

Senator COOPER. I think, of course, it is evident from your testimony you have had wide experience in chest wounds and bullet wounds in the chest.

What experience have you had in, say, the field of ballistics? Would this experience—you have been dealing in chest wounds caused by bullets—have provided you knowledge also about the characteristics of missiles, particularly bullets of this type?

Dr. SHAW. No; Senator. I believe that my information about ballistics is just that of an average layman, no more. Perhaps a little more since I have seen deformed bullets from wounds, but I haven't gone into that aspect of wounds.

Senator COOPER. In the answers to the hypothetical questions that were addressed to you, based upon the only actual knowledge which you could base that answer, was the fact that you had performed the operation on the wound caused in the chest, on the wound in the chest?

Dr. SHAW. That is true. I have seen many bullets that have passed through bodies or have penetrated bodies and have struck bone and I know manners from which they are deformed but I know very little about the caliber of bullets, the velocity of bullets, many things that other people have much more knowledge of than I have.

Senator COOPER. That is all.

The CHAIRMAN. Thank you very much, Dr. Shaw.

TESTIMONY OF DR. CHARLES FRANCIS GREGORY

Senator COOPER. Do you solemnly swear the testimony you are going to give to this Commission will be the truth, the whole truth, and nothing but the truth, so help you God?

Dr. GREGORY. I do.

Mr. SPECTER. Would you state your full name for the record, please?

Dr. GREGORY. Doctor Charles Francis Gregory.

Mr. SPECTER. What is your profession, sir?

Dr. GREGORY. I am a physician and surgeon.

Mr. SPECTER. Would you outline your educational background briefly, please?

Dr. GREGORY. I received a bachelor of science degree from the University of Indiana in 1941, and an M.D. degree in medicine from the Indiana University School of Medicine in 1944.

Following 1-year internship and a tour of duty in the U.S. Navy, I undertook 5 years of postgraduate training in orthopedic surgery at Indiana University Medical Center.

Upon completing that training I became a member of the faculty at Indiana University Medical School, and remained so until November of 1952, when I reentered the U.S. Navy for another 20 months.

In 1956 I was appointed professor and then chairman of the Division of Orthopedic Surgery at the University of Texas Southwestern Medical School, where I presently am.

Mr. SPECTER. Are you certificated by the American Board of Orthopedic Surgery?

Dr. GREGORY. I am, in 1953.

Mr. SPECTER. What experience, if any, have you had with bullet wounds, Doctor?

Dr. GREGORY. Beyond the rather indigenous nature of such wounds in the main teaching hospital at Southwestern Medical School, my experience has covered a tour of duty in the Navy during World War II, and a considerably more active period of time in the Korean war in support of the 1st Marine Corps Division.

Mr. SPECTER. What is your best estimate as to the total number of bullet wounds you have had an opportunity to observe and treat?

Dr. GREGORY. I would estimate that I have dealt directly with approximately 500 such wounds.

Mr. SPECTER. Are you a licensed doctor in the State of Texas at the present time?

Dr. GREGORY. I am.

Mr. SPECTER. What were your duties in a general way back on November 22, 1963, with Parkland Hospital?

Dr. GREGORY. On that date, November 22, 1963, I was seeing patients in the health service of the adjacent medical school building when about noon I was advised that the President of the United States had been admitted to Parkland Hospital due to gunshot injuries.

I went immediately to the emergency room area of the Parkland Hospital, and upon gaining admission to the emergency room, I encountered the hospital superintendent.

I inquired of him then as to whether or not the President had injuries which might require my attention and he indicated that they were not of that nature.

I, therefore, took a number of unnecessary onlookers like myself from the emergency area in order to reduce the confusion, and I went to the fifth floor of the hospital, which is the orthopedic ward.

And after attending a number of patients there, I prepared to leave the hospital, but stopped by the surgical suite on my way out, to check and see if any need for my services might have come up, and encountered there Dr. Shaw who indicated to me that Governor Connally had also been injured, and that these included injuries to his extremities for which I would be retained.

Mr. SPECTER. Did Dr. Shaw then call upon you to perform operative aid for Governor Connally?

Dr. GREGORY. He did.

Mr. SPECTER. And when did you first see Governor Connally then?

Dr. GREGORY. I first saw Governor Connally after Dr. Shaw had prepared him and draped him for the surgical procedures which he carried out on the Governor's chest.

Mr. SPECTER. Now, did you have any opportunity to observe the wound on the Governor's chest?

Dr. GREGORY. I could see the wounds on the Governor's chest, but I could see them only through the apertures available in the surgical drapes, and therefore I had difficulty orienting the exact positions of the wounds, except for the wound identified as the wound of exit which could be related to the nipple in the right chest which was exposed.

Mr. SPECTER. Now what did you observe with respect to the wound on the Governor's wrist?

Dr. GREGORY. I did not have an opportunity to examine the wound on the Governor's wrist until Dr. Shaw had completed his surgical treatment of the Governor's chest wound.

At that time he was turned to his back and it was possible to examine both the right upper extremity and the left lower extremity for wounds of the wrist and left thigh respectively.

The right wrist was the site of a perforating wound, which by assumption began on a dorsal lateral surface. In lay terms this is the back of the hand on the thumb side at a point approximately 5 centimeters above the wrist joint.

There is a second wound presumed to be the wound of exit which lay in the midline of the wrist on its palmar surface about 2 centimeters, something less than 1 inch above the wrist crease, the most distal wrist crease.

Mr. SPECTER. You say that the wound on the dorsal or back side of the wrist you assume to be the wound of entrance. What factors, if any, led you to that assumption?

Dr. GREGORY. I assumed it to be a wound of entrance because of the general ragged appearance of the wound, but for other reasons which I can delineate in a lighter description which came to light during the operative procedure and which are also hallmarked to a certain extent by the X-rays.

Mr. SPECTER. Would you proceed to tell us, even though it is out of sequence, what those factors, later determined to be, were which led you to assume that it was the wound of entrance?

Dr. GREGORY. Yes. Assuming that the wrist wound, which included a shattering fracture of the wrist bone, of the radial bone just above the wrist, was produced by a missile there were found in the vicinity of the wound two things

which led me to believe that it passed from the dorsal or back side to the volar. The first of these—

Mr. SPECTER. When you say volar what do you mean by that?

Dr. GREGORY. The palm side.

Mr. SPECTER. Proceed.

Dr. GREGORY. The first of these was evidence of clothing, bits of thread and cloth, apparently from a dark suit or something of that sort which had been carried into the wound, from the skin into the region of the bone.

The second of these were two or three small fragments of metal which presumably were shed by the missile after their encounter with the firm substance which is bone.

Mr. SPECTER. As to the bits of cloth which you describe, have you had an opportunity earlier today to examine a coat, heretofore identified and marked by a picture bearing Commission Exhibit No. 683, which we will have later testimony on as being Governor Connally's coat?

Dr. GREGORY. I have.

Mr. SPECTER. And what, if anything, did your examination disclose with respect to the wound of the right wrist?

Dr. GREGORY. Well, the right sleeve of the coat has a tear in it close to the margin at a point which is, I think, commensurate with the location of the dorsal surface, the back side of the wrist, forearm where the two may have been superimposed and both damaged by the same penetrating body.

Mr. SPECTER. Is the nature of the material of the suit coat the same as that which you found in the wound of the wrist?

Dr. GREGORY. It is. As a matter of fact, at the time that the wound was treated, and the cloth was found, the speculation was made as to the kind of—the color of the suit the Governor was wearing and moreover the thread was almost identifiable as mohair or raw silk or something of that nature and entirely consistent with this fabric.

Mr. SPECTER. Was the color, which you speculated about, the same as which you see in this jacket?

Dr. GREGORY. Yes; it was my impression it was black or either dark blue.

Mr. SPECTER. You say there was something in the X-ray work which led you to further conclude that that was the wound of entrance?

Dr. GREGORY. Yes.

Mr. SPECTER. Will you proceed now to show the Commission those X-rays, please?

Dr. GREGORY. This is an X-ray made in the lateral view of the Governor's wrist at the time he was brought to the hospital prior to any surgical intervention.

Mr. SPECTER. As to the first X-ray, Dr. Gregory, would you identify the date when it was taken?

Dr. GREGORY. Yes; this film was made on November 22, 1963, as indicated by a pencil marking on that film, and it further bears the assigned X-ray number of 219-992, which was that of the patient, Governor John Connally.

Mr. SPECTER. May it please the Commission we shall reserve number 690 and 691 for later identification of those photographs and X-rays.

Senator COOPER. So ordered.

Dr. GREGORY. If you will notice in addition to the apparent fracture of this, the radial bone here.

Mr. SPECTER. Are you now describing a second X-ray?

Dr. GREGORY. No; these are two taken at right angle of the Governor's wrist prior to attention. These are diagnostic film, one made with the hand palm down and one with the hand turned 90°.

Mr. SPECTER. Do they bear identical numbers then?

Dr. GREGORY. They do.

Mr. SPECTER. Is there any mark on them at the present time which distinguishes them by way of marking or number?

Dr. GREGORY. Other than the pencil markings on each of these two films and my own which I attached last evening for convenience.

Mr. SPECTER. Can you mark one of them as "A" and one as "B," so that when you describe them here we will know which you are referring to?

Dr. GREGORY. Very well. Let the record show that "A" stands for the antero-

posterior view, Exhibit No. 691, and "B" stands for the lateral view, Exhibit No. 690, of the right wrist and forearm. "A" then demonstrates a comminuted fracture of the wrist with three fragments.

Mr. SPECTER. What do you mean by comminuted?

Dr. GREGORY. Comminuted refers to shattering, to break into more than two pieces, specifically many pieces, and if I may, I can point out there is a fragment here, a fragment here, a fragment here, a fragment here, and there are several smaller fragments lying in the center of these three larger ones.

Mr. SPECTER. How many fragments are there in total, sir, in your opinion?

Dr. GREGORY. I would judge from this view that counting each isolated fragment there are fully seven or eight, and experience has taught that when these things are dismantled directly under direct vision that there very obviously may be more than that.

Mr. SPECTER. Will you continue to describe what that X-ray shows with respect to metallic fragments, if any?

Dr. GREGORY. Three shadows are identified as representing metallic fragments. There are other light shadows in this film which are identified or interpreted as being artifacts.

Mr. SPECTER. What is the basis of distinction between that which is an artifact and that which is a real shadow of the metallic substance?

Dr. GREGORY. A real shadow of metallic substance persist and be seen in other views, other X-ray copies, whereas artifacts which are produced by irregularities either in the film or film carrier will vary from one X-ray to another.

Mr. SPECTER. Is it your view that these other X-ray films led you to believe that those are, in fact, metallic substances?

Dr. GREGORY. As a matter of fact, it is the mate to this very film, the lateral view marked "B", which shows the same three fragments in essentially the same relationship to the various levels of the forearm that leads me to believe that these do, in fact, represent metallic fragments.

Mr. SPECTER. Will you describe as specifically as you can what those metallic fragments are by way of size and shape, sir?

Dr. GREGORY. I would identify these fragments as varying from five-tenths of a millimeter in diameter to approximately 2 millimeters in diameter, and each fragment is no more than a half millimeter in thickness. They would represent in lay terms flakes, flakes of metal.

Mr. SPECTER. What would your estimate be as to their weight in total?

Dr. GREGORY. I would estimate that they would be weighed in micrograms which is very small amount of weight. I don't know how to reduce it to ordinary equivalents for you.

It is the kind of weighing that requires a microadjustable scale, which means that it is something less than the weight of a postage stamp.

Mr. SPECTER. Have you now described all the metallic substances which you observed either visually or through the X-rays in the Governor's wrist?

Dr. GREGORY. These are the three metallic substance items which I saw.

Now if I may use these to indicate why I view the path as being from dorsal to volar, from the back of the wrist to the palm side, these have been shed on the volar side suggesting that contact with this bone resulted in there being flaked off, as the remainder of the missile emerged from the volar side leaving the small flakes behind.

Mr. SPECTER. Are the X-rays helpful in any other way in ascertaining the point of entry and the point of exit?

Dr. GREGORY. There is a suggestion to be seen in Exhibit B, the lateral view, a suggestion of the pathway as seen by distortion of soft tissues. This has become a bit irregular on the dorsal side. There is evidence of air in the tissues on this side suggesting that the pathway was something like this.

Mr. SPECTER. And when you say indications of air on which side did you mean by "this side," Doctor?

Dr. GREGORY. Air distally on the volar side. There is some evidence of air in the tissue on the volar side too but they are at different levels and this suggests that they gained access to the tissue planes in this fashion.

Mr. SPECTER. Would you elaborate on just what do you mean by "this fashion,"

indicating the distinctions on the level of the air which suggest that conclusion to you?

Dr. GREGORY. Recall that I suggested that the wound of entrance, certainly the dorsal wound lay some distance, 5 cm. above the wrist joint, approximately here, that the second wound considered to be the wound of exit was only 2 cm. above this point, making the pathway an oblique one.

Mr. DULLES. Would you show that on your own wrist?

Dr. GREGORY. Yes.

Mr. DULLES. We have to explain this a little for the record but I think it would be very useful.

Dr. GREGORY. I think you will have an opportunity to see the real thing a little later if the Governor makes his appearance here.

But the wound of entry I considered to be, although on his right hand, of course, to be approximately at this point on the wrist, and the wound of exit here, which is about the right level for my coat sleeve held at a casual position.

Mr. SPECTER. Let the record show you made two red marks on your wrist, which are in the same position as that which you have described heretofore in technical language.

Dr. GREGORY. Yes.

Mr. SPECTER. Had you finished the complete explanation on the indicator from the air levels which you had mentioned before?

Dr. GREGORY. Yes. The air is a little bit more visible to the dorsal surface, closer to the skin here, not so close down at the lower portion, not so much tissue destruction had occurred at the point of the emergence.

Mr. SPECTER. Before proceeding to the other factors indicating point of entry and point of exit, Dr. Gregory, I call your attention to Commission Exhibit No. 399, which is a bullet and ask you first if you have had an opportunity to examine that earlier today?

Dr. GREGORY. I have.

Mr. SPECTER. What opinion, if any, do you have as to whether that bullet could have produced the wound on the Governor's right wrist and remained as intact as it is at the present time?

Dr. GREGORY. In examining this bullet, I find a small flake has been either knocked off or removed from the rounded end of the missile.

(At this point Representative Boggs entered the room.)

I was told that this was removed for the purpose of analysis. The only other deformity which I find is at the base of the missile at the point where it joined the cartridge carrying the powder, I presume, and this is somewhat flattened and deflected, distorted. There is some irregularity of the darker metal within which I presume to represent lead.

The only way that this missile could have produced this wound in my view, was to have entered the wrist backward. Now, this is not inconsistent with one of the characteristics known for missiles which is to tumble. All missiles in flight have two motions normally, a linear motion from the muzzle of the gun to the target, a second motion which is a spinning motion having to do with maintaining the integrity of the initial linear direction, but if they strike an object they may be caused to turn in their path and tumble end over, and if they do, they tend to produce a greater amount of destruction within the strike time or the target, and they could possibly, if tumbling in air upon emergence, tumble into another target backward. That is the only possible explanation I could offer to correlate this missile with this particular wound.

Mr. SPECTER. Is there sufficient metallic substance missing from the back or rear end of that bullet to account for the metallic substance which you have described in the Governor's wrist?

Dr. GREGORY. It is possible but I don't know enough about the structure of bullets or this one in particular, to know what is a normal complement of lead or for this particular missile. It is irregular, but how much it may have lost, I have no idea.

Mr. DULLES. Would the nature of the entry wound give you any indication as to whether it entered backward or whether it entered forward?

Dr. GREGORY. My initial impression was that whatever produced the wound of the wrist was an irregular object, certainly not smooth nosed as the business

end of this particular bullet is because of two things. The size of the wound of entrance, and the fact that it is irregular surfaced permitted it to pick up organic debris, materials, threads, and carry them into the wound with it.

Now, you will note that Dr. Shaw earlier in his testimony and in all of my conversations with him, never did indicate that there was any such loss of material into the wrist, nor does the back of this coat which I have examined show that it lost significant amounts of cloth but I think the tear in this coat sleeve does imply that there were bits of fabric lost, and I think those were resident in the wrist. I think we recovered them.

Mr. SPECTER. Is the back of that bullet characteristic of an irregular missile so as to cause the wound in the wrist?

Dr. GREGORY. I would say that the back of this being flat and having sharp edges is irregular, and would possibly tend to tear tissues more than does an inclined plane such as this.

Mr. SPECTER. Would the back of the missile be sufficiently irregular to have caused the wound of the right wrist, in your opinion?

Dr. GREGORY. I think it could have; yes. It is possible.

Mr. SPECTER. Would it be consistent with your observations of the wrist for that missile to have penetrated and gone through the right wrist?

Dr. GREGORY. It is possible; yes. It appears to me since the wound of exit was a small laceration, that much of the energy of the missile that struck the Governor's wrist was expended in breaking the bone reducing its velocity sufficient so that while it could make an emergence through the underlying soft tissues on his wrist, it did not do great damage to them.

Mr. SPECTER. Is there any indication from the extent of the damage to the wrist whether the bullet was pristine, that is: was the wrist struck first in flight or whether there had been some reduction in the velocity of the missile prior to striking the wrist?

Dr. GREGORY. I would offer this opinion about a high velocity rifle bullet striking a forearm.

Mr. SPECTER. Permit me to inject factors which we have not put on the record although it has been brought to your attention previously: Assume this is a 6.5-millimeter missile which was shot from a rifle having a muzzle velocity of approximately 2,000 feet per second, with a distance of approximately 160 to 200 feet between the weapon and the victim; and answer the prior question, if you would, Dr. Gregory, with those factors in mind?

Dr. GREGORY. I would fully expect the first object struck by that missile to be very badly damaged, and especially if it were a rigid bone such as the wrist bone is, to literally blow it apart. I have had some experience with rifle wound injuries of the forearm produced by this type of missile, and the last two which I attended myself have culminated in amputation of the limb because of the extensive damage produced by the missile as it passed through the arm.

Considerably more than was evidenced in the Governor's case either by examination of the limb itself or an examination of these X-rays.

Mr. SPECTER. Now, as to the experience you had which you experienced which resulted in amputations, what was the range between the weapon and the victim's limb, if you know?

Dr. GREGORY. The range in those two instances, I concede was considerably shorter but I cannot give you the specific range. By short I mean perhaps no more than 15 or 20 yards at the most.

Mr. SPECTER. Would the difference between the 15 or 20 yards and the 160 to 250 feet make any difference in your opinion, though, as to the damage which would be inflicted on the wrist had that bullet struck it as the first point of impact?

Dr. GREGORY. No, sir; I don't think it would have made that much difference.

Mr. SPECTER. Do you know what the color was of the fragments in the wrist of the Governor, Dr. Gregory?

Dr. GREGORY. As I recall them they were lead colored, silvery, of that color. I did not recall them as being either brass or copper.

Mr. SPECTER. Are there any other X-rays of the Governor's wrist which would aid the Commission in its understanding of the injuries to the wrist?

Dr. GREGORY. Only to indicate that there were two fragments of metal retrieved in the course of dealing with this wound surgically.

For the subsequent X-rays of the same area, after the initial surgery indicate that those fragments are no longer there.

And as I stated, I thought I had retrieved two of them. The major one or ones now being missing. The small one related to the bone or most closely related to the bone, and I will put back up here—

Mr. SPECTER. On the new X-rays which you put up, would you identify them first by indicating the date the X-ray was taken?

Dr. GREGORY. Yes; the date of the X-ray is the same, November 22, 1963, and they may be identified as Exhibit "C" anteroposterior view postoperative, which is this one.

Mr. SPECTER. Did they bear the same numbers, Dr. Gregory?

Dr. GREGORY. They will bear the same numbers; yes.

Mr. DULLES. I think you had better get them marked.

We haven't got them marked yet "A," "B," and "C."

Representative Boggs. Postoperative, these are after the operation?

Dr. GREGORY. These two. This one was made before the wound was dealt with.

Mr. SPECTER. Which one?

Dr. GREGORY. "A" is the one made before the wound was dealt with surgically.

Senator COOPER. Could you mark it 4 "A," "B," "C," and "D," Doctor?

Mr. McCLOY. Is that "B," we have had another "B" here, you know?

Dr. GREGORY. This is "C." "A" and "C" are comparable X-rays, one made before and one made after the operation was carried out.

Before the operation, you will note a large fragment of metal visible here, not visible in this one. You will also note a small satellite fragment not visible here. A second piece of metal visible preoperatively is still present post-operatively.

No effort incidentally is made to dissect for these fragments. They are small, they are proverbial needles in hay stacks, and we know from experience that small flakes of metal of this kind do not ordinarily produce difficulty in the future, but that the extensive dissection required to find them may produce such consequences and so we choose to leave them inside unless we chance upon them, and on this occasion, those bits of metal recovered were simply found by chance in the course of removing necrotized material.

Other than that the X-rays have nothing more to offer so far as the wrist is concerned.

Mr. SPECTER. May we then reserve 692 for "C" and 693 for "D"?

Dr. GREGORY. I will put the other marks on these.

Senator COOPER. So ordered.

Dr. GREGORY. For your convenience.

Mr. DULLES. Was the wound of exit in the wrist also jagged like the wound of entry or was there, what differences were there between the wound of entry and the wound of exit?

Dr. GREGORY. The wound of exit was disposed transversely across the wrist exactly as I have it marked here. It was in the nature of a small laceration, perhaps a centimeter and a half in length, about a half an inch long, and it lay in the skin creases so that as you examined the wrist casually it was a very innocent looking thing indeed, and it was not until it was probed that its true nature in connection with the remainder of the wound was evident.

Senator RUSSELL. When did you first see this bullet, Doctor, the one you have just described in your testimony?

Dr. GREGORY. This bullet?

Senator RUSSELL. Yes.

Dr. GREGORY. This morning, sir.

Senator RUSSELL. You had never seen it until this morning?

Dr. GREGORY. I had never seen it before this time.

Mr. SPECTER. Dr. Gregory, what was then the relative size of the wounds on the back and front side of the wrist itself?

Dr. GREGORY. As I recall them, the wound dimensions would be so far as

the wound on the back of the wrist is concerned about a half a centimeter by two and a half centimeters in length. It was rather linear in nature. The upper end of it having apparently lost some tissue was gapping more than the lower portion of it.

Mr. SPECTER. How about on the volar or front side of the wrist?

Dr. GREGORY. The volar surface or palmar surface had a wound disclosed transversely about a half centimeter in length and about 2 centimeters above the flexion crease to the wrist.

Mr. SPECTER. Then the wound on the dorsal or back side of the wrist was a little larger than the wound on the volar or palm side of the wrist?

Dr. GREGORY. Yes; it was.

Mr. SPECTER. And is that characteristic in terms of entry and exit wounds?

Dr. GREGORY. It is not at all characteristic of the entry wound of a pristine missile which tends to make a small wound of entrance and larger wound of exit.

Mr. SPECTER. Is it, however, characteristic of a missile which has had its velocity substantially decreased?

Dr. GREGORY. I don't think that the exchange in the velocity will alter the nature of the wound of entrance or exit excepting that if the velocity is low enough the missile may simply manage to emerge or may not emerge at all on the far side of the limb which has been struck.

Mr. DULLES. Would this be consistent with a tumbling bullet or a bullet that had already tumbled and therefore entered back side too?

Dr. GREGORY. The wound of entrance is characteristic in my view of an irregular missile in this case, an irregular missile which has tipped itself off as being irregular by the nature of itself.

Mr. DULLES. What do you mean by irregular?

Dr. GREGORY. I mean one that has been distorted. It is in some way angular, it has edges or sharp edges or something of this sort. It is not rounded or pointed in the fashion of an ordinary missile. The irregularity of it also, I submit, tends to pick up organic material and carry it into the limb, and this is a very significant takeoff, in my opinion.

Mr. SPECTER. Have you now described all of the characteristics on the Governor's wrist which indicate either the point of entry or the point of exit?

Dr. GREGORY. There is one additional piece of information that is of pertinence but I don't know how effectively it can be applied to the nature of the missile. That is the fact that dorsal branch of the radial nerve, a sensory nerve in this immediate vicinity was partially transected together with one tendon leading to the thumb, which was totally transected.

This could have been produced by a missile entering in the ordinary fashion, undisturbed, undistorted. But again it is more in keeping with an irregular surface which would tend to catch and tear a structure rather than push it aside.

Mr. SPECTER. Would that then also indicate the wound of entrance where that striking took place?

Dr. GREGORY. I believe it is more in keeping with it, yes.

Mr. SPECTER. As to the thigh wound, what, if anything, did you observe as to a wound on the thigh, Dr. Gregory?

Dr. GREGORY. I was apprised that the Governor had a wound of the thigh, and I did examine it immediately the limb was available for it after Dr. Shaw had completed the surgery.

The wound was located on the inner aspect of the thigh, a little to the front surface about a third of the way up from the knee. The wound appeared to me to be rounded, almost a puncture type of wound in dimension about equal to a pencil eraser, about 6 mm.

I suspected that there might be a missile buried here and so an X-ray was obtained of that limb, and—

Mr. SPECTER. Have you brought the X-ray with you?

Dr. GREGORY. Yes; I have.

Mr. SPECTER. On what date was that X-ray taken?

Dr. GREGORY. This X-ray is marked as having been taken on November 22, 1963. It indicates that it was made of the left thigh, and it belongs to John Connally, John G. Connally.

Mr. SPECTER. That says "G" instead of "C"?

Dr. GREGORY. Yes. It appears to me to be a "G." The number again is 219-922.

Mr. SPECTER. Is that the same number as the other X-rays bear?

Dr. GREGORY. I believe it is, yes.

Mr. SPECTER. May we reserve then Commission Exhibit No. 694 for that X-ray?

Senator COOPER. It may be so done.

Dr. GREGORY. There are a series of these films. Would you like them marked subsequently "E", "F," and "G"?

Mr. SPECTER. Insofar as you feel they are helpful in characterizing the wounds, do mark them in that way.

Dr. GREGORY. All right.

This I understand is Exhibit E, then and it is a single X-ray made on the anterior posterial view of Mr. Connally's thigh. The only thing found is a very small fleck of metal marked with an arrow here. It is that small, and almost likely to be overlooked. This was not consonant with the kind of wound on the medial aspect of his thigh.

Our next natural assumption was that that missile having escaped from the thigh had escaped the confines of this X-ray and lay somewhere else. So that additional X-rays were made of the same date and I submit two additional X-rays identified again as belonging to John G. Connally, the left lower extremity, November 22, 1963, and these two are numbered 218-922, and they are an anterial posterior view which I will mark "F," and a lateral view which I will mark "G."

Mr. SPECTER. May we reserve 695 for "F," and 696 for "G"?

Senator COOPER. So ordered.

Dr. GREGORY. Careful examination of this set of X-rays illustrated or demonstrates, I should say, a number of artificial lines, this is one and there is one. These lines I think represent rather hurried development of these films for they were taken under emergency conditions. They were intended simply to let us know if there was another missile in the Governor's limb where it might be located.

The only missile turned up is the same one seen in the original film which lies directly opposite the area indicated as the site of the missile wound or the wound in the thigh, but a fragment of metal, again microscopic measuring about five-tenths of a millimeter by 2 millimeters, lies just beneath the skin, about a half inch on the medial aspect of the thigh.

Mr. SPECTER. What is your best estimate of the weight of that metallic fragment?

Dr. GREGORY. This again would be in micrograms, postage stamp weight thereabouts, not much more than that.

Mr. SPECTER. Could that fragment, in your opinion, have caused the wound which you observed in the Governor's left thigh?

Dr. GREGORY. I do not believe it could have. The nature of the wound in the left thigh was such that so small a fragment as this would not have produced it and still have gone no further into the soft tissues than it did.

Mr. SPECTER. Would the wound that you observed in the soft tissue of the left thigh be consistent with having been made by a bullet such as that identified as Commission Exhibit 399?

Dr. GREGORY. I think again that bullet, Exhibit 399, could very well have struck the thigh in a reverse fashion and have shed a bit of its lead core into the fascia immediately beneath the skin, yet never have penetrated the thigh sufficiently so that it eventually was dislodged and was found in the clothing.

I would like to add to that we were disconcerted by not finding a missile at all. Here was our patient with three discernible wounds, and no missile within him of sufficient magnitude to account for them, and we suggested that someone ought to search his belongings and other areas where he had been to see if it could be identified or found, rather.

Mr. SPECTER. Had the missile gone through his wrist in reverse, would it likely have continued in that same course until it reached his thigh, in your opinion?

Dr. GREGORY. The missile that struck his wrist had sufficient energy left after it passed through the radius to emerge from the soft tissues on the under surface of the skin. It could have had enough to partially enter his thigh, but not completely.

Mr. SPECTER. In the way which his thigh was wounded?

Dr. GREGORY. I believe so; yes.

Mr. SPECTER. What did you do, Dr. Gregory, with the missile fragments which you removed from his wrists?

Dr. GREGORY. Those were turned over to the operating room nurse in attendance with instructions that they should be presented to the appropriate authorities present, probably a member of the Texas Rangers, but that is as far as I went with it myself.

Mr. SPECTER. I now show you a part of a document heretofore identified as Commission Exhibit 392, a two-page report which bears your name on the second page, and I ask you if this is the report you made of the operation on Governor Connally?

Dr. GREGORY. It appears to be the same; yes.

Mr. SPECTER. Are the facts set forth therein true and correct?

Dr. GREGORY. In essence they are true and correct; yes.

Mr. SPECTER. Dr. Gregory, does that report show the name of the nurse to whom you turned over the metallic fragments?

Dr. GREGORY. There are two nurses who are identified on this page. One is the scrub nurse, Miss Rutherford, and the second is the circulating nurse, Mrs. Schrader.

Mr. SPECTER. And is one or the other the nurse to whom you turned over the metallic fragments?

Dr. GREGORY. I do not remember precisely to whom I handed them. I do not know.

Mr. SPECTER. I now hand you a document marked Commission Exhibit No. 679, which Dr. Shaw used to identify the wounds on the Governor's back, and I ask you to note whether these documents accurately depict the place and the identity of the entry and exit wounds.

Dr. GREGORY. They do not in that, though the location of the wounds on the forearm is correct, and the dimensions, it is my opinion that entrance and exit terms have been reversed.

Mr. SPECTER. Would you delete the inaccurate statement and insert the accurate statement with your initials by the side of the changes, please?

Will you now describe the operative procedures—

Mr. DULLES. Could I ask one question that relates, I think, to your question. Assuming that the wrist wound and the thigh wound were caused by the same bullet, would you agree that the approximate trajectory is as indicated in this chart where Dr. Shaw has drawn a trajectory that he assumed taking into account three bullets instead of two? I am only asking you about the two wounds, namely the wrist and the thigh.

Dr. GREGORY. It would strike me, sir, that the trajectory to the wrist and the subsequent wound of the thigh could be lined up easily in a sitting position.

Now, those two could probably be lined up with a trajectory of the wound in the chest as well, but this would require a more precise positioning of the individual.

Mr. DULLES. But do you agree in general, taking the two wounds with which you are particularly familiar, that that would have been the trajectory as between the wrist and the thigh as drawn on that chart?

Dr. GREGORY. Yes, essentially so; yes, sir.

Mr. SPECTER. For the record, how was that chart identified, Doctor?

Dr. GREGORY. This is identified as Commission Exhibit 689.

Mr. SPECTER. Would you outline briefly the operative procedures which you performed on the Governor, please?

Dr. GREGORY. Yes. The wound on the dorsum of the Governor's wrist was treated by debridement, which means to remove by sharp surgical excision all contaminated tissues and those which are presumed to have been rendered nonviable by force. This meant removing a certain amount of skin, sub-

cutaneous tissue, fat, and all of the particles of clothing, threads of cloth, which we could identify; and, incidentally, a bit of metal or two.

That wound was subsequently left open; in other words, we did not suture it or sew it together. This is done in deference to potential infection which we know often to be associated with retained organic material such as cloth.

The wound on the volar surface or the palmar side of his wrist was enlarged. The purpose in enlarging it was an uncertainty as to the condition of the major nerves in the volar side of the wrist, and so these nerves were identified and explored and found to be intact, as were adjacent tendons. So that that wound was then sutured, closed.

After this, the fracture was manipulated into a hopefully respectable position of the fragments, and a cast was applied, and some traction, using rubber bands, was applied to the finger and the thumb in order to better hold the fracture fragments in their reduced or repositioned state.

Mr. SPECTER. Dr. Gregory, could all of the wounds which were inflicted on the Governor, that is, those described by Dr. Shaw, and those which you have described during your testimony, have been inflicted from one missile if that missile were a 6.5 millimeter bullet fired from a weapon having a muzzle velocity of approximately 2,000 feet per second at a distance of approximately 160 to 250 feet, if you assumed a trajectory with an angle of decline approximately 45 degrees?

Dr. GREGORY. I believe that the three wounds could have occurred from a single missile under these specifications.

Mr. SPECTER. Assume, if you will, another set of hypothetical circumstances: That the 6.5 millimeter bullet traveling at the same muzzle velocity, to wit, 2,000 feet per second, at approximately 165 feet between the weapon and the victim, struck the President in the back of the neck passing through the large strap muscles, going through a fascia channel, missing the pleural cavity, striking no bones and emerging from the lower anterior third of the neck, after striking the trachea. Could such a projectile have then passed into the Governor's back and inflicted all three or all of the wounds which have been described here today?

Dr. GREGORY. I believe one would have to concede the possibility, but I believe firmly that the probability is much diminished.

Mr. SPECTER. Why do you say that, sir?

Dr. GREGORY. I think that to pass through the soft tissues of the President would certainly have decelerated the missile to some extent. Having then struck the Governor and shattered a rib, it is further decelerated, yet it has presumably retained sufficient energy to smash a radius.

Moreover, it escaped the forearm to penetrate at least the skin and fascia of the thigh, and I am not persuaded that this is very probable. I would have to yield to possibility. I am sure that those who deal with ballistics can do better for you than I can in this regard.

Mr. SPECTER. What would your assessment of the likelihood be for a bullet under those hypothetical circumstances to have passed through the neck of the President and to have passed through only the chest of the Governor without having gone through either the wrist or into the thigh?

Dr. GREGORY. I think that is a much more plausible possibility or probability.

Mr. SPECTER. How about the likelihood of passing through the President and through the Governor's chest, but missing his wrist and passing into his thigh?

Dr. GREGORY. That, too, is plausible, I believe.

Mr. SPECTER. Are there any other circumstances of this event which have been related to you, including the striking of the President's head by a third bullet, which would account in any way, under any possibility, in your view, for the fracture of the right wrist which was apparently caused by a missile?

Dr. GREGORY. May I refer to this morning's discussions?

Mr. SPECTER. Yes, please do.

Dr. GREGORY. This morning I was shown two additional missiles or portions of missiles which are rather grossly distorted.

Mr. SPECTER. Let me make those a part of the record here, and ask if those are the missiles which have heretofore been identified as Commission Exhibit 568 and Commission Exhibit 570.

Dr. GREGORY. These items represent distorted bits of a missile, a jacket in one case, and part of a jacket and a lead core in the other.

These are missiles having the characteristics which I mentioned earlier, which tend to carry organic debris into wounds and tend to create irregular wounds of entry. One of these, it seems to me, could conceivably have produced the injury which the Governor incurred in his wrist.

Mr. DULLES. In his wrist?

Dr. GREGORY. Yes.

Mr. DULLES. And in his thigh?

Dr. GREGORY. I don't know about that, sir. It is possible. But the rather remarkably round nature of the wound in the thigh leads me to believe that it was produced by something like the butt end of an intact missile.

Mr. SPECTER. I now hand you an exhibit heretofore identified as Commission Exhibit 388, which depicts the artist's drawing of the passage of a bullet through the President's head, and I ask you, first of all, if you have had an opportunity to observe that prior to this moment?

Dr. GREGORY. Yes, I saw this illustration this morning.

Mr. SPECTER. Well, if you assume that the trajectory through the President's head was represented by the path of a 6.5-mm. bullet which fragmented upon striking the skull, both the rear and again the top, is it possible that a fragment coming at the rate of 2,000 feet per second from the distance of approximately 160 to 250 feet, could have produced a fragment which then proceeded to strike the Governor's wrist and inflict the damage which you have heretofore described?

Dr. GREGORY. I think it is plausible that the bullet, having struck the President's head, may have broken into more than one fragment. I think you apprised me of the fact that it did, in fact, disperse into a number of fragments, and they took tangential directions from the original path apparently.

Mr. SPECTER. Assuming the fact that the autopsy surgeon presented for the record a statement that the fragments moved forward into the vicinity of the President's right eye, as the diagram shows, that there were approximately 40 star-like fragments running on a line through the head on the trajectory, and that there was substantial fragmentation of the bullet as it passed through the head, what is your view about that?

Dr. GREGORY. I think it is possible that a fragment from that particular missile may have escaped and struck the Governor's right arm.

Mr. SPECTER. Did you have an opportunity to observe the slides and films commonly referred to as the Zapruder film this morning?

Dr. GREGORY. Yes; I saw those this morning.

Mr. SPECTER. Did they shed any light on the conclusions—as to your conclusions with respect to the wounds of the Governor and what you observed in the treatment of the Governor?

Dr. GREGORY. Yes, to this extent. It seemed to me in frames marked 234, 235, and 236, Governor Connally was in a position such that a single missile entered his back, could have passed through his chest, through his right forearm, and struck his thigh. That is a possibility.

I looked at the film very carefully to see if I could relate the position of Governor Connally's right arm to the movement when the missile struck the President's head, presumably the third missile, and I think that the record will show that those are obscured to a degree that the Governor's right arm cannot be seen. In the Governor's own words, he did not realize his right arm had been injured, and he has no idea when it was struck. This is historical fact to us at the time of the initial interview with him.

Mr. DULLES. Could I ask just one question? If a bullet had merely struck the Governor's arm without previously having struck anything else, is it conceivable that impediment of the bone that it hit there would be consistent with merely a flesh wound on the thigh? Do you follow me?

Dr. GREGORY. Yes; I follow you. I would doubt it on the basis of the kind of wound that the Governor has. Now the kind of wound in the Governor's right forearm is the kind that indicates there was not an excessive amount of energy expended there, which means either that the missile producing it had dissipated much of its energy, either that or there was an impediment to it someplace else along the way.

It is simply that there was not enough energy loss there, and one would expect a soft tissue injury beyond that point to be of considerably greater magnitude.

Mr. SPECTER. Dr. Gregory, did I take your deposition back on March 23, 1964, at Parkland Hospital?

Dr. GREGORY. Yes; you did.

Mr. SPECTER. Have you had an opportunity to review that deposition prior to today?

Dr. GREGORY. Yes; I have looked it over.

Mr. SPECTER. Do you have anything to add, Dr. Gregory, that you think would be helpful to the Commission in any way?

Dr. GREGORY. No, sir; I do not.

Mr. DULLES. Are you in agreement with the deposition as given?

Dr. GREGORY. Yes. I don't think there are any—there is any need to change any of the essence of the deposition. There are a few typographical errors and word changes one might make, but the essence is essentially as I gave it.

Mr. SPECTER. I have no further questions, sir.

Senator COOPER. I would just ask this question. In your long experience of treating wounds, you said some 500 wounds caused by bullets, have you acquired, through that knowledge of ballistics and characteristics of bullets?

Dr. GREGORY. Within a very limited sphere.

Senator COOPER. I know your testimony indicates that.

Dr. GREGORY. I have been concerned with the behavior of missiles in contact with tissues, but I am not very knowledgeable about the design of a missile nor how many grains of powder there are behind it. My concern was with the dissipation of the energy which it carries and the havoc that it wreaks when it goes off.

Senator COOPER. You derived that knowledge from your actual study of wounds and their treatment?

Dr. GREGORY. Study of wounds together with what I have read from the Army proving grounds, various centers, for exploring this kind of thing. I don't own a gun myself.

Mr. McCLOY. You are from Texas and you do not own a gun?

Dr. GREGORY. Well, sir, I went from Indiana to Texas. My father gave me a .410 shotgun, but he took it away from me shortly after he gave it to me.

The CHAIRMAN. Doctor, thank you very much.

Dr. GREGORY. Thank you very much, sir, Mr. Chief Justice.

(A short recess was taken.)

The CHAIRMAN. Governor, the Commission will come to order, please.

TESTIMONY OF GOV. JOHN BOWDEN CONNALLY, JR.

Governor, this Commission has met today for the purpose of taking the testimony of you and Mrs. Connally concerning the sad affair that you were part of. If you will raise your right hand, please, and be sworn. Do you solemnly swear the testimony you are about to give before this Commission will be the truth, the whole truth, and nothing but the truth, so help you God?

Governor CONNALLY. I do.

The CHAIRMAN. You may be seated, Governor. Mr. Specter will conduct the examination.

Mr. SPECTER. Will you state your full name for the record, please?

Governor CONNALLY. John Bowden Connally.

Mr. SPECTER. What is your official position with the State of Texas, sir?

Governor CONNALLY. I am now Governor of the State of Texas.

Mr. SPECTER. Did you have occasion to be in the automobile which carried President John F. Kennedy through Dallas, Tex., back on November 22, 1963.

Governor CONNALLY. Yes, sir; I did.

Mr. SPECTER. Will you outline briefly, please, the circumstances leading up to the President's planning a trip to Texas in November of last year?

Governor CONNALLY. You want to go back to—how far back do you want to