection. He has answered that three  
10 times.

11 MR. CONNORS: We can refer to prior testimony if  
12 you want. I am trying to get this in order.

13 BY MR. CONNORS:

14 Q Doctor, you don't, do you?

15 A Just as I don't know the condition of the peer group.

16 Q Doctor, just so you can appreciate this, if the  
17 peer group is not comparable for any reason, then that really  
18 is not going to allow your opinion to stand. I am trying to  
19 get a basis for relating to these children and what you know  
20 about these children.

21 Now, my question was -- I hate to go over this again.

22 Doctor, you have stated that you are not aware of

1 the health, physical or mental, condition of the children  
2 aboard the C5A prior to the time they boarded the aircraft.  
3 My question is whether or not in reaching opinion regarding  
4 the cause of any symptoms which are now alleged to exist in  
5 these children it would be important to know their prior health?

6 MR. HORVATH: I object to that question.

7 If you can answer it, go ahead.

8 THE DEPONENT: I will try to put to rest this  
9 question once and for all.

10 If this was a planned experiment, my answer would  
11 be yes. But like all accidents, it is an unplanned experiment.  
12 When you have an unplanned experiment, the only data that one  
13 could rely on is the statistical data on two comparable groups,  
14 and I say that in my opinion the two groups which were used to  
15 make the comparison in my opinion is statistically comparable  
16 except in one group that was subjected to a trauma and the  
17 other group was not. And I am convinced from what I know  
18 about experimental design that the numbers involved gave a  
19 very definite delineation of the results in the traumatized  
20 group and the nontraumatized group.

21 Q Doctor, did you ask for the medical records of the  
22 children aboard the C5A? By medical records, I mean while

1 they were in Vietnam.

2 A That is not even within my province. I am not a  
3 clinician doing the evaluation. Why should I ask for the  
4 medical records? I design experiments. I produce trauma.  
5 I make studies of the sequela and the analysis of the sequela  
6 on the animal experiments. I depend on either biologist  
7 friends, neurologist friends or co-investigators in different  
8 aspects of the clinical and basic medical sciences.

9 I am saying, in my judgment as an experimentalist,  
10 the numbers, the subjects or the peer group were quite adequate,  
11 more than adequate.

12 Q Doctor, if the children boarded the aircraft display-  
13 ing symptoms to those now alleged, would that make a difference  
14 in your conclusions, if, in fact, the children were not healthy  
15 when they boarded the aircraft? Would that make a difference?

16 MR. HORVATH: I will object to the question.

17 If you can narrow it down.

18 MR. CONNORS: I don't want to narrow it down.

19 BY MR. CONNORS:

20 Q Am I correct, Doctor, you assumed the children  
21 were health when they boarded the aircraft?

22 A No. I am not. I am saying the two groups are

1 comparable. If they are unhealthy in one group, they are  
2 unhealthy in another group, in statistical terms. If you  
3 are asking me what are the chances that the group that boarded  
4 the C5A were identical or as normal as the group that did not  
5 board the C5A, then the classic statistical answer is the  
6 chances are, say, one in a thousand that this particular  
7 effect which we observe in this given child is one chance in  
8 a thousand that this would be so. That is the only valid  
9 measure that I know of.

10 Q Doctor, isn't it correct that you do not know the  
11 prior condition of the children in this so-called peer group  
12 nor do you know the prior condition of the children on the  
13 C5A and, in fact, you do not know whether they are comparable  
14 groups; isn't that correct?

15 A I say that they are comparable groups based on the  
16 statistics, the end.

17 Q Just a minute. Don't they have to be comparable  
18 before you start the study?

19 A Yes.

20 Q My question is then, you have stated you did not  
21 know the prior condition of the children in the so-called  
22 peer group. You do not know the prior condition of the



1 children on the C5A. Therefore, how do you know they are  
2 comparable?

3 MR. HORVATH: I object to the form of the question.

4 THE DEPONENT: The beginning of any experieiment is  
5 the condition of the animal at that given time, yes.

6 BY MR. CONNORS:

7 Q In this case you don't know the condition of either  
8 of the groups you supposedly have been comparing, do you?

9 MR. HORVATH: He has already testified they were  
10 comparable.

11 BY MR. CONNORS:

12 Q On what basis are you saying --

13 MR. HORVATH: Let the record reflect counsel is  
14 pounding the table.

15 BY MR. CONNORS:

16 Q On what basis, Doctor, are you stating the peer  
17 group you have been referring to and the children on the C5A  
18 are comparable?

19 A If they came though similar environments, to the  
20 accident that we know --

21 Q All right. What do you know?

22 A I assumed that they were brought up under similar

1 conditions. There may be individual variations but the  
2 individual variations are completely obscured by the statis-  
3 tical averaging process. Any tendency to err in one way or  
4 another is smoothed out in the end.

5 Q Doctor, how large a sample are we talking about?

6 A It depends on the statistical method used to make  
7 the comparison. Depending upon the numbers, you have a number  
8 of different kinds of statistical comparisons.

9 Q How many children were involved in the comparison  
10 who were aboard the C5A?

11 A I assume the number was greater than 30.

12 Q How many survived?

13 A I don't remember.

14 Q How many in the peer group that you are supposedly  
15 comparing?

16 A I don't remember exactly what the numbers were,  
17 but I seem to recall that the end was greater than 25, 30.

18 Q Doctor, do you know if the people studying the so-  
19 called peer group were the same group studying the C5A children?

20 A I presume they are. A collection of people did the  
21 study. It is impossible for one person to do all of the  
22 studies.

1 Q Do you know if the children in the peer group you  
2 have been referring to were examined by the same doctors or  
3 the same team of doctors that examined the C5A children?

4 A I got the impression they were examined by quite  
5 a few people, by the experts for plaintiff and the experts  
6 for the defendant, and the synopsis for comparison was very  
7 well delineated in Doctor Conners' report.

8 Q Does Doctor Conners refer to any children who  
9 were not on the C5A?

10 A No, he does not, but he compared the examination  
11 of the defense experts viz-a-viz the plaintiff's experts in  
12 terms of symptomatology and the incidence, the correlation,  
13 I thought, there was a high correlation between the two groups  
14 of experts.

15 In other words, I am surprised that you guys are  
16 not listening to your own experts.

17 Q It is a fact that that is Doctor Conners' inter-  
18 pretation and he is one of the experts for plaintiffs, isn't  
19 he?

20 A Yes. But he has asked three very distinguished  
21 colleagues to help him in terms of delineating the data without  
22 knowing exactly, I believe, which one came from what source.

1 Q Doctor, did you personally look at any of the evalu-  
2 ations of any of the children?

3 A No, I did not personally look at them.

4 Q So you are in no position to evaluate the Conners'  
5 study?

6 A In fact, the contrary is the case. I think I am  
7 an investigator in my own right and I can evaluate Doctor  
8 Conners' study like any peer review person would. If he had  
9 submitted this to, say, the Journal of Neurological Science,  
10 I could very well be one of the reviewers.

11 Q Doctor, but not having looked at any of the evalu-  
12 ations you can't tell if the so-called scoring which was done  
13 in the Conners' study is correct, can you?

14 A They were very reasonable scoring schemes.

15 Q The question is not the scheme, Doctor, but whether  
16 it was, in fact, done, whether the so-called scoring reflects  
17 what is on the report.

18 MR. HORVATH: Are you insinuating the people who  
19 did the Conners' study falsely did it?

20 MR. CONNORS: My question is whether the Doctor is  
21 in a position to evaluate it, not having seen any of the under-  
22 lying data.

1 THE DEPONENT: Do you mean did I examine the kids

2 myself?

3 BY MR. CONNORS:

4 Q No. Did you look at any of the reports of Doctor  
5 Connors and his colleagues?

6 A A part of it is appended in this report, what they  
7 discussed and they scored.

8 Q The study is based on the reports of doctors  
9 employed by plaintiffs who saw the children, doctors for  
10 plaintiffs and children; is that correct?

11 A That is correct.

12 Q The reports of the doctors from plaintiffs and  
13 defendants were reviewed by them but not reviewed by you;  
14 is that correct?

15 A Of course not reviewed by me.

16 Q So you are in no position to evaluate whether or  
17 not the scoring that was done, the interpretations of what  
18 was written is correct, are you, Doctor?

19 A I found that their techniques for scoring, they  
20 explicitly say exactly how they did it. They have samples of  
21 how they did them and I found them eminently reasonable.

22 Q Doctor, you are still talking about the methodology,

1 isn't that correct?

2 MR. HORVATH: Counsel, are you trying to ask whether  
3 he independently scored any of the doctors' reports?

4 MR. CONNORS: Basically, I have asked that three  
5 times.

6 THE DEPONENT: I obviously did not do any of the  
7 scoring.

8 BY MR. CONNORS:

9 Q So you don't know whether anything in the Connors'  
10 study is correct other than by looking at a methodology which  
11 you think should have produced correct results?

12 A The methodology is eminently reasonable. I have  
13 said that three times.

14 Q But you yourself did not attempt to do it?

15 A That is not my concern.

16 Q We got off on the side track when we were talking  
17 about your knowledge of the peer group and the C5A children  
18 and whether or not they were comparable. I asked you on what  
19 basis you said they were comparable and you told me you had  
20 made some assumptions.

21 Now, we were talking about whether or not the  
22 peer group had been examined by the same doctors who examined

1 the children aboard the C5A and I believe you told me they  
2 had been; is that correct?

3 A Would you repeat that.

4 Q You have been referring to a comparison between a  
5 so-called peer group and children aboard the C5A; is that correct?

6 A Yes.

7 Q You have stated that as one of the bases you relied  
8 upon for reaching your own conclusions regarding the causation  
9 of any problems in these children; is that correct?

10 A That is part of the corroborative evidence, yes.

11 Q We went through a scenario where I asked you how  
12 many children in each group and you thought it was greater  
13 than 25 or 30; is that correct?

14 A Yes.

15 Q I asked you if the children in the peer group and  
16 the children in the C5A have been examined by the same doctors  
17 and you said you assumed they have; is that correct?

18 A Yes, I assumed they have been.

19 Q If, in fact, the children in the peer group had  
20 not been examined in the same way by the same doctors, would  
21 it affect the comparability of the two groups?

22 A In a statistical sense, yes.

1 MR. HORVATH: Counsel, let me refocus this deposition.

2 At the beginning of the deposition I made a state-  
3 ment concerning the areas on which the doctor would testify.  
4 We have been in this deposition for two and a half hours now.  
5 I want to be sure you remember those areas. We have not  
6 offered Doctor Liu to testify concerning the statistical  
7 background and the comparison of the two groups. He has been  
8 offered to correct the Turner report with the symtomatology  
9 found in the Conners report. That is one of the key areas  
10 for which he has been offered. If that is an area you would  
11 like to get into, you should get into'. There are three areas  
12 delineated for this deposition and you have not covered them.  
13 You are trying to go into a lot of extraneous areas on which  
14 he is not going to be offered as a witness. I have not  
15 objected because it is your deposition but if you would keep  
16 that in focus, maybe we could get along a lot faster.

17 BY MR. CONNORS:

18 Q The areas we have been addressing have been in  
19 conjunction with the opinion you formed following the meeting  
20 in March of 1980. That is the question that led up to all of  
21 this.

22 A Yes.



1 Q Other than the presentations at that meeting in  
2 March of 1980, and the notes which we have marked here today,  
3 is there any other material I can look at to determine the  
4 basis for your opinion?

5 A I think the reports by Doctor Morain and Doctor  
6 Turner is very germane.

7 Q I am speaking now of the opinion you formed in  
8 March of 1980. The reports of Doctor Morain and Doctor Turner  
9 and, indeed, the Connors report did not exist at that time;  
10 is that right?

11 A That is right.

12 Q Looking at the time frame March of 1980 when you  
13 formed your opinion in this matter, was there any area that  
14 provided the basis for that opinion?

15 A I have already told you and I am repeating myself.  
16 I said I was very impressed with the data that was presented  
17 and based on what I know about the design of experiments,  
18 I thought there was adequate control and I came to the con-  
19 clusion that it is remarkable how many symtomatologies which  
20 were reported there coincided with the symptomatology we  
21 observed on the Rhesus monkeys which we subjected to whiplash.

22 On that basis, I said that I am of the opinion

1 that trauma was one of the definite primary contributory  
2 factors to what was being observed.

3 Q You formed that opinion in March of 1980?

4 A If you want to clarify it that way, yes.

5 Q Since that time, has your opinion changed?

6 A No, it has been greatly reinforced by the new  
7 evidence.

8 Q In March of 1980, did you have any facts presented  
9 to you regarding the accident on April 4, 1975?

10 A Only what I learned in the symposium.

11 Q Of those facts, what facts did you single out as  
12 either significant or of significant importance to rely upon.

13 A To rely upon? That there was definitely an impact  
14 trauma in this particular case and that there were possible  
15 additive or synergistic components such as hypoxia, decompres-  
16 sion, and the other factors which were part of the trauma  
17 environment.

18 Q Doctor, for the time being I want to confine my  
19 questions to the area of the troop compartment. Are you aware  
20 of that, the two compartments?

21 A Yes.

22 Q With regard to the children in the troop compartment,

1 on what do you base your statement that there was impact trauma?

2 A If my recollection serves me right that there were  
3 eight to twelve impacts from the time that the decompression  
4 occurred at 23,000 feet until it crash-landed in the spot that  
5 it did and the plane broke into four different pieces.

6 Q Doctor, let me back up a second. We have been talk-  
7 ing of your opinion as of March 1980 and you mentioned that  
8 one of the bases was the impact trauma.

9 Based on your opinion in 1980 -- strike that.

10 As of March 1980 with regard to the children in  
11 the troop compartment, what basis did you have for your  
12 opinion that they were subject to impact trauma?

13 A The evidence was all over the place -- eight to  
14 twelve impacts during the episode, the cargo compartment  
15 people -- I don't remember the number -- I think five or six  
16 survived, so it was fairly clear that the people in the adjacent  
17 layers were subjected to decelerations both in direction as  
18 well as the X direction.

19 Q Is that Z plus X?

20 A Depending on which system you use, but the deceler-  
21 ation towards the earth and the deceleration in the direction  
22 forward of the aircraft. There are two systems of notation.

1 Q Doctor, what do you mean by impact trauma?

2 A Impact trauma are the wounds caused by the forces  
3 applied over a very short period of time to the human body,  
4 that is.

5 Q What period of time?

6 A What period of time? All the way from the milli-  
7 second range to many seconds.

8 Q Is there any outward limit that defines impact  
9 trauma as opposed to some other trauma?

10 A A good cut-off point might be, let's say, if the  
11 forces are applied within a second, I would say.

12 Q What wounds were observed on the children in the  
13 troop compartment of the C5A following the accident?

14 A I wish to change that to say that wounds in the  
15 sense that you understand it must be some sort of lesion. By  
16 wounds, I mean both anatomically observable lesions of the  
17 tissue as well as dysfunctions.

18 Q Were there any visible physical manifestations of  
19 impact trauma on the children in the aft troop compartment  
20 of the C5A?

21 A Were there any?

22 MR. HORVATH: I think your question should be if he

1 recalls.

2 MR. CONNORS: I will rephrase the question.

3 BY MR. CONNORS:

4 Q What, to your knowledge, Doctor, if any, was the  
5 extent of any physical manifestations of impact trauma of the  
6 children aboard the C5A who were located in the aft compart-  
7 ment?

8 A In terms of physical wounds, I think if there were  
9 any, they were fairly minor but in the adults there were quite  
10 a few clearly discernible wounds.

11 Q Were the children in the aft troop compartment  
12 seated in rearward facing seats?

13 A Yes.

14 Q Did any of the adults have seats or seatbelts to  
15 restrain them?

16 A I don't remember the particulars. I presume some  
17 of them were seated, and there is testimony to the effect that  
18 some of them were standing or sitting on the armrest of the  
19 seats. I do not recall the particulars.

20 Q Isn't that a significant difference though, Doctor,  
21 between children seated in aft-facing seats and adults who  
22 are not in seats or unrestrained?

1 A There is some differences.

2 Q You don't regard that as a significant difference?

3 A The wounds received by the adults give further  
4 collaborative evidence of the trauma environment which the  
5 children were in.

6 Q Are you able to calculate, based on the injuries to  
7 the adults, the forces that would have been present for the  
8 children?

9 A Yes. One could do that kind of upper and lower  
10 wounds analysis.

11 Q Can you explain how that would be done?

12 A Based on the injuries received by the adults, you  
13 can get some idea of the acceleration environment in which  
14 they wer subjected and if this same environment were applied  
15 to the children, what is the probability of their sustaining  
16 the sort of symtomatology that was exhibited by these adults.

17 Q Did you do such a study in this case?

18 A I depended pretty much on Doctor Turner's calcu-  
19 lations.

20 Q So you made no independent figures.

21 A I checked his results.

22 Q How did you do that?

1           A     I made sure his assumptions were correct and I  
2 substantially agreed with his assumptions.

3           Q     Doctor Turner's analysis was based on an analysis  
4 of the aircraft's structure; isn't that correct?

5           A     Yes, that is the source of the traumatic environ-  
6 ment.

7           Q     We were just talking, however, about the injuries  
8 to the adults in the troop compartment; isn't that correct?

9           A     They are all caused by the same source.

10          Q     Doctor, if a person is sitting in a rearward-facing  
11 seat and another is unseated and either braced or unbraced  
12 and is thrown about, isn't that a significant difference in  
13 the condition of the two individuals?

14          A     Significant difference?

15          Q     It is a difference?

16          A     There is difference, but I would not characterize  
17 it as a significant difference.

18          Q     The fact that one person is unrestrained and might  
19 be thrown about is not significant compared to a person who is  
20 in a rearward-facing seat and is not thrown about.

21               MR. HORVATH: I will object. It depends upon the  
22 context in which you are using it. If you can sharpen the

1 question, maybe the Doctor will be able to answer it.

2 BY MR. CONNORS:

3 Q Do you understand the question, Doctor?

4 A Yes, I do.

5 With a rear-facing seat, and if the aircraft is  
6 decelerated in the direction of the flight deck, let's say,  
7 and decelerated with respect to the ground, then the rear-  
8 facing seat produces what is classically called the hyper-  
9 extension, hyperflexion injury or in lay terms a whiplash kind  
10 of injury.

11 If another person is in a forward-facing seat or  
12 is in a forward position, then you get essentially what amounts  
13 to a hypoflexion kind of injury, and the two are very different;  
14 and of the two, the rear-facing seat produces whiplash injury  
15 and whiplash injury is caused by the fact that the normal  
16 range of motion that we have in the hyperextension direction  
17 is much less than in the hyperflexion direction. If you go  
18 beyond the normal range of extension, you can cause injury.

19 Q Doctor, what evidence do you have that any of the  
20 children went beyond the normal range of extension?

21 A What evidence do I have? I don't have any physical



1 evidence.

2 Q In fact, when seated in a rear-forward-facing  
3 seat, the child's back, neck and head are against the seat's  
4 back; isn't that correct?

5 A Not necessarily.

6 Q You are saying they are not?

7 A Not necessarily. I am not saying they are not but  
8 not necessarily.

9 Q Isn't that the normal position for any person in a  
10 seat?

11 A No.

12 Q Doctor, have you been shown any pictures of children  
13 in the aft troop compartment?

14 A Pictures of children actually in the troop compart-  
15 ment, no.

16 Q And how they have been seated?

17 A No.

18 Q You have not been shown any?

19 A I was told there were two of them to a seat.

20 Q That is all you were told?

21 A Yes.

22 Q Doctor, the three areas that counsel has advised us

1 you were going to address are the connection between Doctor  
2 Turner's report and Doctor Conners' report. Can you be more  
3 specific with what you understand that area to address?

4 A My understanding is that given the impact time  
5 history of this C5A aircraft during its course of crash-landing,  
6 is it possible on the basis of the impact environment alone  
7 to produce the symptomatology which is reported in Doctor  
8 Conners' report.

9 Q The connection you make is based on your study  
10 with Rhesus monkeys?

11 A Yes, and based also on my review of literature  
12 concerning tolerances by humans and extrapolated to children.

13 Q What is the time impact history on the C5A children  
14 for the children in the aft troop compartment as you under-  
15 stand it?

16 A There were eight to twelve impacts in the course of  
17 which the damaging traumatic episode took place.

18 Do you want me to be more specific than that?

19 Q Did you read any of the eye-witness accounts of the  
20 adults in the aft troop compartment?

21 A Only to the extent that as they were reported in  
22 the Edwards' memo.

1 Q Did you read any others?

2 A No.

3 Q Did you read any of the official reports from the  
4 United States Air Force?

5 A No.

6 Q You said there were eight to twelve impacts; is that  
7 correct?

8 A That is the characterization, yes.

9 Q When was the first impact?

10 A On the east side of the Saigon River.

11 Q When I ask when, what caused the first impact?

12 MR. HORVATH: I will object to that question, what  
13 caused the first impact.

14 BY MR. CONNORS:

15 Q An impact occurs when another object strikes another  
16 object; is that correct?

17 A Yes.

18 Q When did the first impact regarding the accident  
19 on April 4, 1975 occur? What was happening to the aircraft  
20 at that time?

21 A If my memory serves me correctly, the landing gear  
22 came in contact with the ground.

1 Q How many G's would have been produced by that  
2 contact?

3 A How many G's? It has been variously estimated but  
4 the G's of that first contact were insignificant.

5 Q What was the second impact?

6 A I don't recall all the details exactly. There  
7 were three impacts on the east side of the Saigon River.

8 Q Who says there were three impacts on the east side  
9 of the river? By that I mean, on what are you basing your  
10 statement?

11 A The wreckage diagram as prepared, I think, by the  
12 topographic analyst, Doctor Morain.

13 Q It is your understanding Doctor Morain's topographic  
14 analysis indicates there were three impacts on the east side  
15 of the Saigon River; is that correct?

16 A I will have to read it again.

17 That is right.

18 Q You have identified those on the wreckage diagram  
19 that you are referring to?

20 A Yes.

21 Q Where are they located? Are they all in the same  
22 general area?

1 A Yes, fairly close.

2 Q Are they all the result of the landing gear of the  
3 C5A making contact with the ground on the east side of the  
4 Saigon River?

5 A Yes.

6 Q What would be the maximum G's experienced by the  
7 children in the aft troop compartment at the time of those  
8 three impacts, either individually or collectively?

9 A I would say they are insignificant.

10 Q When was the fourth impact?

11 A The aircraft took off and impacted again on the west  
12 side of the Saigon River.

13 Q Where would the fourth impact have occurred?

14 Can you identify it from some topographical feature?

15 A It occurred just on the other side of the Saigon  
16 River, according to this map.

17 Q What was occurring at that point in terms of the  
18 cause of the impact?

19 A The cause of the impact -- the aircraft was not  
20 under control.

21 Q My question again relates to what two pieces of  
22 material are coming together to cause the impact? What caused

1 the fourth impact?

2 MR. HORVATH: I am sorry. I really don't under-  
3 stand the question. Maybe the Doctor does but are you asking  
4 did the plane hit the ground?

5 BY MR. CONNORS:

6 Q Did the landing gear hit the ground? There are a  
7 variety of things that could have happened. To the Doctor's  
8 knowledge, what was the cause of the fourth impact?

9 A The cause of the fourth impact from this diagram  
10 there is evidence based on the so-called marks left on the  
11 ground that the wing span touched the ground and scraped the  
12 ground. I am looking at this diagram.

13 Q You are saying the impact was caused when the wing  
14 touched the ground?

15 A Yes, when the wing span touched the ground.

16 Q Where did the fifth impact occur?

17 A The aircraft apparently became airborne again and  
18 apparently it finally came down hard over a section which is  
19 approximately, on this map, in between 1,400 and 1,575 feet  
20 from the scale drawing shown in the wreckage diagram.

21 Q I think what I would like to do is get this a little  
22 more precisely later.

1           We have previously marked as Liu Exhibit No. 8 a  
2 copy of a wreckage diagram. Do you see that?

3           A     Yes.

4           Q     I would like to leave this unmarked and I have here  
5 what is a copy of that document. If you will satisfy your-  
6 self that that is an accurate copy of Doctor Morain's latest  
7 wreckage diagram, --

8           A     Yes.

9           Q     -- I am going to give you a red pencil. I would  
10 like for you to mark, please, on the wreckage diagram in front  
11 of you the location of the first, second, and third impacts  
12 on the east side of the Saigon River which you previously  
13 referred to.

14          A     It is already marked here very physically with A,  
15 B, C, D.

16          Q     I understand that, but I want your understanding.

17          A     How do you want me to do it?

18          Q     Circle the area and draw an arrow off to the side.

19                The Doctor has drawn a circle around the area he  
20 has referred to.

21          A     One, two, three.

22          Q     And write the word "impacts" after that, please.

1           Would you also indicate on that wreckage diagram  
2 where the fourth impact occurred?

3           The Doctor has drawn a circle at a particular point  
4 and he has put a 4 inside the circle.

5           That is at the end of a line.

6           Are you indicating any particular point or just a  
7 general location?

8           A     Just a general location.

9           Q     Where did the fifth impact occur?

10          A     The fifth impact occurred after the aircraft became  
11 airborne.

12          Q     Would you please indicate where the fifth impact  
13 occurred?

14          A     The fifth impact occurred on the wreckage map  
15 where it says "large section over the cargo floor."

16          MR. HORVATH: I am not sure if the record is clear  
17 at this point.

18          You have asked him to indicate the major impact  
19 points with the wreckage diagram

20          MR. CONNORS: His understanding of the various  
21 impact points.



1 BY MR. CONNORS:

2 Q Doctor, you have just drawn a circle and placed a  
3 5 in it; is that correct?

4 A Yes.

5 Q Would you indicate where the sixth impact occurred?

6 A Then at this point because of the enormous impact  
7 which essentially collapsed the cargo floor and caused the  
8 complete breakup of the aircraft, many different pieces then  
9 scattered from this local point of impact which I have  
10 characterized by the number 5. Then the tail section broke  
11 off, pieces of fuselage went forward, pieces of the crew  
12 compartment went forward and pieces of the troop compartment  
13 went forward, the wings snapped and also went forward.

14 Q I asked you how many impacts --

15 A These are all -- each one of these sustained  
16 different impacts.

17 Q My question related to the aft troop compartment.  
18 Where would the sixth impact be for the aft troop compartment?

19 A After the large impact at this enormous impact which  
20 occurred at Section 5, then pieces of the aircraft became in  
21 a sense airborne and the aft troop compartment became a missile  
22 which slid forward and then came to rest against a hill.

1 Q Doctor, you said slid forward. Was the aft troop  
2 compartment in contact with the ground from the area you have  
3 marked as No. 5 to eventually where it came to rest?

4 A I think the distance between the time the aft  
5 troop compartment came in contact substantially with the  
6 ground and the place where it came to a stop is approximately  
7 160 feet.

8 Q My question is, was the aft troop compartment in  
9 contact with the ground where you have marked a 5 to the point  
10 where it eventually came to rest?

11 MR. HORVATH: Was it in constant contact?

12 THE DEPONENT: No, it was not in constant contact.  
13 It became airborne again and became a missile.

14 MR. CONNORS: Note my objection to Mr. Horvath  
15 coaching the witness.

16 MR. HORVATH: Of course it is in contact with the  
17 ground. The question did not make any sense. I was trying  
18 to help things along.

19 MR. CONNORS: I will take that as a stipulation that  
20 the troop compartment was in contact with the ground at that  
21 point on.

22 MR. HORVATH: We are merely trying to find out what

1 this witness knows. He testified yes, it was in contact  
2 with the ground. It hit the ground when it landed. Eventually  
3 it has to come in contact with the ground. He also testified  
4 it shot forward like a missile after the cargo compartment  
5 crashed into the ground.

6 Your question was unclear and I was just trying to  
7 help you out and avoid the problems but if you want to play  
8 games, I wouldn't help any more.

9 MR. CONNORS: You don't have to help me out.

10 BY MR. CONNORS:

11 Q Where was the sixth impact of the aft troop compart-  
12 ment?

13 A Somewhere from the time it hit the ground until it  
14 came to a stop.

15 Q You have drawn an arrow with the No. 16 between  
16 them; is that correct?

17 A Yes.

18 Q Where on that chart, Doctor, was the sixth impact?

19 A The sixth impact occurred before that. There were  
20 some track marks according to Doctor Morain's diagram which  
21 suggested that the aft compartment slightly scraped this area  
22 about 250 feet but again that is insignificant in my opinion

1 because the tracks were not very deep.

2 Q Would you put a 6 in a circle at the approximate  
3 location where you believe the sixth impact occurred?

4 A As I say, these are not to scale.

5 Q I understand that.

6 Where did the seventh impact occur?

7 A The seventh impact occurred here.

8 Q And the eighth impact?

9 A The eighth impact is right here.

10 Q The Doctor has just drawn a 7 and 8 in circles at  
11 the end of that line where he previously marked 160; is that  
12 correct, Doctor?

13 A Yes.

14 Q Doctor, I want to call your attention to point 5  
15 that you have indicated on the wreckage diagram. That is also  
16 marked in the written portion as the location of a large  
17 section of cargo floor; is that correct?

18 A Yes.

19 Q Prior to that point, were the major pieces of the  
20 aircraft, that is, the T tail, the aft troop compartment, the  
21 wings and the flight deck area still attached to one another?

22 A I would presume so, yes.

1 MR. CONNORS: I am going to ask that this document  
2 which the Doctor has been marking on be identified as Liu's  
3 Exhibit No. 10. And while that is being done, we will take  
4 a short break.

5 [Document marked Liu's Exhibit No. 10  
6 for identification.]

7 [A brief recess was taken.]

8 BY MR. CONNORS:

9 Q Doctor Liu, before the lunch break, we were looking  
10 at a document we have now marked as Liu's Exhibit No. 10,  
11 which is the wreckage diagram prepared by Doctor Morain, on  
12 which you have indicated the various impact points with respect  
13 to the aft troop compartment.

14 With respect to the east side of the river where  
15 you have marked 1 to 3 impacts, I believe you stated those  
16 impacts were insignificant.

17 A They are minor.

18 Q Would it be correct as to those impacts the children  
19 in the aft troop compartment would have suffered no injury?

20 A Most likely, yes.

21 Q Would you turn your attention to the area marked  
22 Impact No. 4, which is the first impact on the west side of

1 the river.

2 Let me preface this by asking you this. Is it  
3 correct that vertical impacts would be made by a force moving  
4 toward the earth?

5 A It depends on your reference point. If you are  
6 referring to the aircraft, the force is towards the aircraft.

7 Q Towards the aircraft?

8 A Yes.

9 Q How would you describe or what label would you put  
10 on the force that was measured by children in the aft troop  
11 compartment as the aircraft made contact with the ground at  
12 the fourth impact point?

13 A Again, if that were a single impact, I would say  
14 that the effects would be minor, but now we have in a sense  
15 four impacts in succession. Then we are beginning to get  
16 into the region where these effects may become additive or  
17 even synergistic. I want to emphasize the word may.

18 Q If I use the term vertical G forces, you understand  
19 I am talking about up and down motion?

20 A Yes.

21 Q How many vertical G's would be experienced by the  
22 children at the area of the first impact on the west side of

1 the river, which you have indicated as being the fourth  
2 impact?

3 A I would say that, depending on the assumptions, it  
4 would be anywhere between no more than two or three G's.

5 Q What assumptions would that be dependent on?

6 A It depended on essentially the fact that the plane,  
7 the area of contact, was a scraping of the ground by some  
8 part of the aircraft, in this case most likely the wing span.

9 Q What, if any, vertical G forces would have been  
10 experienced by the children in the aft troop compartment at  
11 the area you have marked as Impact No. 5?

12 A There, the vertical impact forces or G's acceleration  
13 experienced would be in the neighborhood of, say, 20 to 30  
14 G's, which is significant.

15 Q On what are you basing that?

16 A I am basing that on the calculations made by Doctor  
17 Turner and confirmed by myself as being a valid calculation.

18 Q When you say confirmed by yourself, did you, in  
19 fact, do an independent calculation of the G forces?

20 A Yes.

21 Q Where are those calculations?

22 A If you look at the notes in his report, as you

1 rightly observed before, I have made marks, I have had additions  
2 and things like this and like that, and that, in a sense,  
3 constitutes my notes in the area. I wanted to go over the  
4 fact that these are, in fact, reasonable assumptions and  
5 here at the point of final impact the aft troop compartment  
6 would experience 10 to 30 maximum G's.

7 Q What page are you reading from of Doctor Turner's  
8 report?

9 A I would say the last page before the summary.

10 Q Does that indicate that that is the fourth impact  
11 he is talking about?

12 A He does not label it the same way we are labeling  
13 it. He just goes over the sequence of events without numbering  
14 them.

15 The basis for his calculation is given in what he  
16 calls Figure 3 of his report.

17 Q Have you made any independent calculations, that is,  
18 a numerical computation with regard to the G forces?

19 A There was no necessity to repeat the calculations.  
20 I would have made similar ones, I am sure.

21 Q You would have made the same assumptions Doctor Turner  
22 made?



1           A     Yes, because this is essentially sophomoric mechanics.  
2     It is nothing that requires enormous sophistication in  
3     mathematical analysis.

4           Q     Is Doctor Turner there talking about vertical G  
5     forces?

6           A     Yes.

7           Q     What would have been the G forces experienced by  
8     the children in the aft troop compartment at the point you  
9     have labled No. 6 on the wreckage diagram?

10          A     No. 6, again, the aircraft was, in a sense, bouncing  
11     up in the air and then scraping the ground a little bit. I  
12     would say, again, it is minor.

13                But remember now, you have one to four minor impacts,  
14     No. 5 a major impact in the vertical direction, and No. 6 a  
15     scraping action, a minor impact again.

16          Q     Would the G forces have been measurable? Could  
17     the G forces have been calculated with regard to the area  
18     you have labeled No. 6?

19          A     It is possible to make estimates, yes.

20          Q     Do you have an estimate?

21          A     No, I don't but I would essentially say that it  
22     is discountable.

1 Q Would have been the G forces experienced by the  
2 children in the aft troop compartment in the area you have  
3 labeled 7 in the wreckage diagram?

4 A Seven I would characterize it as when the aft  
5 compartment came down as a missile and contacted the ground,  
6 so you would have two components, one up and down with  
7 respect to the ground and the other one horizontal deceler-  
8 ation.

9 Q Let's look at the vertical.

10 A The vertical at this time again would be maybe a  
11 little less than at 5 because some of the energy is dissipated  
12 due to the scraping action at 6. So I would characterize that  
13 as 20 to 25 G vertical impact.

14 Q Are there any vertical calculations with respect  
15 to that impact that you prepared?

16 A No. Again, I would take the calculations of Doctor  
17 Turner as being essentially correct.

18 Q Does he make any calculations as to that impact  
19 point?

20 A No, he does not, but it comes to about 11 G's, was  
21 my estimate. I am referring to the horizontal deceleration  
22 so you have a horizontal deceleration of 11 G's and 20 to 25  
in the vertical direction.

1 Q Have you or Doctor Turner made any calculations  
2 with respect to the area labeled No. 7 on the wreckage diagram?

3 A He performs two sets of calculations, one based on  
4 the integration of what he knows about the velocity change,  
5 and the second set of calculations is based on a calculation  
6 of what it takes to disrupt the structure. In this case his  
7 calculations at that point were based on the fact that the  
8 seats were designed to transfer so many pounds horizontal and  
9 so many pounds vertical and so many pounds lateral. Based  
10 on that and the fact that some of the seats failed, seats  
11 failed in the horizontal direction, he came up with a G  
12 calculation.

13 Q How many seats failed, Doctor?

14 A I don't know how many seats failed.

15 Q Do you know which seats failed?

16 A No.

17 Q Looking at point 8, how many G's would the children  
18 have experienced in the area of 8, and I am speaking of  
19 vertical G's now?

20 A Vertical G's, insignificant because the thing came  
21 in at an angle of, maybe, I would roughly estimate anywhere  
22 between at most 15 to 20 degrees to the horizontal.

1 Q Are you saying at point 8, the troop compartment  
2 was at an angle to the ground?

3 A No. The missile contacted the ground at an angle  
4 of anywhere from 15 to 20 degrees with respect to the local  
5 horizon.

6 Here is a missile and when it has a trajectory, it  
7 hits the ground at a certain angle, and that is the angle I  
8 am talking about.

9 Q You are saying the troop compartment hit the ground  
10 at an angle; is that correct?

11 A Yes.

12 Q What structure comprised the troop compartment at  
13 that point?

14 A It consisted of the shell, the wings are gone, the  
15 tail is gone, the crew compartment is gone. So, essentially,  
16 just this cylindrical shell comprises the troop compartment  
17 plus whatever remains of the cargo compartment. Let me put  
18 it that way.

19 Q Do you have an opinion as to whether any portion  
20 of the cargo compartment did remain at that point?

21 A Maybe a little bit, but a large section of the  
22 cargo floor is at location 5 where most of the people died as  
a result of this crash.

1 Q What about the cargo compartment walls?

2 A The cargo compartment walls -- again, I don't know  
3 exactly, but the large section of the cargo floor that remained  
4 at location 5 indicated a substantial of the cargo floor  
5 remained there. How much of it remained at the time of impact  
6 is a matter of conjecture and speculation at this point.

7 Q Doctor, there is a point on the chart which you  
8 marked No. 5 which has the words in printing "large section  
9 of the cargo floor." Do you see that?

10 A Yes.

11 Q Were there any sections of the cargo wall found at  
12 that point?

13 A That I don't know.

14 Q Were there any sections of the cargo wall found at  
15 point 6 on the wreckage diagram?

16 A I presume that you will find sections of the cargo  
17 wall in the densely shaded area which says "heavy debris."

18 Q What about point 7 that you have marked on the  
19 wreckage diagram. That is just at the borderline of that  
20 shaded area. Would there be any cargo floor there?

21 A Possibly, yes.

22 Q Any cargo wall area there?

1           A     There could be.

2           Q     How about at point 8 where the troop compartment  
3 finally came to rest?

4           A     There would be some residue, I would think, because  
5 if one looks at the photograph, the entire longitudinal  
6 cylinder that comprises the troop compartment plus the cargo  
7 area appears in the photographs that I have seen. So,  
8 therefore, you have some walls there. There is no doubt  
9 about that.

10          Q     Doctor, if the aft troop compartment struck the  
11 ground at a 15- or 20-degree angle, wouldn't there be rather  
12 deep gouge marks at the point of impact?

13          A     You can come in and then it could skip before it  
14 goes back down again. So the gouge marks as delineated by  
15 Doctor Morain suggested that at point 6 there was a relatively  
16 light contact then at point 7 that is when the thing went into  
17 the ground, slid for, I guess, say, 140 feet and then at 8 is  
18 when it hit this abutment that he talked about.

19          Q     Did you see the photographs that were used by  
20 Doctor Morain?

21          A     Yes.

22          Q     Perhaps I am confused. At point 6 or point 7 where

1 do you believe the compartment impacted the ground at a 15-  
2 or 20-degree angle?

3 A I would say at 6 there is a skipping action as if  
4 you were throwing a stone with any sort of forward velocity.  
5 You scrape the surface at 6 and I would say at 7. That is  
6 when you have that angulation.

7 Q Is it your opinion that the photographs of the  
8 impact at the point you have marked at 7 will indicate a  
9 gouge mark to support that theory?

10 A Yes, a much deeper gouge mark than at 6.

11 Q How would the gouge mark at 7 compare with the  
12 gouge mark between the point 7 and point 8 on there?

13 A I presume it will get progressively deeper as you  
14 go from 7 to 8.

15 Q If the troop compartment were slowing down, why  
16 would the gouge get deeper?

17 A Because the thing was, in fact, inclined at an  
18 angle. There is a tremendous amount of kinetic energy of  
19 this very massive cylinder which comprises the compartment.

20 Q I would like to go through the same process again  
21 on the track with regard to horizontal G forces.

22 A I was talking about horizontal G forces. We

1 somehow got confused.

2 Q Let's back up.

3 MR. HORVATH: I believe he was talking about vertical  
4 and horizontal.

5 BY MR. CONNORS:

6 Q This series was directed at the vertical.

7 I will restate the question as to points 7 and 8.

8 I understand at 6 you feel there were minimal forces  
9 of any kind at point 6; is that correct?

10 A Yes.

11 Q Doctor, what, if any, G forces were experienced by  
12 the children in the aft troop compartment at the point you  
13 have labeled 7 on the wreckage diagram?

14 A Let me give you sort of a continuum and be done with  
15 it all at once.

16 Between 5 and 30 G's. At point 7, between, let's  
17 say, 20 to 25 G's, and then at 8, practically negligible in  
18 terms of the vertical G forces.

19 Q Would you return now to the area of first impact  
20 on the east side of the river where you have circled 1 to 5  
21 impacts. Were there any horizontal G forces at that location?

22 A There were some.



1 Q Can you quantify them, please.

2 A Maybe a quarter G.

3 Q Would the children in the aft troop compartment  
4 have suffered any injuries as a result of that?

5 A No, not as a result of that single impact.

6 Q I am speaking of the areas you have marked 1 to 3  
7 impacts.

8 Turning to the west side of the river, the area,  
9 the first impact after crossing the river, the area you have  
10 marked 4 on the wreckage diagram, were there any horizontal  
11 G forces at that point?

12 A Yes, there were some.

13 Q What, if any, horizontal G forces were experienced  
14 by the children in the aft troop compartment in the area  
15 labeled 4 on the diagram?

16 A I would estimate roughly at one G.

17 Q Would the children have suffered any injuries as a  
18 result of that?

19 A As I said earlier, we are now having four serious  
20 impacts so things are beginning to add up. So I would just  
21 answer by saying they may now have had a cumulative effect.

22 Q Doctor, how long a period was it from the time of

1 the group of impacts we have marked 1 to 3 and the fourth  
2 impact?

3 A I think the whole thing, if my memory serves me  
4 correctly, about 15 seconds but I would roughly estimate --  
5 and this is now doing the calculation roughly in my head --  
6 I would say that maybe 6 or 7 seconds plus or minus 2. It  
7 is not very accurate.

8 Q Would a person, including an infant seated in a  
9 rear-foward-facing seat who experiences G forces of approxi-  
10 mately 1 G separated by a 7-second interval, be likely to  
11 experience any more injuries as a result of the second impact  
12 or horizontal G than the first?

13 A That kind of data is not readily available, but we  
14 know, for example, from boxing that the repeated impacts of  
15 subinjury durations do produce some impact.

16 Q How many impacts is a fighter likely to take before  
17 such injury?

18 A It depends on the severity of the blow.

19 But one must also remember in the case of children  
20 their heads are much larger than the rest of the body than  
21 it is for you and I as adults. Relative mass -- the head mass  
22 is relatively larger than their body compared to an adult.

1 Q But a G working on the mass of the head is one G  
2 whether it is the first horizontal G impact or the second,  
3 isn't it?

4 MR. HORVATH: I object to the form.

5 THE DEPONENT: No, it is not. It depends on the  
6 mass and it also depends -- because in terms of the data,  
7 there is no real good data except, as I said, from boxing  
8 where you can show that repeated impacts produce injury where-  
9 as one single blow or two single blows of a given magnitude  
10 will not.

11 BY MR. CONNORS:

12 Q Doctor, between the points you have labeled 4 and  
13 5 on the wreckage diagram, how many, if any, horizontal G's  
14 would have been experienced by the children in the aft compart-  
15 ment?

16 A Again, very, very minor, maybe a half G.

17 Q So the G forces were decreasing between points 4  
18 and 5?

19 A The G expresses in change in the velocity over a  
20 period of time. So since between 4 and 5 the aircraft was  
21 essentially airborne, the number of G experienced is the rate  
22 of slowing down over that aircraft.

1 Q You are saying the aircraft was airborne between  
2 the points marked 4 and 5 on the wreckage diagram?

3 A I think so.

4 Q How many horizontal G would have been experienced  
5 by the children in the aft compartment at the point labeled  
6 5 on the wreckage diagram?

7 A There, the preponderant component is the vertical  
8 deceleration. The horizontal one, again, is not very sub-  
9 stantial.

10 Q Can you quantify it at all?

11 A I would say maybe two or three G's.

12 Q How many G's would the children in the aft troop  
13 compartment have been exposed to in the area labeled 5 to the  
14 point labeled 6 on the wreckage diagram?

15 A Substantially unchanged from the previous figure  
16 that I gave you.

17 Q At what point would the horizontal forces begun to  
18 increase, if at all?

19 A It begins to increase at 7.

20 Q How many horizontal G's would the children in the  
21 aft compartment have experienced at the point labeled 7 on  
22 the wreckage diagram?

1 A I would say between 11 and 12.

2 Q What about the points labeled 7 and 8 that you have  
3 labeled on the wreckage diagram?

4 A I would say prior to the contact with the small  
5 hill that the average G would be about 11 or 12, as I have  
6 characterized it.

7 At 8 is when the most severe impact occurred.

8 Q What would have been the horizontal G's experienced  
9 by the children in the aft troop compartment at the point  
10 labeled 8 on the wreckage diagram?

11 A You are talking there in orders of magnitude higher,  
12 such as, depending on one's estimate of the crush distance  
13 available at point 8. I would say it could go anywhere. Let's  
14 say the highest is around 450 G's. The lowest would be  
15 around 60 G's.

16 Q You referred to the crush area?

17 A The stopping distance available at this small hill.

18 Q Doctor, what was the forward velocity of the C5A  
19 at the point labeled 4 on the wreckage diagram?

20 A Four?

21 Q Yes, the one labeled 4.

22 A Do you mean if I look at the notes?

1 Q Please do.

2 A At 4, I think it is about 460 feet per second.

3 Q What would be the forward velocity of the aft troop  
4 compartment at the point you have labeled 5 on the wreckage  
5 diagram?

6 A We can roughly estimate it at about 360 feet per  
7 second.

8 Q You say you are roughly estimating it. Do you have  
9 any calculations to base that on?

10 A That calculation is based on Doctor Turner's calcu-  
11 lation. As I said to you before, I have checked calculations.

12 Q Is there a specific calculation regarding the  
13 forward velocity of the aircraft at the point marked 5 on the  
14 wreckage diagram?

15 A Yes.

16 Q What is that?

17 A He takes a very conservative value of 360 plus or  
18 minus 20 feet per second.

19 Q What is the forward velocity of the troop compartment  
20 at the point labeled 6 on the wreckage diagram?

21 A It is substantially unchanged.

22 Q What is the velocity of the troop compartment labeled

1 7?

2 A It is substantially unchanged.

3 Q What is the forward velocity of the troop compart-  
4 ment at a point just prior to what you have described as its  
5 impact with the abutment at point 8?

6 A It is about 250. That is the calculation that  
7 Doctor Turner used.

8 Q You have not made an independent calculation?

9 A Yes, I have in the sense I checked his results and  
10 they are correct.

11 Q You assume the aft troop compartment struck the so-  
12 called abutment at point 8 on the wreckage diagram at a  
13 speed of 250 feet per second?

14 A That is correct.

15 Q What is the nature of the abutment which you believe  
16 the troop compartment struck at point 8 on the wreckage  
17 diagram?

18 A Here I am depending on Doctor Morain's testimony  
19 that the hill that is located at 8 is essentially a little hill  
20 which there are iron and iron oxide particles deposited which  
21 can be characterized almost as if it is a solid wall.

22 Q Have you seen any photographs which depict the

1 so-called hillet that struck at point 8 on the wreckage  
2 diagram?

3 A Only the still photographs that were shown to us,  
4 yes.

5 Q Do you recall showing any sort of rise or elevation  
6 at that point?

7 A Yes.

8 Q How high a rise?

9 A From the observable local horizontal I would say  
10 maybe two or three feet.

11 Q Did you make any calculations of that?

12 A No, I have not but Doctor Morain has.

13 Q And you are relying on Doctor Morain for that?

14 A Yes, he is the expert in this area.

15 Q Doctor Liu, we have been referring to impacts in the  
16 course of discussion and we have marked the wreckage diagram  
17 as Liu No. 10. Those are primary impacts?

18 A Yes.

19 Q And secondary impacts are what happen to an individual  
20 after impact?

21 A Yes, they are like second or third collisions.

22 Q For clairty, would you want to provide us with a



1 definition of a secondary impact?

2 A That is an impact in which, as a result of the first  
3 impact, the body concerned moves in a certain trajectory and  
4 then it contacts another object. If, as a result of that  
5 collision it contacts a third object, that is a third collision.

6 Q Turning to Liu Exhibit No. 10, the wreckage diagram,  
7 the areas you have labeled 1 to 3 impacts, did the children  
8 in the aft troop compartment experience any secondary impacts  
9 at that location?

10 A No one can say for sure but I would say not.

11 Q You say no?

12 A Right.

13 Q At the point labeled No. 4, did the children in the  
14 aft troop compartment experience any secondary impacts?

15 A Probably not.

16 Q At the point labeled No. 5 on the wreckage diagram,  
17 did the children in the aft troop compartment experience any  
18 secondary impact?

19 A They could have.

20 Q What could they have impacted?

21 A They could have impacted the seat behind them,  
22 depending on the initial configuration, and I believe a lot

1 of adults in the compartment started to have second collisions.

2 Q I am speaking only of the children now.

3 A If you are speaking of the children, depending upon  
4 the state of their constraint and the initial configuration,  
5 they may have sustained secondary impacts.

6 Q The children were in rearward seats?

7 A That is correct.

8 Q And you were referring to impacting the seat possibly  
9 behind them?

10 A No, you have a vertical deceleration. They could  
11 slip out of the restraint if they had one or they could have  
12 knocked against one another. The possibility is there simply  
13 because the vertical G's are quite high at impact point 5.

14 Q Doctor, is there any evidence or to your knowledge  
15 do you know of any testimony or other evidence supporting the  
16 fact that some, if any, of the children slipped out of their  
17 restraint system?

18 A I don't know.

19 Q How were the children restrained?

20 A Presumably by a lap belt.

21 Q Anything else?

22 A I don't know of anything else.

1 Q You don't know if any of them slipped through their  
2 restraints; is that right?

3 A That is right, I don't know.

4 Q Your testimony about a secondary impact at that  
5 point is conjecture?

6 A Yes. That possibility exists.

7 Q In your opinion, did the children in the aft troop  
8 compartment experience any impact at the point labeled 6 on  
9 the wreckage diagram?

10 A Let's say the possibility is not high.

11 Q What, if any, secondary impacts did the children in  
12 the aft troop compartment experience at the point labeled 7  
13 in the wreckage diagram?

14 A At the point 7 you now have a substantial horizontal  
15 deceleration. Their head would begin to rotate back and may,  
16 in fact, contact the seat back in the rearward-facing seats.

17 Q That presumes, Doctor, that their head was not  
18 already in contact?

19 A If they are not already in contact, then that is the  
20 time of the contact.

21 You must remember these seats were built for adults  
22 and the children may not have been seated against the seat back.

1 Q You don't know how they are seated?

2 A No, but knowing the variety and knowing kids a  
3 variety of things could take place. They may be huddled against  
4 one another because of the previous impacts. All of these are  
5 possibilities and anything I say at this point can only be  
6 conjecture.

7 Q What, if any, secondary impacts did the children in  
8 the aft troop compartment experience at the point labeled 8  
9 on the wreckage diagram?

10 A Here, that is where the most severe impact in this  
11 entire episode would take place. If, in a sesnse, they are  
12 not already in contact, if they were still able to maintain  
13 distance, this is the time when they would receive their most  
14 severe impact.

15 Q That would be against the back of the seat in which  
16 they are seated?

17 A If, in fact, the seat back does provide the barrier,  
18 forms a barrier.

19 Q What direction would the force be directing the  
20 child's head toward?

21 A Toward the seat, if the seat held. If the seats did  
22 not hold, then the children would be ejected from the seats

1 causing now second and third collisions.

2 Q To your knowledge, did any of the seat backs not hold?

3 A There is some deposed testimony that says not all  
4 of the seats held.

5 Q Do you know how many?

6 A I have no idea how many.

7 Q If the force is directing the child's head toward  
8 the seat back, once it has made contact with the seat back and  
9 the force continues in that direction, what, if any, other  
10 secondary impacts would occur?

11 A When you have an impact --

12 MR. HORVATH: I object to the form of the question.  
13 Go ahead.

14 THE DEPONENT: When you have an impact, there is a  
15 period from the time of contact to the time of maximum defor-  
16 mation and then, depending on the material, that is, two  
17 bodies are composed of, you have a period of restitution from  
18 the time of maximum deformation to the time of separation. In  
19 fact, the head may knock against the barrier several times.

20 BY MR. CONNORS:

21 Q What is the seat back of a C5A made of?

22 A I would presume that is made of some sort of metal,

1 probably aluminum with some sort of foam as a support.

2 Q Is it your assumption it is the same as a standard  
3 airline seat except that it faces a rearward direction?

4 A I am not prepared to say one way or the other what  
5 exactly kind of seats.

6 In the photographs that I saw, the seats were denuded  
7 of any foam and it was just metal, but then you could see,  
8 however, evidence of fire in those seats in which the metal  
9 itself appears to have been twisted.

10 Q Is it your opinion there was fire in the troop  
11 compartment?

12 A It looks that way from the photographs I have seen,  
13 especially that part which was closer to the wings.

14 Q Doctor, if you would assume for me, please, that the  
15 seats in a C5A are similar to a standard airline seat except  
16 for the fact that they face a rearward direction and I am  
17 talking about standard being the type of construction and  
18 covering of the seat, and we have already discussed how the  
19 horizontal G's would be pushing the child's head toward the  
20 seat back.

21 A We must make a distinction here. There are two  
22 possibilities. If my head is already, in a sense, in contact

1 with a seat or only a small distance away, then there is a  
2 possibility of a contact impact which the occipital region  
3 of the skull actually impacts against the seat. That is one  
4 possibility.

5           However, if I was sitting fairly forward, which  
6 these kids might be, because these seats were designed for  
7 adults, then there is a possibility of no impact at all except  
8 that the head went back in the classic hyperextension mode.

9           Q     But since you don't know how they were separated,  
10 this is just conjecture.

11          Q     Given the number of children involved and given the  
12 circumstances, the entire history, they were probably scared  
13 to death by the time they probably reached that particular  
14 point that any one of the possibilities that I mentioned is  
15 there.

16          Q     The point is, these are all opinions to a possibility?

17          A     That is right. Nobody knows exactly what happened at  
18 the last moment.

19          Q     If, in fact, the child's head was already in contact  
20 with the seat back and the type of seat I have described as a  
21 standard airline-type seat except it is facing rearward, what  
22 would happen during the onset and duration of the horizontal

1 G's?

2 A I don't understand your question.

3 Q If the child's head was already against the seat  
4 back, it is a rearward-facing seat and the horizontal forces  
5 are pushing the child's head toward the seat back, what occurs  
6 in terms of the interaction between the child's head and the  
7 seat back from the time of the onset of the horizontal G's to  
8 the time that the G forces are spent?

9 A The head would be pushed into a cushion if you have  
10 a cushion there, and the G's experienced by the head of the  
11 child would be very much attenuated.

12 Q If that were, in fact, the case in the troop compart-  
13 ment of the C5A during the accident, would the children have  
14 suffered any of the secondary impact effects you have described?

15 A They would not if the seat held. If the seat did  
16 not hold, then all bets are off.

17 MR. HORVATH: Counsel, for the record at this time,  
18 we earlier discussed this deposition having the Doctor prepare  
19 a list of all of the cases he worked on. I mention that in  
20 case you are planning that in your questioning.

21 MR. CONNORS: I will pick that up at the end of  
22 the deposition.



1 BY MR. CONNORS:

2 Q Doctor Liu, another area which counsel has described  
3 you will be testifying to is the synergistic or hypoxia effect  
4 of deceleration. What particular area do you understand you  
5 will be addressing?

6 A Are you asking me such a general question?

7 Q Did anyone present you with a series of questions  
8 that you were to address in this litigation?

9 A I was asked if any additive or synergistic effects  
10 exist in this case and my answer is yes.

11 Q Is it yes as to more than the effects of hypoxia  
12 and deceleration?

13 MR. HORVATH: I am not sure what you mean by that  
14 question.

15 MR. CONNORS: He said any synergistic effects and  
16 his opinion was yes, there were synergistic effects but the  
17 only ones you mentioned were hypoxia and deceleration.

18 THE DEPONENT: No one has data on that. In additive  
19 terms, we know of impact trauma and the example from boxing  
20 in which a series of blows could cause damage.

21 Now, if you superimpose on this trauma or deceleration  
22 or impact environment hypoxia, that could have an additive

1 effect or it could even have a synergistic effect.

2 Then on top of it, there is the possibility there is  
3 fire in the compartment. That could also have a synergistic  
4 effect. In terms of the smoke inhalation from the burning  
5 of material which releases cyanide-type gas, all of these are  
6 possibilities. Those were merely examples. One could include  
7 the possibility of carbon monoxide poison, we could include  
8 a host of other factors, but the two which I believe to be  
9 primary would be hypoxia and deceleration.

10 BY MR. CONNORS:

11 Q Would your opinion in this area, again, be conjecture,  
12 Doctor?

13 MR. HORVATH: Objection.

14 THE DEPONENT: It is fairly well known that if an  
15 animal is subjected to hypoxia, even for a brief period and  
16 then you deliver a head impact to the animal, the animal is  
17 much more severely injured than if you just traumatized the  
18 animal without the hypoxia.

19 The reverse is true in this case that if you subject  
20 the animal to an impact and then have subsequent periods of  
21 hypoxia, injury also results.

1 BY MR. CONNORS:

2 Q You say it is widely known. On what basis are  
3 you making that statement?

4 A Well, there are published papers showing the effects  
5 of the combination of hypoxic episodes and traumatic episodes.

6 Q Can you give us some of those articles?

7 A I will try to.

8 Q You don't know any offhand?

9 A Let's say the only one I can think of is a paper  
10 by Doctor Gennaerelly, et al.

11 Q Do you know the name of the article?

12 A No, I don't recall.

13 Q Can you remember where it was published?

14 A No -- in one of the neurosurgical journals.

15 Q Do you recall approximately when it would have been  
16 published?

17 A All of this material is reviewed in an article -- it  
18 is a book published by the National Institute for Communicative  
19 -- the acronym is NINICDS -- National Communicative --

20 Q Are there other articles besides this one that you  
21 are relying on?

22 A In there are listed a series of articles dealing with

1 the question of hypoxia plus trauma, trauma plus hypoxia.

2 One of the problems associated with head injuries  
3 is because of a head injury, you also have a concomitant  
4 pulmonary insufficiency that gives you additional damage.

5 Q You don't recall the specifics of the article at  
6 this time?

7 A There are so many of them.

8 Q I will take care of that by simply calling for the  
9 production of whatever you are relying on.

10 MR. HORVATH: I would object to that.

11 You fellows can do your own research.

12 BY MR. CONNORS:

13 Q Do you know what article you are relying on?

14 MR. HORVATH: He gave you the name of a book that  
15 lists the articles.

16 MR. CONNORS: He has given me a partial name of  
17 something.

18 THE DEPONENT: The color is canary yellow, published  
19 by NINCDS, National Institutes Neurological Communicative  
20 Disease and Stroke. The editor is Guy Odom. And it is called,  
21 "Central Nervous System Trauma Research Status Report." I  
22 happen to be one of the authors of that report.

1 BY MR. CONNORS:

2 Q Doctor, what is your understanding of the nature and  
3 duration of the hypoxia which the children on the C5A were  
4 subjected to on April 4, 1975?

5 A They started out at 23,000 feet, and it was a very  
6 rapid descent so you have exposure to the lack of oxygen at  
7 that altitude and it is a transient effect and not a slow  
8 process.

9 Q Would there have been any neurological damage to  
10 children as a result of the hypoxia?

11 A I am reluctant to speculate. It is outside of my  
12 area of expertise concerning the damage due to hypoxia alone.

13 Q But you are willing to make an opinion on the  
14 combination of hypoxia and impact trauma?

15 A Well, that is because, as I said, it is fairly well  
16 known. Hypoxia by itself, the transient hypoxia episode these  
17 kids were exposed to -- whether that did any damage, it is  
18 outside of the area where I am supposed to testify. My area  
19 of expertise is trauma, trauma in combination with other  
20 factors.

21 Q Wouldn't you have to know how much hypoxia, if any,  
22 they were subjected to?

1           A     I believe there is very primary evidence if you  
2 blow a door open at 23,000 feet that you will get a transient  
3 hypoxia episode.

4           Q     Hypoxia is not a matter of an instant or momentary  
5 effect at that one time. Isn't it a matter of effect on a  
6 body over time in a decrease in oxygen?

7           A     There are lots of other things, not just the oxygen  
8 alone and the rate at which it withdraws and all kinds of  
9 parameters. If I slowly reduce your oxygen intake, it is quite  
10 different than if I were to suddenly reduce it.

11          Q     What was the duration of the decompression on the  
12 C5A?

13          A     Again, on that question, I deferred to previous  
14 testimony which other people have given.

15          Q     My problem, Doctor, and allow me to explain it, is  
16 how you can attempt to give an opinion on the combination of  
17 hypoxia and deceleration forces in these children without  
18 knowing or being able to give an opinion on the severity of  
19 the hypoxia, if any, that they were exposed to?

20          A     I have already told you that. My main interest is  
21 trauma and in what other ways is the trauma aggravated by  
22 environmental factors. I have said not that I have done the

1 experiment myself but I am privy to the sort of information  
2 which says if you have hypoxic episodes before that, then the  
3 trauma is more severe.

4 Q What was the nature of the hypoxic episodes in the  
5 studies you are referring to?

6 A What are they?

7 Q What was the nature and duration of the hypoxic  
8 episodes used in the studies you are referring to?

9 A It varies. The animals could be hypoxic for 30  
10 seconds, they could be hypoxic for two minutes, or they could  
11 be hypoxic -- it depends on the concentration. It depends  
12 on the whole parameters of space of variables in terms of  
13 hypoxic episodes.

14 Q Were all of the studies animal studies?

15 A Most of them, yes.

16 Q Were any of them a hypoxic experience similar to  
17 the experience on the C5A on April 4, 1975?

18 A I don't know what the C5A experienced exactly.

19 Q Doctor, the third area which counsel mentioned was  
20 some connection between Doctor Turner's report and Doctor  
21 Conners' report.

22 A That is the first area.

1 Q I am taking these in the order in which I want to  
2 deal with them.

3 What do you understand to be the area addressed by  
4 counsel's statement?

5 A Say that again.

6 Q I am again trying to identify that particular area  
7 or that question or the question that was posed to you in  
8 connection with the Conners' study and the report of Doctor  
9 Turner.

10 MR. HORVATH: I am going to object to asking him  
11 to interpret what my statement was made at this deposition.

12 BY MR. CONNORS:

13 Q What is your understanding of the question that  
14 was posed to you in terms of the connection, if any, between  
15 the so-called Conners study and Doctor Turner's report?

16 A Does there exist a deceleration time history  
17 substrate to the symptomatology observed by Doctor Conners  
18 and the answer is yes.

19 Q For the crash history, you rely on Doctor Turner;  
20 is that correct?

21 A Yes, and I essentially agree with him.

22 Q For the symptomatology you are relying upon



1 Doctor Conners?

2 A Yes.

3 Q What symptomatology in Doctor Conners' report  
4 precisely are you referring to?

5 A He lists anywhere from, I think, at least 16 of  
6 them.

7 Q You are saying that there is some connection. What  
8 is the connection that you see?

9 A As I remarked earlier, the animal data that I have  
10 studied suggests that the animals have short-term memory loss.

11 Q Anything else?

12 A Anxiety, undue aggravation, frustration to the point  
13 of self-biting in animals and irritability. I have to describe  
14 these things in the following context. In our animal experi-  
15 ments, the experiments are very well controlled. We know  
16 exactly what they are capable of before the trauma. We  
17 traumatize the animals and repeat the same tests and stress  
18 them the same way and find out that they have these functional  
19 deficits, many of which are in fact characterized in Doctor  
20 Conners' report.

21 Q All of the studies you are talking about deal with  
22 animal studies; is that correct?

1 A That is correct.

2 Q What kind of animals?

3 A Rhesus monkeys.

4 Q In all cases?

5 A My own studies, yes.

6 Q The ones you are relying upon in making the connec-  
7 tion between Doctor Turner's and Doctor Conners' report?

8 A Yes.

9 Q How do you test a Rhesus monkey's attentional span?

10 A It is quite easy. It is called the Wisconsin  
11 Apparatus. You put some fruit on a well and you find out  
12 whether he remembers which one you put it in and then you  
13 lower a barrier for a prescribed number of seconds, open it  
14 and see if he remembers which one.

15 Q That is a memory test?

16 A Yes.

17 Q My question is, how do you test a Rhesus monkey for  
18 attention?

19 A Attention and short-term memory are not mutually  
20 exclusive things. All these class of tests which the pedi-  
21 atric-neurologists are doing is essentially similar sort of  
22 tests with one difference, which is that these animals cannot

1 talk.

2 Q So there can be equation with any speech problems  
3 or anything like that?

4 A That is right.

5 Q If attention span is not defined as short-term  
6 memory but rather is the subject's ability to maintain its  
7 attention on a given task, how do you test a Rhesus monkey  
8 for that?

9 A Part of short-term memory is ability to pay attention.  
10 It is observational ability as to where their food is hidden,  
11 in which well and so on.

12 Q How do you test a Rhesus monkey for a conduct  
13 disorder?

14 A It is stress and it starts to bang the cage or bite  
15 itself -- I mean, there are corollaries -- the behavior of  
16 Rhesus monkeys we have studied again and again, so it is  
17 nothing that is that unfamiliar to people doing pediatric  
18 psychology or psychoneuro-behavior and so on.

19 Q How do you test a Rhesus monkey for a learning  
20 disability?

21 A If he performed a task extremely well to the same  
22 set of stimuli before the trauma, you train him to the plateau

1 of performance and after the trauma he can't even do the very  
2 simple task, you have a learning disability.

3 Q In that case, you had knowledge of the animal's  
4 ability prior to the trauma; is that correct?

5 A Yes. As I said, that is the difference between  
6 controlled animal experiments and uncontrolled human experi-  
7 ments.

8 Q How do you test a Rhesus monkey for visual motor  
9 integration?

10 A One of the tests which I described about the  
11 hiddent food wells, alternating sequences with which you hide  
12 the food and so on.

13 When I have integration by the central nervous  
14 system, all these tests form a pattern. Each one of these  
15 tests do not tell you how, yes, or that the short-term memory  
16 is impaired and you can come to a conclusion. There is a  
17 whole battery of tests that collaborates that and you can  
18 come to a conclusion there is impairment in short-term memory  
19 or memory range change and all the other things you see in  
20 symptomatology.

21 Q Am I correct, you would not be able to test a Rhesus  
22 monkey for reading or spelling or math skills?

1 A That is correct.

2 Q How about the self-esteem of the monkey? Can you  
3 test for that?

4 A I don't know how and none of my esteemed colleagues  
5 would seem to know how.

6 Q Doctor, did you make any attempt to simulate the  
7 accident environment in any sort of laboratory test?

8 A No.

9 Q Doctor, did you have any consultations with a  
10 Doctor Schneider?

11 A I was introduced to Doctor Schneider at the symposium.  
12 I had known Doctor Schneider previously in professional  
13 capacities.

14 Q Have you had any conversations with him relating  
15 to the accident?

16 A Only during the course of the symposium.

17 Q Have you had any conversations or consultations  
18 with a Doctor Busby?

19 A Again, I think I was introduced to him.

20 Q Is that your only contact with him?

21 A Yes.

22 Q Have either of those two doctors provided you with

1 any information which in any way forms a basis for your  
2 opinion?

3 A No.

4 Q Have they provided you with any sort of information  
5 of any sort relating to this accident?

6 A No, they have not.

7 Q With regard to the forces involved in the accident,  
8 is it correct that you are relying on Doctor Turner's report  
9 as verified, making the same assumptions and you are checking  
10 his calculations?

11 A That is right.

12 Q Are you relying in any way on any of the injuries  
13 to any of the adult passengers in the troop compartment?

14 A The injuries to the adult passengers form, in a  
15 sense, the background corroborative evidence of the acceleration  
16 environment.

17 Q How do they relate to the acceleration environment?

18 A How do they?

19 Q Yes. How do you in terms of your opinion relate to  
20 injuires to the adults in the aft troop compartment or any  
21 place else in the aircraft to the deceleration forces affecting  
22 the children?

1           A     If my memory serves me correctly, many of the adult  
2 passengers had bone fractures. In fact, one died or maybe  
3 more than one -- I don't recall -- and there were fractures  
4 of the clavicle, of the femur, of the lumbar spine and so on.  
5 These could not have taken place in a vacuum. They could only  
6 have taken place because they were part of the same acceleration  
7 environment.

8           Q     I appreciate that, Doctor.

9           The question is, if the adults were not in seats and  
10 not restrained except for how they may have chosen to place  
11 themselves with their own hands and arms, children in rear-  
12 ward-facing seats, how does the condition of the adults relate  
13 or in any way enable you to substantiate any forces that were  
14 involved with regard to the children?

15           MR. HORVATH: I object to the form and I believe he  
16 has already answered that question.

17           THE DEPONENT: As I said, the injuries to the adults,  
18 pardon the pun, did not occur in a vacuum. They were the  
19 result of certain deceleration forces which perhaps caused the  
20 second and third collisions that we mentioned earlier. The  
21 same environment is what the children were subjected to.

22           Q     Would you tell me specifically which adult injuries

1 you are referring to?

2 A I will have to take a look at my notes.

3 MR. HORVATH: I would like to note for the record  
4 this deposition has been going on now for over four hours.

5 THE DEPONENT: Can we go off the record a moment?

6 MR. CONNORS: Yes.

7 THE DEPONENT: Let me just tell you the ones that  
8 come to mind.

9 BY MR. CONNORS:

10 Q So it is clear, I want anything which in any way  
11 impacts on your opinion.

12 A My opinion is based on a melange of impressions,  
13 not on precisely each individual case in the sense the fact  
14 that Barbara Adams died in this crash as a result of injuires  
15 in the same compartment is significant to me. Linda Adams  
16 suffered a whiplash injury. She could not have suffered a  
17 whiplash injury if she had not been facing the rear. All these  
18 things form the patterns to completion of the puzzle.

19 Do you want me to go further?

20 Q I want from you, Doctor, a list of those adults you  
21 are referring to and the nature of their injuries which in any  
22 way indicates to you the force that may have affected the



1 children.

2 I can go down the list individual by individual if  
3 that would help.

4 A I will do it off the top of my head.

5 The first one on this composite of the members of  
6 the troop compartment injuries --

7 Q You are referring to Liu Exhibit No. 4 entitled,  
8 "Composite of Troop Compartment Injuries," which you said was  
9 prepared by the Law Firm of Lewis, Wilson, Lewis & Jones.

10 THE DEPONENT: The first one is Neill -- fractured  
11 clavicle and burns, suggesting there was a burning in the  
12 compartment, fire in the compartment.

13 Bruises up and down the back and the legs and so on,  
14 suggesting that she might have fallen and came in contact  
15 with objects -- lacerations, pulled muscles on the back means  
16 she was thrown about within the compartment.

17 At this rate we will never get through.

18 You told me you wanted me to go through them.

19 Q What you have done basically is read to me what is  
20 on the right-hand side of this page, Liu Exhibit 4.

21 A Yes.

22 Q Perhaps, to expedite this, as you go down, tell me

1 the name of the adult you are talking about and we will assume  
2 you are referring to the injuries under that person. That  
3 will give us a place to start.

4 What individual adults are you talking about in  
5 terms of their injuries?

6 A In terms of their injuries --

7 Q That would be significant in terms of the forces that  
8 might have affected the children.

9 A Barbara Adams, Susan Derge. Her back was broken in  
10 four places.

11 Marcia Tate.

12 Regina Aune.

13 There is obviously a small typographic here. There  
14 is a compression not a decompression of the L-3 back.

15 Gregory Gmerek -- loss consciousness, great difficulty  
16 in breathing.

17 All of these are suggestive of transient hypoxia  
18 episodes which is aggravated or even caused by the fracture of  
19 ribs.

20 William Parker died as a chronic brain syndrome,  
21 fracture left femur. That is obviously also wrong. That  
22 should be hemothorax.

1 I don't think it is necessary to go through all of  
2 them, but their injuries give me an idea that, in fact, a lot  
3 of the adults were, in fact, thrown about in the cabin causing  
4 at least just by a casual reading two deaths, many contusions  
5 and lacerations, chronic whiplash syndrome and all the classic  
6 burns and cuts and hematomas. The picture is one in which the  
7 so-called -- one arrives at the possible synergistic effects  
8 of all of these little components.

9 Q You mentioned Harriet Neill. She is listed as  
10 having a fractured clavicle.

11 A That is correct.

12 Q How much force does it take to fracture a clavicle?

13 A I don't recall at the moment. There is data on that.

14 Q But you don't know how much force?

15 A I don't remember how much force. That is one of the  
16 favorite places where you break your bones.

17 Q Regina Aune is listed as having four broken bones  
18 in the right foot. How much force is needed to break a bone  
19 in a foot?

20 A It depends on what direction it is applied.

21 Q What would be the minimum force?

22 A It depends on whether the bone is hit this way or

1 that way. There could be a whole series of things.

2 Q How much force is required to fracture someone's  
3 ribs?

4 A Again, it depends on how the rib was loaded.

5 Q Could it be done with the force of a single G?

6 A No.

7 Q Two G's?

8 A It may not be the cause of the broken rib. It might  
9 not be the G alone. It might be the second or third contact.  
10 Force is not measured in G's.

11 Q How do you measure the force?

12 A It is measured in pounds or in units.

13 Q If we speak in terms of one G, that is the measurement  
14 in terms of the mass of the body we are speaking of; is that  
15 correct?

16 A No, that is not correct.

17 Q Describe one G for me.

18 A One G is the acceleration due to gravity. In  
19 English units it is 32 feet per second.

20 MR. HORVATH: We have to leave in a few seconds, and  
21 you may want to mark this document because he has a plane to  
22 catch. He has a student with oral exams tomorrow and he has  
been present.

1 BY MR. CONNORS:

2 Q What airport are you leaving from?

3 MR. HORVATH: I have given you over four hours at  
4 this point. He has to go back to my office to pick up his  
5 things. We started this deposition at 9:45. At 12:30 we  
6 started to talk about the areas which Doctor Liu has been  
7 offered on. The first two hours and forty-five minutes were  
8 not spent talking about the areas we offered Doctor Liu on.  
9 I know there will be a motion to exclude his testimony but we  
10 have given you adequate time.

11 MR. CONNORS: Could I have Doctor Morain's report  
12 and Doctor Turner's report?

13 BY MR. CONNORS:

14 Q Have you made any notes or underlineations on any  
15 of the other reports that you have reviewed?

16 A No. Most of the others are the reports of the  
17 defense witnesses. I read them for amusement.

18 Q Amusement? Why do you say amusement?

19 A They were mainly talking about -- well, they started  
20 constantly characterizing average and here we are talking about  
21 a transient event, such as a crash, so I had a great deal of  
22 amusement and maybe amazement at the same time.

1 Q Doctor, have you ever done any studies of aircraft  
2 crashes?

3 A No, I have not.

4 Q Has Doctor Morain ever done any studies of aircraft  
5 crashes?

6 A You would have to ask him that.

7 Q I did and he had not.

8 Has Doctor Turner ever done any studies of aircraft  
9 crashes?

10 A I don't know. You would have to ask him.

11 MR. CONNORS: I want to put on the record, so we  
12 wouldn't have to copy this entire document, this document by  
13 Doctor Stanley Morain, "Photogrammetric Measurements and Soil/  
14 Vegetation Interpretations Related to the C5A Incident." On  
15 page 50 of that report, there is a red mark going from the  
16 middle of the page --

17 MR. HORVATH: Why don't you just make a copy and  
18 send it back to us?

19 MR. CONNORS: Let's mark at this time as Liu's  
20 Exhibit No. 10 a copy which counsel has furnished to us of  
21 the article, "Subcortical EEG Changes in Rhesus Monkeys Follow-  
22 ing Experimental Hyperextension-Hyperflexion," co-authored by

1 Doctor Liu and three other gentlemen. I will mark that as  
2 10 if the Doctor will so identify for us.

3 THE DEPONENT: I so identify it.

4 [Document marked Liu's Exhibit No. 10  
5 for identification.]

6 BY MR. CONNORS:

7 Q I would like to show you a copy of a document  
8 entitled, "Accident Report," and ask you if you can identify  
9 that, please.

10 A Yes. This is the accident report written by Doctor  
11 Turner.

12 [Document marked Liu's Exhibit No. 11  
13 for identification.]

14 BY MR. CONNORS:

15 Q Are the underdelineations, the red markings on that  
16 document your notes and your marks?

17 A Yes.

18 MR. CONNORS: I will ask that that be marked as  
19 Liu's Exhibit No. 11.

20 BY MR. CONNORS:

21 Q Doctor, I show you the report of Doctor Morain,  
22 entitled "Photogrammetric Measurements and Soil/Vegetation

1 Interpretations Related to the C5A Incident," and ask if that  
2 is your personal copy of that report?

3 A Yes.

4 Q Are there any red marks or notes in that article  
5 your own notes, constituting your notes as to that article?

6 A Yes. There were not too many marks on this.

7 Q But the ones in here are yours?

8 A Yes.

9 MR. CONNORS: I will ask that that be marked as  
10 Liu's Exhibit No. 12.

11 [Document marked Liu's Exhibit No. 12  
12 for identification.]

13 MR. CONNORS: Please note my objection to plaintiff's  
14 arbitrary limitation of this deposition.

15 MR. HORVATH: I think the record is clear. You have  
16 not asked the Doctor about his areas of testimony beforehand  
17 and you had more than an ample period of time to inquire. I  
18 have given you warnings all along. He has a plane to catch  
19 and you said you would have no trouble finishing up in an  
20 hour two hours ago. I think your objection is invalid.

21 MR. CONNORS: We will note we did not receive a  
22 single document, not even the CV, until this morning. The



1 nature of his testimony is apparently changing from the time  
2 we were given a proffer until he comes here. We are in no  
3 way bound by plaintiff's counsel's limitation or characteri-  
4 zation of what we should be asking questions about. These  
5 depositions are for both discovery and evidence and if we have  
6 to inquire into the basis that is our right. I will be happy  
7 to quote back every one of your statements to Mr. Oren Lewis  
8 the next time he deposes our witness.

9 MR. HORVATH: I just want to follow Rule 26.

10 MR. CONNORS: It would not be the time.

11 We just note our objection to the arbitrary cutoff  
12 of the deposition and we do not regard the deposition as  
13 concluded.

14 MR. HORVATH: ARE you suggesting that this witness  
15 stay over and fail to be in Iowa City for a student's exams  
16 tomorrow?

17 MR. CONNORS: All the expert witnesses have their  
18 own problems. Every single one has had problems and we have  
19 had to bring them back in.

20 THE DEPONENT: For the record, I have no objection  
21 to coming back but I must go. I am a master thesis' adviser  
22 to my students.

1 MR. CONNORS: I understand that.

2 [Whereupon, the deposition adjourned at 3:30 p.m.]

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5  
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Y. KING LIU

CERTIFICATE OF NOTARY PUBLIC/REPORTER

UNITED STATES OF AMERICA )

) ss.

DISTRICT OF COLUMBIA )

I, ALBERT J. GASDOR, 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 26<sup>th</sup> day of December, 1981.



Albert J. Gasdor  
Albert J. Gasdor

Notary Public in and for  
the District of Columbia

My Commission expires:  
July 31, 1985