I also ask you to assume that all crew members in the flight crew compartment survived; that one had spranged ankles as a result of being tangled in the rudder pedals and that, after the aircraft came to a stop, but all of those in the crew compartment area survived. There was one crew member in the troop compartment who stood up, according to reports, and was thrown forward at the time of impact and he did not survive. He was unrestrained and standing at the time of impact.

I want you also to assume that after the crash landing, helicopters arrived at the scene within five minutes and the surviving attendants were able to evacuate the minor children including Michael Schneider in the troop compartment within a period between 30 to 45 minutes.

I want you also to assume that the pediatrician in the troop compartment remained conscious throughout the landing, was not injured. He was braced between seats. He assisted in the evacuation of infants who he observed to be still buckled in their seats, rearward facing seats, after the troop compartment came to a stop and were not apparently injured except for the one I mentioned with the cord around his neck who may have been strangled by the cord.

Also assume that the persons who assisted in the removal of the infants from the troop compartment found all but one of the infants still strapped in their seats except

for one who was under the seat and who somehow slid under the seat who was alive and who, when picked up, woke up and cried.

I want you also to assume that other crew members who helped with the offload or evacuation of these infants observed them and did not observe any apparent injury and that most of them were awake, crying in a fussy way or indicating other signs of alertness -- again except for the one with the cord around his neck.

I want you to assume that most of the surviving infants were taken to the Seventh Day Adventist Hospital which one of the witnesses, a pediatric nurse, had testified was the best one in Saigon and that was where she would want to go if she had to be treated.

Assume that Michael Schneider was among those who went to the hospital and after being examined was one of those who did not require hospitalization and was sent back to the To Am Nursery where he had previously resided for a couple of days prior to the accident.

I want you also to assume that a pediatric nurse at the To Am Nursery observed these children, and Michael Schneider was among them, although we don't know that he was specifically observed, but assume he was among those observed not to have any serious or abnormal problems when they were brought back to the nursery, and that on the next day, April 5th, a large number of these children, including Michael

Schneider, were placed on a Pan American special charter flight from Saigon to San Francisco where he was evacuated to the United States and arrived at the hospital, at the Presidio, an Army medical hospital and was examined there on the following morning, April 6th, and was found to be active and alert and his neurological signs were reported as normal.

I want you to assume that on the Pan American charter flight there were more than 300 children, perhaps 140 of them,those who had been on this accident airplane and another 150 or so who had been from other sources and that they were all reported to be cranky and upset.

Now, considering those facts as well as the medical records you have reviewed and the medical reports and indications you have seen in the records of the hospitals you looked at regarding Michael Schneider; considering your background and your knowledge of aerospace medicine and the effec of both decompression descent and G-forces, do you have any opinion within reasonable medical certainty as to whether the decompression descent and ultimate landing circumstances were the proximate causes of any of Michael Schneider's medical conditions that you observed and the reports that you reviewed?

A Yes, I do.

THE COURT: Before you answer this, just a moment,

Doctor.

MR. LEWIS: Objection.

THE COURT: Do you have an extensive statement?

MR. LEWIS: I have a few things that I heard differently than he did.

THE COURT: Let us excuse the jury for our afternoon recess. We will be back at 3:35.

(Jury leaves.)

MR. LEWIS: May we have the witness excused please?

THE COURT: Yes.

MR. DUBUC: Did the reporter get the answer: Yes, I have an opinion?

THE REPORTER: Yes.

MR. DUBUC: That is where we are. He hasn't given an opinion.

THE WITNESS: Where do I go?

THE COURT: There is a chair outside. Stay close by.

(Witness temporarily excused.)

MR. LEWIS: May I stand here, Your Honor?

THE COURT: Come to the podium for the reporter's benefit more than mine.

MR. LEWIS: If the court will give me a minute to gather my point together?

THE COURT: Certainly.

MR. LEWIS: Your Honor, it was hardly a fair, straight statement considering all of the elements that have come before this jury. It is hard to know where precisely to start, but I will make a stab at it.

THE COURT: Before you start, would you be protecte by asking the question on cross-examination if this, that and the other fact were different?

MR. LEWIS: Entirely.

THE COURT: Well, you will be privileged to do that

MR. LEWIS: Thank you, sir.

THE COURT: We will take a recess until 3:35.

(Recess.)

THE COURT: Please bring back the jury.

(Jury enters.)

THE COURT: You may be seated, Dr. Gibbons.

Whereupon,

DR. HARRY GIBBONS

resumed the stand and testified further as follows:

THE COURT: Mr. Dubuc.

DIRECT EXAMINATION (Resumed)

BY MR. DUBUC:

Q Doctor, before the recess started, I asked you to assume certain facts in a question and you recall the facts as I recited them?

A Yes, sir.

Q I will ask you if you have an opinion based upon those facts to a reasonable medical certainty as to whether or not any of the conditions of the decompression, descent and the circumstances in the airplane and the landing as described as to a reasonable medical certainty, in your opinic had any connection or were any proximate cause of any of the complaints or illnesses that were described in the medical records that you have reviewed with respect to Michael Schneider, and I don't believe I heard your answer.

A I do have an opinion.

Q Would you state that opinion please?

A Yes, sir.

It is my opinion with a great deal of medical certainty, it had nothing to do with any of the things that Michael may have. It was a very safe decompression and a very safe level of hypoxia and the G-force is extremely mild.

Q I would like you to explain your opinion a little bit further if you would.

One of the considerations was the decompression at 24,300 feet and you had given us a little explanation of that in general before I asked the question.

Could you explain for us the reason for your opinio as it relates to the decompression aspects of the accident?

A Yes, sir, as I mentioned before, 30,000 is the critical altitude for serious decompression sickness. Now,

decompression sickness is manifested in four ways. Number one, the bends in which a person has pain in the joints. Diver's bends are familiar to us where they most certainly have pain in their knees or their hips or their lower extremities. In aviators it occurs more frequently, flight decompression occurs more frequently in the shoulders, arms and hands.

Regardless, when it does occur, it is usually about 30,000 feet and does not occur unless there is exposure for some time.

Other types of bends are, there is a type of skin manifestation which can be itching, burning, actually a mottling of the skin that is very mild and doesn't occur very often.

There is a type of decompression sickness called the chokes in which there is dry hacking cough usually associated with pain on breathing and there is also neurocirculatory collapse, but again these occur almost always above 30,000 feet unless there is, of course, prolonged exposure to altitude or strenuous exercise.

For example, in one series they didn't even report symptoms below 26,000 feet, and then they go from mild decompression sickness on up to the mid-thirty ranges. With severe or strenuous exercise, it is possible to bring on the bends at levels as low as 17- or 18,000 feet, but again that

takes a great deal of exercise.

For example, the courses which I started for enabling general aviation pilots to go into altitude chambers, that is the average, private pilot so he can learn about hypoxia, decompression sickness and these other factors, in one report the people who attended just the chamber in Oklahoma City, they had about 4,700-plus cases and not one single case involved gas decompression in the people. They were decompressed to either 25,000 feet or to 29,000 feet and kept there for a matter of minutes and brought down again, and again out of about 5,000 cases, not one single case of decompression sickness.

Q You mentioned time again?

A Yes, sir.

Q Could you amplify that a little bit more with respect to these particular facts as they might have affected Michael Schneider and the descent of this particular airplane with the assumed facts I gave you?

A With the facts you gave me, with a descent within a very short period of time, it is highly unlikely for any decompression sickness to occur because one of the factors that goes with getting to altitude is staying there to bring on symptoms of decompression sickness, and it is extremely remote to occur with, as he says, its being initiated immediately after decompression.

Q You said highly unlikely. Is your opinion with respect to decompression sickness, these altitudes and these times to a reasonable medical certainty?

A Definitely.

Q There is also some defensive testimony with respect to ear injuries as a result of the decompression itself at 24,300 feet.

Could you comment on that for us?

A Yes, there is, I believe, agreement that unless someone has actually something plugging up the eustachian tube, the air will escape. There may be a problem getting some air back in as one comes down from altitude, but even with severe, very severe decompression, the air still escapes readily from the middle ear.

For example, in Sweeney's work, they did decompression from 8- to 39,000 feet in only 9/100 of a second and there were slight twinges of pain in the diaphramatic area in the upper abdomen in the very rapid decompression in this large range, but no problem with the ears.

Q How about with respect to the descent itself, considering the facts I gave you including the facts of the time of the descent and the fact that the descent was not directly from 24,300 feet, but from time to time the airplane would either level out and climb slightly and then continue to the descent; could you give us your opinion on that with

respect to the potential for ear injury?

A The flight path of leveling off or a slight going up before going down more, is far less likely to produce ear trauma or ear pain than a descent of continuation.

Q Why is that again, Doctor?

A Because the middle ear has a chance to ventilate and get some air back in behind the eardrum.

Q There has been some testimony with respect to the fact that Michael Schneider experienced some dehydration and diarrhea and subsequently a few weeks later, pneumonia, say a week or a week and a half after the decompression and two weeks after the decompression.

Are any of these, diarrhea, dehydration or acute pneumonia medical problems which, in your experience, have been related to decompression?

A Definitely not.

Dr. Gillies in the "Textbook of Aviation Physiology" reports on a half million decompressions in England -- there have probably been millions in this country and I have never heard of pneumonia being related to that. I don't see how it could occur as a result of a decompression.

Q Then you mentioned the hypoxia factor. Could you expand your opinion and explain a little bit specifically with respect to the facts I have given you as they might have affected Michael Schneider at the altitude and times that I

provided you in the assumed facts, as to the reason for your opinion that the hypoxia aspect of decompression had no resulting or proximate relationship to his medical condition today?

A The altitudes we were talking about were well within the limits of the time of useful consciousness, let alone consciousness. That is, not only would a pilot be able to navigate without supplementary oxygen at descent from that altitude, but a person would not likely to become unconscious but even if they did, there have been a number of people, including myself, unconcious in altitude chambers doing various tests I hope with full recovery.

Q When you say full recovery, can you expand on that?

Are you talking about some momentary period of unconsciousness?

THE COURT: Be careful about leading.

BY MR. DUBUC:

Q You said with full recovery.

Was that after unconsciousness?

A Even where there have been cases of unconsciousness at higher altitude for longer periods such as a decompression in commercial United States airliners, even if there have been cases of unconsciousness, there is full recovery and even in some cases after a prolonged period of unconsciousnes

Q What would you refer to as a long period of

unconsciousness?

A In some cases actually a coma for hours with full recovery after that.

Q All right, sir.

Are you aware of any studies of treatises with respect to testing of both adults and to some extent young animals, particularly monkeys, which pertain to this factor of hypoxia and partial or unconsciousness?

A There is a great deal of research being done relatin to hypoxia because it is so important to life to have oxygen and have it get to the cells. I mentioned earlier one of the persons I talked to was Donald E. Meyers. He had done a great deal of research on asphyxia and hypoxia. To differentiate the two, asphyxia --

MR. LEWIS: If he wants to cite any of the written works of Dr. Meyers, fine. But as to a conversation with Dr. Meyers, unless he is going to come here, I object because I can't cross-examine.

THE COURT: Sustained.

BY MR. DUBUC:

Q If you can restrict whatever you are referring to as to studies or documented reviews of studies that have been published either by Dr. Meyers or others, would you do it that way?

A Dr. Meyers, who is in Perenatal Physiology at the

National Institutes of Health has published regarding asphyxia and hypoxia and has shown -- with both fetal monkeys and other sheep -- other animals including sheep -- that prolonged periods of hypoxia with very much reduced amounts of oxygen in the blood stream, for example, 12 minutes with complete lack of oxygen to the brain -- Dr. Meyers has shown complete recovery with these fetal animals and with longer periods thereafter with hypoxia, that is partial limitation of the oxygen up to 25 minutes.

Q Thank you.

Does the human body have certain protective mechanisms, built-in protective physiological mechanisms which respond to a situation of hypoxia?

A Without the built-in mechanisms, we would probably pass out at lower altitudes, but anyone exposed to hypoxia has certain things that happen immediately.

For example, the first breath that a person takes in a hypoxic situation, some of the blood going through the lungs doesn't get quite enough oxygen, and as soon as that blood travels to some little chemical receptors in the body, it does a number of things.

First of all, the body is told through the brain to breathe deeper and faster and just that alone markedly increases the amount of oxygen to the brain.

Besides breathing deeper and faster, automatically,

it is something we don't have to think about because the body takes care of that, other things take place here. There is slightly increased blood pressure in the lungs and slightly increased blood pressure throughout the body and the heart beats faster to move the oxygen that is there around faster to keep the oxygen level up more so that we can handle the stress of hypoxia.

Those are some of the -- those are the basic ones.

Q In connection with the tests you have participated in, and I think you mentioned many, many, tell us again on chamber tests, how many of those you worked with on experimentation and also testing?

A I personally accompanied hundreds of pilots as they went into altitude chambers when I first initiated the course in my region as Region Flight Surgeon. Now it has gone nationwide. I still every year or every other year since -- I guess it has been four or five times in eight years -- take a group of Utah pilots to the chamber where in either Williams Air Force Base in Arizona or I take a group to Colorado and go into the chamber, the record made at the chamber by the FAA who did the very first test while I was there, they kept good records on 4,700 plus.

They have taken them to 25- and 29,000 feet plus where they remove the mask for a short period of time to experience hypoxia.

Q Do the age brackets of these people, were they the same, were they all military pilots in their mid-twenties or did their ages vary?

A This group goes from 16 to the 70s or 80s. One fellow not listed in the report is a fellow I accompanied in the altitude chamber in New Mexico who has seen two, but they go from 60 to 82.

Hitchcock's work which is also available, goes from the 15 to 60 range.

Q Are there any changes that take place physiologically in the body as we grow older which have any effect or any relevance to the resistance to hypoxia?

A Both the hypoxia and decompression sickness, it is felt that there is a definite increased limitation as we get older.

For example, in decompression sickness, there is a ten-fold increase from about age 18 to 30 in the amount of problems people have. Just in that ten-year span, there is an increase in problems with the symptoms of decompression sickness, with hypoxia.

Unfortunately as we get older, we develop arteriosclerosis which is somewhat of a block in some cases in getting the oxygen to the cells, particularly the cells of the heart, at least that is what we worry about most, and the brain, and our lungs may be less compliant. A person

who smokes is going to be, in my opinion, less capable of handling the stresses of latitude.

Q How about factors such as size or weight? Does that have any effect?

A Weight, per se, is a very heavy factor since the fatty tissues of the body dissolve more nitrogen than just the plain muscle tissues and over a large series of people, the individuals most likely to have problems are those that are obese.

Q With respect to the testing that you observed of the range of ages, could you give us some comparison as to, let us say, centering on such things as to weight and age, as to the ability, considering those two factors of a person to withstand or operate productively in connection with an hypoxic situation?

A With the flights I participated in or observed or organized, I didn't see that difference. It takes thousands of subjects to do a complete series.

Adler, for example, who reviewed thousands and thousands of cases, he and others have reported this increase by age.

Q Do you have an opinion as to whether or not children of a younger age would respond better or the same or worse to hypoxia than say an adult at age 30?

A It is my opinion that children will tolerate

hypoxia much better.

Q Are there any other factors you took into consideration, other than those we have already mentioned?

A Just the fact that we have what I would call a cleaner system, move compliant lungs and less obstacles to keep you from getting oxygen from the air to the cells of the body.

Q Okay.

In rendering your opinion, I asked you to consider certain G-forces and in rendering your opinion, I would like you to amplify that portion which would pertain to considering the G-forces described, the location of Michael Schneider and the other infants in the troop compartments and the rearward facing seats, as well as the distances that I described those components traveled; would you tell us the reasons for your opinion with respect to that aspect of the assumptions that I made?

A Yes, sir.

First of all, it was obviously low Gs because people were able to brace themselves in aisles and without restraint at all. It was a deceleration in the semi-liquid top water system in a rice paddy which is the ideal type of break used on many deceleration tests where actual research is done. And the fact that they were in rear-facing seats markedly enhances the likelihood of their survival and without

any particular problems at all.

For example, the ideal aircraft accident as taught by the "Aviation Crash Research Course" I attended some years ago, the ideal accident was one in which the wheels, the tail and the wings are all torn off, absorbing all that energy. There is a tremendous amount of energy at that much speed with anything with that weight. The ideal crash is one in which the forces are dissipated in pulling off the various parts of the airplane and leaving the occupants, in this case the troop compartment, untouched.

Q And in rendering that opinion, you took into consideration that the troop compartment traveled with some tracks, some indication of travel in the --

A A considerable distance. I think I mentioned that.

Q Okay.

MR. DUBUC: Just give me a moment, Your Honor.

THE COURT: Yes.

BY MR. DUBUC:

Q With respect to the rearward facing seats and what you have told us as to the literature that you have reviewed and also from your own experience in the testing that you told us about in Oklahoma City, would you explain a little bit more your opinion with respect to what and how the G-forces on the assumptions that I gave you would react on a seat with a child in a seat rearward facing?

A I think it can best be described in one of the summation paragraphs in "Aerospace Medicine" by Col. John Paul Stapp who subjected himself to tremendous forces in a forward facing seat. He said the answer is a rearward facing seat properly anchored with a headrest above the head, with the back against the back of the seat for distribution of forces. I am paraphrasing slightly.

This is the dean of air crash specialist who summed up everybody's experience with the fact that a rearward facing seat is the answer because it distributes force.

Q What do you mean when you say distributes force?

A I mean, I compare that again to the shoulder harnes or seatbelt. You have so much weight in your body that is going to be subject to 30 Gs that multiplies the weight by 30 times. That distributes the weight just over the shoulder harness or the seatbelt, whereas if it is in the rearward facing seat, we have the entire surface of the neck, back and head to absorb that energy. It is just distributed over a large area. It is one of the basic principles of crash survival.

Q It is distributed over an area.

You are talking about the area of the seat back itself?

A Yes, sir. I am speaking of the body against the seat back.

Q Okay, I see.

MR. DUBUC: You may cross-examine.

THE COURT: Mr. Lewis.

CROSS-EXAMINATION

BY MR. LEWIS:

Q What is the effect of a pancake kind of situation where somebody sitting in a seat is banged hard that way (indicating)?

MR. DUBUC: Objection.

THE COURT: Overruled.

THE WITNESS: Would you care to state how hard "that way"?

BY MR. LEWIS:

Q Hard enough to break the airplane that they are in into about 10,000 small pieces and four big pieces.

THE COURT: There is an objection to that and it is sustained.

BY MR. LEWIS:

Q Are you familiar with the central nervous system of the human body?

A Well, I have studied it. When I speak of the central nervous system, I refer to the brain, the medulla and the spinal column if that is what you are referring to.

Q Do you know what the brain stem is?

A Yes, sir.

Q Have you ever seen a closed head injury with a very minor accident in the sense of a bang?

MR. DUBUC: Objection.

THE COURT: Overruled.

BY MR. LEWIS:

Q One can have a very serious brain injury without any damage to the exterior of the head at all? Is that true?

A Yes, sir, that is true.

As a matter of fact, there was a case in Utah some time ago of a person hitting her head on the back on a tree limb causing her death.

Q How many people were killed in this accident?

A Over a hundred.

Q Do you know how many?

A I can give you an exact figure if I can refer to my notes.

Q Right now I'm interested in your memory right now, then we will go to your notes.

A I believe it is 155.

Q Do you know where the personswere located that were killed?

A The majority of them were in the cargo area.

Q Do you know how many of them were in the troop compartment?

A There was one that I was aware of, one of the infan-

and at least one crew member and I think one adult woman.

Q Do you know whether there were two infants or not?

A I don't know for sure. I have heard of the one with the cord around the neck. I don't know the circumstances if there is another one.

Q In the hypothetical question that was asked, your opinion is based on the accuracy of the data given you?

A Well, I rendered an opinion on a large number of things. Could you elucidate on that please?

Q No. You gave an opinion on the ultimate question on whether the child was injured as a result of this accident.

Counsel went through a long list of things. He said assuming all of these things in my question to you, and your answer was based upon the accuracy of the assumptions you were asked to assume; isn't that true?

A Yes.

Q All right.

Now, were you aware that Lockheed had admitted that these babies had sustained an injury at the time of the explosive decompression?

A No, sir.

Q Let me read this to you, sir. Quote --

MR. DUBUC: Objection.

THE COURT: Sustained.

BY MR. LEWIS:

Q Would it make a difference in your opinion if you knew that Lockheed in an argument to this court involving a legal claim --

THE COURT: That is the same quotation.

MR. LEWIS: I wasn't going to quote it.

THE COURT: The objection was sustained not as to the form, but as to the substance.

MR. LEWIS: All right, sir.

THE COURT: So don't come at it some other way.

MR. LEWIS: All right, sir.

I want to abide by the Court's ruling.

THE COURT: Then do that.

MR. LEWIS: All right.

THE COURT: It shouldn't be hard. Just go to something else.

MR. LEWIS: All right, sir.

BY MR. LEWIS:

Q Now, sir, how did you arrive at the G-forces in the crew compartment? Did you make any mechanical studies of it?

A No, sir.

Q Now I would like to show you some pictures and ask you some questions about the G-forces involved.

A Yes, sir.

MR. DUBUC: I have no objection to his showing the

pictures, Your Honor, but I think the witness testifying based on assumed G-forces --

THE COURT: If you don't have an objection, don't make an argument.

MR. DUBUC: My objection is based on the assumed G-forces.

THE COURT: If he asks a question like that, it is time enough to object.

MR. DUBUC: May we have the number of the exhibit?

MR. LEWIS: Your Honor, we are displaying --

THE COURT: Are you showing this to the witness or to the jury?

MR. LEWIS: So that we can all see it.

THE COURT: Show it to the witness.

BY MR. LEWIS:

Q Mr. Witness, this is Exhibit 2DD that has been admitted in evidence. That is part of the wreckage of the C-5-A.

From your experience in accident investigations, sir, can you tell me whether or not substantial physical forces would be required to tare that part of the airplane off of the parts to which it was originally attached?

A Yes, sir, it would.

Q Really enormous forces, wouldn't it?

A Yes, sir.

MR. LEWIS: May I place this on the easel?

THE COURT: Show it to the witness.

BY MR. LEWIS:

Q Sir, this is Exhibit 27. This shows the C-5-A striking the ground the second time. This portion here (indicating) is the troop compartment and I ask you to assume, sir, that at the time of impact the impact had a kinetic energy force in excess of 1,000,500,000 (sic) foot pounds, and that the airplane disintegrated at the time of the second impact; and that the parts flew in different directions.

You are familiar with the distribution pattern?

A Yes.

MR. DUBUC: Objection.

THE COURT: Overruled.

BY MR. LEWIS:

Q And this troop compartment flew through the air for a distance of some roughly 400 yards and then struck again the ground coming down again and then sliding the distance farther than roughly 150 yards; would it be your testimony, sir, that the persons inside that troop compartment would not be subjected to a number of vertical Gs coming down like that (indicating)?

MR. DUBUC: Objection.

THE COURT: Overruled.

THE WITNESS: It depends, from the material you gave me, over what period of time it came to rest in the rice paddies, in water, in mud, whatever, would determine the extent of those forces.

BY MR. LEWIS:

Q Part of it would be the height, wouldn't it?

A Yes, sir.

Q How high is it ordinarily off the ground?

A I believe two stories off the ground.

Q The bottom of it or the top of it?

A I'm not sure.

Q You don't know whether the bottom of it or the top of it was two stories off the ground?

A I'm not even sure how far two stories is in feet, so I'm not sure.

Q Then you don't know how far the drop was that the troop compartment had to fall in order to strike the ground to end up in its final condition, do you, sir?

A No, sir. All I know was the witnesses' statements of being joggled around a bit, something similar to that.

Q Well, would it make any difference to you if you learned that the troop compartment went through a series of crashes: Bang! Crash-Crash-Crash-Crash like that (indicating in a jerky motion before it came to rest? Would that make any difference?

MR. DUBUC: Objection.

THE COURT: Overruled.

BY MR. LEWIS:

Q Would that make any difference?

A Sir, I would place a great deal of credence on what the people going through the Gs experienced especially those were not strapped down and were able to brace themselves through whatever occurred just by holding on.

Q What if a competent witness that was in the troop compartment said that's what happened? Wouldn't that indicate a series of jerks as opposed to a smooth deceleration?

A Yes, sir, it would. As a matter of fact, we discussed this in my deposition. I mentioned that I doubled my estimated Gs to being three or four above the person just being able to hold on because you are going to have some jolts in any deceleration. It is not specifically set up on scientific equipment.

Q How many Gs would you say they were subjected to?

A As I mentioned in my deposition, I estimated it to be three or four, doubling what it appeared to be, but I did not estimate the Gs except the people were able to restrain themselves by holding on.

Q What if people were not able to restrain themselves when trapped between two seats and were thrown either over the

seat or around the seat and slammed up against the bulkhead ending up, upside down, fracturing a collar bone?

Would that be important to you or did you take that into consideration in trying to decide whether people were able to successfully hold on?

A In explaining G-forces, if a person decelerates with the aircraft over the entire period of time, that is one thing, but if a person is loose and then decelerates over a short period of time after the aircraft comes to a stop, that markedly increases the Gs.

So if the person did not decelerate with the aircraft by holding on or being strapped to a seat, they could be subject to higher G-forces.

Q What would the G-forces be under those circumstances?

A It depends entirely over what distance they did come to a halt.

Q Is there any way you can figure that?

A No, sir.

Q What if that person was braced between two seats, a female, an experienced air traveler, a nurse, braced between two seats and the movements of the vehicle were such that she was flung from between the seats either over the top or around the side from her secure position and up against the bulkhead upside down, fracturing her collar bone? That would be a lot more than three or four Gs,

wouldn't it?

A Possibly it would. If it broke a bone, I would expect it to be more than that when she hit and came to a stop over a short period.

Q How many Gs would it take to fracture the lung bone in a baby seated in a seat of a C-5-A under those circumstances?

MR. DUBUC: Objection.

THE COURT: Overruled.

THE WITNESS: I don't know. There have been --

THE COURT: You have answered it.

BY MR. LEWIS:

Q Can you tell me how many Gs it would take to fracture a socket in a one-year old child seated in a seat, remaining in that seat in that fashion?

THE COURT: Fracture what?

MR. LEWIS: The socket, the hip joint.

THE WITNESS: I thought you were going to say the socket of the eye because there has been some work on the head --

THE COURT: Just answer the question.

THE WITNESS: No, sir, I don't know.

BY MR. LEWIS:

Q That would indicate substantial G-forces if such fractures existed under such circumstances?

appears it will be three days plus the portion of another day at least.

Q Can you tell me how many hours so far?

A Today? This trip? Which, sir?

Q This trip, sir.

A Again, three and one-half days approximately.

Q And the 28 percent comes to how many dollars?

A For this year?

Q Yes.

MR. DUBUC: Objection.

THE COURT: Overruled.

THE WITNESS: I worked this out before I left home. I think it came out to $6,000 or $7,000. I don't remember the exact figure.

BY MR. LEWIS:

Q Now, am I correct, sir, that the problem of decompression is the difference in pressure?

In other words, the difference in pressure before the explosive decompression and after the explosive decompression?

A Yes, sir; that is correct.

Q And over four to five pounds per square inch difference is potentially very serious, isn't it?

A Not necessarily.

Q It is potentially very serious, isn't it, Doctor?

MR. DUBUC: Objection.

THE COURT: Overruled.

THE WITNESS: I said not necessarily.

BY MR. LEWIS:

Q Can it be dangerous?

A It can be; yes, sir.

Q And speed of the change is important, isn't it?

A Not very because it has been reported in a number of studies that although in some situations it appears the rate of descent is a factor, it is not always consistently worse with the studies performed at a faster rate of decompression according to Randel's "Textbook of Aerospace Medicin

Q When I say speed, you could get a more serious injury at a lower altitude if it was a so-called explosive or a very quick, instantaneous decompression than you might at a higher altitude where it was a very leisurely change in altitude; isn't that true?

A Would you explain that again? I am not sure I followed your question.

Q Yes.

I am trying to say that if the so-called explosive or rapid decompression gets much of its potential problem from the difference in air pressure plus the quickness or speed of the change from one air pressure to the other air pressure, isn't that generally speaking the case?

A That is the case if it exceeds a certain limit. All that has been listed is two-tenths of a second for humans over a certain range. I mentioned Sweeney's work of decompressions from eight to thirty-five thousand feet in nine one-hundredths of a second or three times as fast without any problems at all, so it can be a factor, but it is not always a factor.

Q Let me ask you if you would agree with this.

MR. DUBUC: Your Honor, if he is referring to something, could he refer us to it?

MR. LEWIS: Yes, I am speaking of the accident report that we received from Lockheed of the decompression of C-141A, 16 January, 1967, which we were furnished by Lockheed.

I don't know that it has a number.

MR. DUBUC: Is there an exhibit number?

MR. LEWIS: Not that I know of.

THE COURT: Do you know what he is talking about?

MR. DUBUC: No.

THE COURT: Why don't you come up and look at it?

MR. LEWIS: I will show it to him. It was attached to their Answers to certain Interrogatories that we prepared.

THE COURT: Give him a moment to look at it.

MR. DUBUC: I have it, Your Honor.

THE COURT: Go ahead, Mr. Lewis.

BY MR. LEWIS:

Q Under the circumstances, sir, when the pressure differential across the lung walls exceeds four to five pounds per square inch, air sacs tend to rupture in the lungs is that your understanding?

A They tend to if the trachea or the airway is blocke only; other than that, the air escapes quite easily.

Q Then let me read you this whole sentence.

A Yes, sir.

Q "One would be most concerned with the effects upon pulmonary air sacs since under even ideal conditions the air sacs tend to rupture when a pressure differential across the lung wall exceeds four to five pounds per square inch --

It says psi and I am reading it.

A Yes, sir.

Q " -- as apparently occurred in this incident."

I appreciate you can get different pressures. I am just trying to find the low range. And do you agree that if you are over four to five pounds per square inch, the air sacs tend to rupture in lungs?

MR. DUBUC: Note my objection. Counsel should at least indicate to the witness by giving him a copy or telling him the altitude involved in this.

THE COURT: Objection sustained as to that.

Give him the further dimensions.

MR. LEWIS: Yes, sir.

BY MR. LEWIS:

Q The altitude is thirty-four six.

THE COURT: 34,600?

MR. LEWIS: 34,606, yes.

BY MR. LEWIS:

Q I am talking about a pressure differential value.

A This is decompression value you are talking about?

Q Yes.

A What altitude did it start at?

Q 34,606.

A No, that would be the end altitude, sir.

What did it start at? What was the cabin altitude prior to the depressurization?

Q My question, Doctor, is involving in this instance an expression of an opinion by somebody that is writing on the subject as part of a report, and I'm trying to find out whether you agree that even under ideal conditions, air sacs in the lungs tend to rupture when the pressure differential across the lung wall exceeds 4 to 5 pounds psi --

MR. DUBUC: Objection.

THE COURT: The objection suggests rather reasonably that it makes a difference, it makes the differential as a part of the effect, as a part of the function of the altitude at which the differential is experienced. The

question so states.

MR. LEWIS: It doesn't.

THE COURT: In this case it does at this moment. So state it, if you will.

MR. DUBUC: I wonder if Mr. Lewis is going to ask the witness questions about the report that he feels make some difference, then perhaps Mr. Lewis will make a copy of it available to the witness or we will.

THE COURT: Do you have any objection to his seeing the copy?

MR. LEWIS: No. I am interested in the principle as opposed to the situation of this particular accident. I am interested in the dimensions of that principle.

THE COURT: All right.

BY MR. LEWIS:

Q Let me call your attention to the bottom of the first page.

A Yes, sir.

Q Let us start at the top. This is 2A, J. C. Gilly, isn't it?

A Yes, sir.

Q And it is a Lockheed document, isn't it?

A I don't see Lockheed on here, but I will take your word for it.

Q Well, would you look at the last page?

A Yes, sir.

Q Who signed the document?

A It looks like C. L. Barrett, M.D.

Q What does it say under that?

A Medical Director.

MR. LEWIS: May I ask the Court to take judicial notice that he is Medical Director of Lockheed?

THE COURT: I don't know that judicially. It might be stipulated, certainly.

BY MR. LEWIS:

Q Assume, if you will--

MR. LEWIS: Would you stipulate that?

MR. DUBUC: Dr. Barrett is not presently Medical Director. He was at one time.

BY MR. LEWIS:

Q I want you to assume, sir, that at the time this report was written--would you do that for purposes of our question?

A Of course.

Q Would you assume that Dr. Barrett was Medical Director of the Lockheed Aircraft Corporation, or whatever its precise name is, the defendant in this case?

A Yes.

Q I want to call your attention to the last sentence on the first page.

Do you see where it says, "One would be most concerned with the effects upon the pulmonary air sac since unde even ideal conditions, the air sacs tend to rupture when the pressure differential across the lung wall exceeds 4 to 5 psi."

And "psi" stands for pounds per square inch?

A Yes.

Q As a principal of aerospace medicine, do you agree with that statement or not?

A I agree with it, with the trachea closed, and I explained that. Dr. Barrett has discussed this case before because as a matter of fact, of all the persons in the airplane, one person did have injury and he is referring to closed trachea.

For example, Lockheed decompressed 800 people from 35,000 feet, 7 psi change, with no problems. It requires a closed trachea for the damage to occur that you are referring to.

Q Is there any finding in here that this man had a closed trachea? It may be here. I just don't notice it.

A I don't see any reference to it, but that is what he is referring to.

Q What I am just interested in--and it may not be true--is if as a general principle of aerospace medicine, air sacs tend to rupture at pressures like that?

MR. DUBUC: Objection.

THE COURT: Overruled.

THE WITNESS: I would like to explain that, as a principle, in aerospace medicine, I would like to go back to Gillies, not the one to whom this was written, who pointed out that as of 1965, with the fantastic number of experiences that were obtained until that time, that not one single air crash accident with much greater decompressions have resulted in lung injuries. This may have been the first in the history of the world. There is one case of the entire crew.

I am saying again that Lockheed themselves have on record over 800 decompressions made from 35,000 feet, approximately a 7 psi difference with no lung rupture. The lung can rupture if you have got the closed trachea. If you

have the closed trachea, the air cannot get out and the air sacs could rupture at 4 to 5 psi. I agree with that.

Q In this particular accident, the pressure was greater than 4 or 5 pounds per square inch, wasn't it?

A I assume so.

Q I am talking about the one we are litigating today.

A Yes, sir.

Q What about the pressure in this accident?

A I believe it was about 7 psi.

Q Let us take that.

What in your opinion would be the result if a baby was lying or sitting and being fed a bottle when the explosive decompression occurred? What would happen to the air sacs in his lungs?

A If they were swallowing at the very instant of the portion of the second that the decompression occurred, they could experience lung damage.

Q They would, wouldn't they, if the trachea was closed?

A Not "would", they could. I base this on the fact that so many accidents have occurred without any lung damage.

Q Do you know if a situation where babies were exposed to explosive decompression at 7 psi when they were drinking from their bottles, any of them?

A I don't know if they were drinking from bottles or

not, but there is the DC-10 accident of 1973, with a large number of people aboard, and at least three children aboard, but I don't know if they were drinking from a bottle or not.

Q Do you know if there were any babies two or three years of age on that airplane?

A I don't know their exact age.

Q Are you telling us that there were babies on the airplane?

A I said I don't know. I know there were children. I don't know their ages.

Q You don't know if there were babies on bottles or not; is that right?

A That is true. I do not know.

Q Is it fair to say, doctor, that you really don't know of your knowledge the "G" forces that the various people were subjected to in this accident by way of any mathematical computation?

A Only those that were presented in the hypothetical, and I did not do those computations.

Q Doctor, your official duties are in the ordinary sense far removed from aerospace medicine, aren't they?

A Not necessarily, sir.

Q Do you deal with decompression on a daily basis?

A Not on a daily basis; no, sir.

Q Do you deal with decompression on a regular basis?

A As a Director of Health and as Chairman of the Transportation Committee of the Emergency Medical Services, I have some responsibility to review our pressurized air ambulance operation where decompression can and has occurred, carrying infants therein, but in isolettes and the helicopter area in these operations which I am supposed to assure the state are properly operated.

Q How much of your time is spent on that?

A That, per se, I have never figured out. But it is not a great deal on that alone.

Q Much of your time is spent on regular health department duties?

A The majority; of course.

Q You see to the inspection of restaurants?

A I don't inspect them. I see that it gets done.

Q I am not saying that it is not important. You see that it gets done?

A Yes.

Q And you sit on the Trash Dump Board?

A Which board?

Q Trash Dump Board?

A We don't like to call it that.

Q I understand.

A I sit on the Solid Landfill Waste Council.

Q I understand.

That meets frequently, doesn't it?

A Once a month.

Q You are responsible for that? That is important?

A There are five of us that are responsible. I sit on the board. Unfortunately, I missed the last two meetings. I am going to do better next month.

Q Most of your duties are along this line.

You supervise the WIC program?

A Yes; I supervise the WIC program.

Q As a matter of fact, you were sued by Utahans Against Hunger for the administration of that program?

A Yes, sir.

Q In that situation, doctor, to be precise, the suit was brought because you required people to call in for an appointment rather than to follow the Federal regulations, didn't you?

MR. DUBUC: Objection.

THE COURT: Objection sustained.

MR. LEWIS: I wish to impeach the witness on the basis of a--

THE COURT: You better not do that until you are sure you can, and then you better come up here.

[Whereupon, the following took place at the bench outside of the hearing of the jury:]

MR. LEWIS: I have a deposition here.

MR. DUBUC: He is entitled to impeach the credibility of the witness, but this is a civil suit.

THE COURT: What is your proffer?

MR. LEWIS: I proffer that the witness was the administrator in charge of a program called the WIC program, which is a Federal program for the providing of especially nutritious foods for pregnant women and their young infants.

In the deposition, I asked him details about this. He said he was sued because women did not wish to make an appointment to come in to apply for this program; they wished to be able to come in, walk in off the street, and make an application.

I asked him, and I have the complaint and the consent order, all the details, judge, and he made a misstatement of truth; I am sure he didn't mean to lie, but he did say--I asked him as talking about how the case was resolved; in other words, did it come out in his favor or not.

I asked him, Did you agree that they could walk in off the street, or did your telephone program prevail?

He replied, "No. As a matter of fact, what actuall occurred was that the Federal regulations, a change in Federal regulations required that they be able to walk in and make appointments on the telephone also."

The fact is that the Federal regulations that he cites did not occur after the imposition of this law suit,

but were in fact in force 11 months prior thereto.

THE COURT: As a matter of fact, I had the case.

MR. LEWIS: They had to be enjoined before they did it.

THE COURT: The case came from Utah. I don't think this has anything to do with his credibility.

The objection is sustained.

Let us go on.

MR. LEWIS: Shall I finish my proffer?

THE COURT: I don't think it is competent. Impeachment is much more prejudicial than it is probative of his integrity.

MR. DUBUC: Mr. Jones.

MR. JONES: Your Honor, we went through approximately two and one-half hours of such questions as, do you run the garbage dump; and I would like to see if there is a proffer of any more of this collateral question.

THE COURT: It is more inflammatory than probative.

Objection sustained.

MR. LEWIS: I have a consent order.

THE COURT: I understand. It is just too far out.

[Whereupon, the following took place in open court:]

BY MR. LEWIS:

Q Doctor, would it make a difference in an airplane accident if children were fastened in their seats in such a

way that with the bouncing and thrusting of the airplane as it bounced and lurched across the ground that they could bang their heads together; could that be a mechanism of the accident?

A Yes, sir.

Q Would you tell us what coup contracoup means?

A It is a little difficult to explain, but coup and contracoup, that is injury occurring other than where the impact occurs. And as I understand coup contracoup, coup contracoup--

Q Coup?

A As I understand coup contracoup, trauma can be placed at one point and reflect off the surface and occur at another place. It is almost a double reflection of forces.

Q Doesn't that mean that a shock wave actually passes through the brain and enters the head on the other side?

A If there is injury, contracoup injury, contracoup is the other side; yes, sir.

Q So that is an injury in which you get hit on one side of the head and the forces travel actually through the soft tissues and create an injury either inside or on the other side of the head?

A That is a good description.

Q So you can get a coup contracoup injury with no mar on the head at all, can't you?

A I assume so.

Q Now, coup contracoup injuries can occur with--let me back up.

The brain being part of the body would continue to move in an airplane until it finally comes to rest against something; is that true?

A It has slight movement within the cranial vault; ye sir.

Q So even if the head was stationary and pressed against something, then if the brain in the head were moving at 310 miles an hour and that backrest suddenly stopped it, the brain would continue to move until it banged against the head, wouldn't it?

A Not quite. It is surrounded in fluid to give some protection.

Q But the brain continues to move at the speed of the airplane, which would be 310 miles an hour, until it stops by hitting against something; isn't that true?

MR. DUBUC: Note my objection.

THE COURT: That is overruled.

THE WITNESS: I would assume being encased in the fluid, it would come to a stop with the skull, with the rest of the body.

BY MR. LEWIS:

Q And it could be injured by striking against the

skull under those circumstances, couldn't it?

A I don't think so, not that sufficient force to injure, more to just provide movement.

Q You say 310 miles an hour wouldn't be enough?

A I didn't say that. I am saying that you are giving the brain too much movement. You are removing the protective covering of the fluid when you describe that.

Q You are familiar with the organization of the tissue in the baby's brain of a year-old child?

A Could you explain that?

MR. DUBUC: A year old?

THE COURT: That is a misstatement of the premise.

MR. LEWIS: We have evidence that the child was different ages. I have to start some place.

THE COURT: Start some place that is more nearly where it is.

BY MR. LEWIS:

Q Are you familiar with the organization of the brain in a child that is 12--excuse me--that is 18 months old?

A Can you explain "organization" just a little bit?

Q Yes.

How is it put together and how it differs from an adult's brain.

A I am not aware of differences except in size.

Q Is it your testimony that tissues of the brain are

the same texture and consistency in a child of 18 months of age as in an adult?

A I would assume the tissues would be very much the same. Except for the vascular system, I would expect the adult to have a little bit of arteriosclerosis in the vascular system.

Q Let us talk about the tie-downs.

Is there any difference in the structures that tie down the baby's brain at 18 months of age than in a mature person?

A I know of none.

Q Are you saying there aren't any or you just don't know of any?

A I don't know of any.

Q You would admit the possibility, though?

A I would rather not.

Q You don't know.

All right.

Now, the aircraft had certain seats that you mentioned that were pointing backwards. They were stressed for 20 "G's", weren't they?

A I assume that; but I don't know that to be a fact.

Q You testified to that on your deposition?

A I told you I thought they were because that was a military requirement; but I don't know for sure.

Q Your impression is that military requirements provide that seats are supposed to be able to stand 20 "G's" before they break?

A Yes, sir.

Q All right.

And a child's head that was against the seat in a deceleration situation such as we are talking about here, there would be shock waves passing through the baby's brain in that deceleration; is that correct?

A I don't know that.

MR. LEWIS: May I have the deposition?

[Document handed to counsel.]

MR. LEWIS: Do you have an extra copy for him?

MR. DUBUC: I have only got one copy.

THE COURT: Why don't you stand up there and share it with him?

MR. DUBUC: Very well.

THE COURT: Do you have any markings in the margins

MR. DUBUC: No.

MR. LEWIS: I don't.

THE COURT: Share your copy, Mr. Dubuc.

MR. DUBUC: What page?

MR. LEWIS: Starting on 220, and I am going to read several.

BY MR. LEWIS:

"Question: Now their brains, their little, tiny brains and their little heads would also bang against the sides of the skull where they had a skull, applying that same principle, wouldn't it?

"Answer: I am not sure under what circumstances you mean."

MR. DUBUC: Would you give us a line?

MR. LEWIS: I am sorry; I am now at line 13.

THE COURT: Page 220?

MR. LEWIS: 260.

THE COURT: You said 220.

MR. LEWIS: 260. I apologize.

MR. DUBUC: 260?

THE COURT: Yes.

MR. DUBUC: Two-six-zero?

THE COURT: Yes.

MR. LEWIS: And 261.

BY MR. LEWIS:

Q "Answer: I am not sure under what circumstances you mean, moving forward if they actually moved?

"Question: No. Let's suppose the head was still, let's suppose the head was against the back of the seat. What happens to the head when the airplane stops? Does it bang against the skull?

"Answer: It has its attachment through the spinal cord and so forth. I do not think it would move much, but there would be pressure on it.

"Question: Shock waves pass through it?

"Answer: Yes, sir."

Then you go on.

"And the effect would be that the brain would move at whatever speed it was that itwas traveling through the air until it hit something that wouldn't allow it to move any further; isn't that true?"

And you said, "No, sir, I don't believe the brain would move at the same speed as the body."

That accurately states what you said, doesn't it?

A You said I went on with that. That was your question. I missed that when I went through the deposition because I meant to say it would move at the same speed as the body as I just said now.

Q You agree now that the brain moved until it hit something, it moved along with the body at the same speed?

A It moves with it and then it has the protective fluid around it to restrain it and give some protection.

Q How much protective fluid is there in a baby's brain 18 months of age?

A I don't know the exact amount. I don't even know the approximate amount.

Q Are you suggesting that there is enought to protec it under a situation where the airplane is traveling at 300 miles an hour and flows abruptly?

MR. DUBUC: Objection.

THE COURT: Sustained.

"Abruptly" is not a word anybody can deal with.

BY MR. LEWIS:

Q Are you suggesting, sir, that this protective fluid provides substantial protection in an airplane accident of this sort?

A Yes, sir, with these decelerating forces over long distances, without question in my mind.

Q All right.

Are you knowledgeable in the difference between the eustachian tubes of children 18 months of age and younger and adults?

A Just what I have read and rewritten, that they are

shorter and more horizontal.

Q And you are not an expert in injuries to the brain; is that correct?

A That is right.

I am not a neurosurgeon, nor have I had research in injury to the brain per se.

Q Are you a neurologist?

A No, sir, I am not at all.

Q What is the fontanel?

A The fontanel is the space created by the lack of closure of the sutures or the seams in the head of a child.

Q Can you tell me what ages the fontanel -- how many fontanels are there?

A There are two on top.

Q At what age do they commonly close? If there is a range, give me the range.

A I am not sure, between 1, 1 1/2 and two years. I am not sure.

Q At 18 months of age, would you expect a fontanel to be opened or closed?

A I am not sure at what age they close.

Q The little soft spot on the head if it is in fact open is what we are talking about as the fontanel?

A Yes, sir.

Q That makes the baby's brain more vulnerable to

damage?

A In a sense, but it also permits some expansion and some absorption. For a baby being born, it is a tremendous trauma to the head and yet it can handle those pressures.

Q How about blows like an airplane accident? Can you tell me whether that does not make a baby with an open fontanel more vulnerable to --

A It could be -- permit more absorption of energy.

Q You don't think that having an open fontanel doesn't make the baby more vulnerable to damage? Is that what you are saying?

A That is what I am saying.

Q Can it make it more vulnerable?

A A blow directly over that, if it were angular, would be more likely to damage brain tissue because there would be no skull there, but I am talking about a sharp objec penetrating.

Q Only in the event of a sharp object would it make a baby's head more vulnerable?

A I didn't say "only." That is one instance where it could be more vulnerable.

Q Can it be more vulnerable under other circumstances other than sharp objects?

A I can't think of any. I don't know.

Q But as a general principle, you don't think that

that makes a great deal of difference?

A I said I think it can permit more energy absorption

MR. LEWIS: Indulge me just one moment, sir.

THE COURT: Surely.

BY MR. LEWIS:

Q Did you consider whether there were any burned babies in among the passengers in the troop compartment?

A What do you mean did I consider? I did not read of any burns in the troop compartment.

Q All right.

If you had had an accurate, confirmed description of floppiness or hypotonia following the explsosive decompression, would that have any medical significance?

MR. DUBUC: Objection.

THE COURT: Overruled.

THE WITNESS: You are speaking I assume of a child

MR. LEWIS: Yes, a baby.

THE WITNESS: A floppy child is usually considered to be one that is ill.

BY MR. LEWIS:

Q Wouldn't be one of the signs of hypoxia?

A It could be severe hypoxia; could be.

Q Thank you.

MR. LEWIS: That is all.

THE COURT: Any redirect?

MR. DUBUC: No.

THE COURT: You may be excused.

MR. LEWIS: Your Honor, will you indulge me for a minute?

THE COURT: Surely. Keep your seat.

MR. LEWIS: There was an item I meant to ask about and in my multitude of papers, I didn't see it.

THE COURT: Proceed.

BY MR. LEWIS:

Q You did consider Hugh W. Randel and his book on "Aerospace Medicine" as an authority in the field?

A Yes, sir.

Q I want to read you a part from page 68 under the heading of "Aerospace Medicine" and the chapter is called "Performance at Altitude."

MR. DUBUC: Will you indulge me a second, Your Honor?

THE COURT: Certainly.

MR. DUBUC: I have page 68.

Shall I share it with the witness?

THE WITNESS: Where did I get this (indicating)? Do I return it to someone?

BY MR. LEWIS:

Q Down in the middle of the second paragraph starting "In the distress phase which extends from -- " and I'm going

to give it in feet instead of meters if that is acceptable to everyone.

I will begin again.

"In the distress phase which extends from 14,764 feet to 21,982 feet, compensatory mechanisms become progressively more inadequate. Deterioration in physical and mental performance is apparent and function reserves approach depletion. A critical phase extends from 21,982 feet to 24,934 feet wherein compensatory mechanisms are enabled to maintain adequate oxygenation. Medical and physical incapacit leads to loss of comprehension, muscular weakness, unconsciousness, convulsions, cardiorespiratory failure and death."

You followed what I said?

A Yes, sir.

Q I appreciate that there is a great deal more in the book, but that does adequately describe the part that I read?

A I think it requires some explanation of the times involved, if I may.

Q All right, please.

A For example, on pages both fore and aft of page 65 showing changes in arterio saturation at 29,000 feet where it takes a full minute for the saturation to drop down to a significant level of only 70 percent hemoglobin saturation -- this is the same book I have been quoting which has at about

23,000 feet at the time of consciousness between 1, 2 and 3 minutes.

Q How many minutes did you determine these children were above 10,000 feet from your examination of these records?

A I don't like to talk in terms of 10,000 feet because it is 14,000 feet where the oxygen masks drop in airliners and I will have to refer to my notes as to those times.

Q Please.

MR. DUBUC: Are you through with Randel?

MR. LEWIS: Yes, thank you.

THE WITNESS: Based on the MADAR report, they were down to 21,800 feet in approximately one minute and five seconds; in a minute and a half, 21,200.

Two minutes; 19,500. And at four minutes; 16,500. And below 14,000, in about four minutes and forty-six seconds -- four minutes, fifty-two seconds, I am sorry.

BY MR. LEWIS:

Q Can you read a MADAR tape?

A I read the print-outsince I found some errors listing those altitudes.

Q I understand. My information was data given to me by the Air Force.

A They goofed.

Q I know.

THE COURT: Let us discontinue this colloquy.

Do you have a question?

MR. LEWIS: Yes, sir.

THE COURT: Ask it.

BY MR. LEWIS:

Q Can you read the MADAR tape?

A I can read the print-out. I have never seen the actual tape per se, sir.

MR. LEWIS: May I show this to him?

THE COURT: Yes.

BY MR. LEWIS:

Q This is D-43. If you look in the back you will find the MADAR tape.

A Yes, sir.

Q It may not be within your area of expertise. Do you know how to read that?

THE COURT: You have asked him that three times now.

THE WITNESS: I have read this and I think I can find altitudes on it if that is your question.

BY MR. LEWIS:

Q That is exactly the question.

A Okay.

Q At what point did the airplane first go below 10,000 feet?

A I will refer to my notes and then find that on the MADAR if that is okay.

Q Please.

A The first time below 10,000; in seven minutes 35 seconds. It was at 10,092 and shortly thereafter it went below 10,000.

Q Did it rise again above 10,000 at a later period?

A It went up to 10,869 -- five twenty-one five six.

Q When was the last time it went back down below 10,000 feet?

A At five twenty-two nineteen which is nine minutes one second, it was at 9,800 feet.

Q Five minutes?

A No, nine minutes and one second.

Q It finally went below 10,000 feet for the last time on its way down; is that correct?

A Yes.

Q Under Air Force regulations when you put your mask on, how long are you supposed to keep it on? At what altitude are you free to take it off?

MR. DUBUC: Objection.

THE COURT: Objection sustained.

He hasn't testified to Air Force regulations for masks.

BY MR. LEWIS:

Q Under FAA regulations, at what altitude after an explosive decompression is the --

A If you are a pilot, first of all --

Q As a pilot.

A You are not supposed to -- if you are going to be over 12,500 over 30 minutes, you should put it on and wear it above 14,000.

Q After an explosive decompression, when may you take it off according to FAA regulations?

A FAR doesn't address that. 91.32 mentions when to wear it, what altitude, but I don't know that it says anything about when you can take it off.

MR. LEWIS: Thank you, Your Honor.

THE COURT: Any further redirect?

MR. DUBUC: I want to be sure we have the last part clear.

REDIRECT EXAMINATION

BY MR. DUBUC:

Q Do you understand the Federal Aviation Regulation you are referring to is FAR 91.32?

A Yes, sir.

Q Do I understand your interpretation of that is -- does that apply to general aviation?

A Yes, sir.

Q Does that regulation indicate that you wear an

oxygen mask when you are flying between 12,500 and 14,000 feet for 30 minutes or more?

A Only if you are going to be there for 30 minutes or more; yes, sir.

Q If you are there less than for 30 minutes, you don't need oxygen to go below 14,000 feet?

A That is true.

Q That is for someone operating an airplane who has to read instruments and function with the controls?

A Yes, sir.

Q Does that have any application to passengers who are not working or performing energy tasks?

A No, sir.

Q With respect to what Mr. Lewis asked you about the MADAR read-out; in connection with those altitudes and those times that you described, you had brought him down to I think you said 16,000 feet?

A 16,000 feet in two minutes forty-five seconds -- 16,313.

Q Based upon your knowledge and information, at that altitude, would a passenger under ordinary circumstances following a decompression in the descent require oxygen in order to sustain himself normally?

A No, sir.

MR. DUBUC: Your Honor, as long as Mr. Lewis has

brought it up, I would like to ask the Court to take judicial notice of an permit in evidence, or at least instruct to that extent, the Federal Aviation Regulation 91.32.

THE COURT: I certainly will take judicial notice of it and it will be received accordingly.

MR. DUBUC: I have no more questions.

MR. LEWIS: I have no more questions.

THE COURT: Thank you.

You may step down.

(Witness excused.)

THE COURT: We will adjourn now.

Did you have another witness ready?

MR. DUBUC: No.

THE COURT: Let the jury take a rest. You may all step into the jury room. In case I don't see you again, remember the rules and wait in there a few minutes.

(Jury leaves.)

THE COURT: Did you have something further, Mr. Dubuc?

You can be seated, gentlemen.

MR. DUBUC: The next witness would be either Mrs. Grant, she is here, or the reading of the deposition of the teacher, Mrs. Wallace. I have not heard from counsel whether she is here or not, and that testimony will take perhaps an hour or more.