

Excerpts from a monograph

"The First Shot: A New Line of
Evidence Challenging the Warren Report"

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The First Shot: A New Line of Evidence

Challenging the Warren Report

It is almost unbelievable that for the four years since the Kennedy assassination the simple physical facts reported here have gone unnoticed. When I combine these facts with evidence from the Warren Report, I am forced to conclude that more than one person was involved in the assassination.

Josiah ^h₁ Tompson reports in his book, Six Seconds in Dallas, that he arrived at a similar conclusion through intensive study of movie film made during the assassination by Mr. Abraham Zapruder. Thompson's approach was very different from the one to be described here, yet both approaches show that the President and Governor Connally were not struck by the same bullet as maintained in the "single-bullet theory" put forth by the Warren Commission.

Most people are by now familiar with the basic issues concerned with the assassination question. As shown on the Zapruder film, everything appeared normal until the Presidential limousine was briefly blocked from view by a road sign. As the car emerged from behind the sign, the President was raising his hands up to his throat and it was obvious he had already been hit. Governor Connally did not appear to be hit until slightly later.

The interval between the time when a tree no longer blocked the limousine from view of the Texas School Book Depository sixth floor and the time when Governor Connally was struck was so short it would have been impossible for two bullets to have been fired from the same bolt action rifle.

Also, if the bullet which struck the President were fired downward from the sixth floor it would have been found either in the President's body or inside the car, yet no bullet was found. The single-bullet theory propounded by the Commission attempted to solve these problems by maintaining that one bullet had passed through President Kennedy's body and gone on to inflict wounds on Governor Connally, and that the time difference in response to the wounds could be accounted for by assuming a delayed reaction to the shot by Governor Connally.

Many, perhaps most, people have found it hard to accept the single-bullet theory, but have not been able to go beyond saying it doesn't seem likely. Thompson casts grave doubt on the theory. I will show here why it is anatomically impossible for a bullet to have followed the path the Warren Commission said it did.

~~Some people, of whom Mark Lane is perhaps the best known, have argued that the wound in the front of the President's neck was not an exit wound, but an entrance wound. As it is generally accepted that the wound in back~~

First we need to consider some preliminary issues. The President's wound in back has been variously referred to as a "back" wound, a "neck" wound, and a "shoulder" wound. We will consider its exact location later, but in order to have a consistent term of reference let us designate it as the shoulder wound. The wound in front we will refer to as the neck wound. Let us consider the nature of each wound and its possible relationship to the other.

No serious doubts have been raised about the Commission's conclusion that the shoulder wound was an entrance and not an exit wound. I am not questioning this either. The autopsy doctors agreed that this wound was "presumably of entry." This was supported by examination of the President's clothing, the fibers of which were turned in at the site of the wound. We will accept that the shoulder wound was one of entrance.

The situation is not so clear for the neck wound. An entrance wound is generally small, round, and neat. An exit wound tends to be larger, more irregular in shape, and to have ragged edges. The amount of difference can vary though depending on type and speed of bullet, and the amount and type of tissue the bullet encounters in the body. The statements of the doctors at Parkland Hospital who first treated the President agreed in describing the wound as small (four to seven millimeters in size), round, and with smooth edges. Mark Lane has emphasized the entrance-like characteristics of the neck wound.

If we base our decision about the neck wound on its physical characteristics alone then we must conclude that it was an entrance wound. A front entrance wound however, implies certain things. First of these is the presence at some position in front of the presidential limousine of a rifleman. This in turn implies a location for the rifleman which is consistent with the layout of Dealey Plaza, the limousine and the President's position in it, and with other physical characteristics of the President's body as determined either at Parkland Hospital or at Bethesda during the autopsy.

Another necessary implication of a front entrance wound is that the bullet either exited the body or remained within it to be found later. Except for bullet fragments in the President's skull from the fatal head shot or shots, no bullets or fragments of bullets were found in the President's body during the autopsy examination which included the use of X rays. A theory of a front entrance wound cannot be viable without accounting for the bullet.

There are some simple principles of physics which should not be overlooked either. The advocates of a front entrance wound would have us believe that a bullet which had not previously encountered any other person or object and consequently was traveling at approximately its initial velocity could strike from the front and then apparently come to a full stop within a distance of no more than two inches, neither damaging the neck vertebrae immediately behind the wound nor having enough velocity to continue in a lateral angle into the body and possibly exit from it.

The final argument against accepting the neck wound as one of entrance arises from the utilization of a principle which has been overlooked in material dealing with the assassination up until now and which is of vital importance in determining what happened during the assassination. I am referring to the principle of lateral angle. The importance of this principle will become evident as we proceed, because without it there would be no basis for this article.

Here we need to relate physical evidence from the President's body to possible locations of an assassin in front of the limousine. Given the configuration of the automobile and the location of the President within it there is only a certain direction from which a bullet could have struck from in front. This direction coincides with the only possible area where such an assassin could be concealed— behind the trees and shrubbery of the grassy knoll. This site at first seems plausible and Mark Lane has argued strongly for it.

But we must take into account the principle of lateral angle. A shot fired from the grassy knoll would have been traveling at a lateral or side-ways angle of about 35 degrees. Striking the President at the midline of the neck it would necessarily have continued into the left side of his body. There simply is no evidence— from clothing, the doctors who gave treatment at Parkland Hospital, or from the autopsy— that there was any damage to the left side of the President's body whether in the neck, shoulder, or back.

Considering the total situation I can only conclude that however much the neck wound looked like an entrance wound, it could not have been one.

The neck and shoulder wounds in themselves would not have been fatal to the President. The fatal wounds were those inflicted on his head. The resulting massive damage prevents us from establishing conclusively from autopsy information whether there was more than one shot to the head and what direction another shot would have come from. Thompson's frame-by-frame study of the Zapruder film led him to conclude that more than one shot struck the President in the head, with one of the shots coming from the grassy knoll area. I have no basis for not accepting his conclusion in this matter.

If the first shot was not fatal then why is it so important? In effect, this whole article is an answer to the question because it will show how evidence relating to the first shot gives much more ^{information} ~~evidence~~ about the assassination than does that pertaining to the fatal shot or shots.

Let us go back to the day of the assassination. Rightly or wrongly, federal officials wanted to return to Washington as soon as possible and so did not permit an autopsy in Parkland Hospital in Dallas. This not only produced a delay in the time of the autopsy but it also resulted in part of our information coming from one group of doctors at Parkland Hospital in Dallas and another part coming from the group of doctors who performed the autopsy at the National Naval Medical Center in Bethesda, Maryland.

An almost incredible consequence arises from this, in that at no time after the assassination while the President's body was still available for examination did any doctor realize that the President had both a neck wound and a shoulder wound. The doctors at Parkland Hospital who first treated the President saw the neck wound but did not turn him over and so discover the shoulder wound in back. In their doomed attempts to save his life they made a tracheotomy incision into his windpipe to aid in his breathing— the incision being right at the site of the neck wound thus obscuring the evidence of it. During the autopsy the doctors at Bethesda located the shoulder wound but because of the tracheotomy incision did not detect the neck wound.

It was only the next day, when Dr. Humes at Bethesda called Dr. Perry in Dallas that the autopsy doctors learned that there had also been a neck wound in front. By this time the President's body was no longer available so the assumed path of the bullet was deduced ex post facto rather than actually observed. In the language of the Commission Report the doctors "concluded" and the path of the bullet was "traced."

Photographs of the President's body were made at the time of the autopsy, but the undeveloped film was taken by secret service agents and Dr. Humes never saw the pictures before testifying before the Commission. X rays were also made during the autopsy, at least some of which were developed immediately and were available during the autopsy and afterward.

Didn't the autopsy doctors try to probe the shoulder wound and if they did, why didn't they discover the neck wound in the process if both were actually caused by one bullet? The answer to the first question is yes, the doctors at the autopsy did try to probe the shoulder wound. The autopsy report itself only says that "The missile path through the fascia and musculature cannot be easily probed."

Fortunately, we have other evidence relating to the autopsy. Secret Service Agent Roy Kellerman was present at the autopsy and testified that Lieutenant Colonel Pierre A. Finck tried to run a probe through the body from the site of the shoulder wound and was unable to do so, saying "There are no lanes for an outlet of this entry in this man's shoulder." Chief autopsy pathologist Commander J. J. Humes testified that they could not "take probes and have them satisfactorily fall through any path at this point."

Also present at the autopsy were FBI agents Francis X. O'Neill, Jr. and James W. Sibert. In their report dated 26 November 1963 they wrote, "This [shoulder] opening was probed by Dr. HUMES with the finger, at which time it was determined that the trajectory of the missile entering at this point had entered at a downward ~~angle~~ position of 45 to 60 degrees. Further probing determined that the distance travelled by this missile was a short distance inasmuch as the end of the opening could be felt with the finger."

We have answered our two previous questions. The doctors did try to probe the shoulder wound and they did not discover the neck wound because their attempts to probe were unsuccessful. Does this mean then that a bullet did not pass through the President's body? We will deal with this question later and believe that in the process of doing so will be able to answer another intriguing question which obviously should have been raised immediately by the above-mentioned FBI report but until now has not been raised at all. The question is this: Given that the highest vantage point in the whole Dealey Plaza area would have resulted in a downward angle of bullet travel of no more than about 25 degrees, how could a bullet have entered the President's body at an angle of from 45 to 60 degrees?

What Did Not Happen During the Assassination

I believe that the material which is presented in this section comes as close as possible to being proof in the technical scientific meaning of the term that the single-bullet theory is false. On the basis of this, we can say how the assassination did not happen. Later on we will suggest what did happen.

When the Commission called Dr. Humes to testify several months later, he had a medical illustrator prepare an "artist's conception" of the path of the bullet and the nature of the injuries. This drawing, Commission Exhibit 385, has added to confusion rather than reducing it. It is not correct in its proportions. Dr. Humes explained this by saying that he had had only two days in which to prepare the exhibit. I was able to prepare an outline profile of the President in less than an hour by the simple device of projecting a profile photograph of him on a sheet of paper and tracing the outline. ^[See profile outline] Furthermore, the bullet on Exhibit 385 was shown as following a 10 degree angle downward although the Commission concluded that the actual angle was approximately 18 degrees.

Thus we have the stage set for a monumental oversight. Dr. Humes was concerned with bullet path and anatomy, as remembered without aid of photographs several months after the autopsy, but was not concerned with

exact location of others, either Governor Connally or the rifleman. The Commission was concerned with these, but was not aware of a very misleading aspect of Exhibit 385. The exhibit implies that a bullet not striking any bones can exit at the center of the neck below the Adam's apple (the site of the wound in front) and travel in a straight direction forward. The fact is that it cannot.

Both the X rays and the observations made during the autopsy showed that the bullet did not damage any bones in the President's body. Thus any bullet traveling through his body had to travel in a path which was outside the bony structure of the body or in between the bones. This means that study of the human skeleton might give us valuable information about the first shot in the assassination, and in fact it does. The one used and shown in the accompanying pictures is a standard articulated male skeleton from our anthropology laboratory. Comparison with others and with standard anatomy textbooks shows that it is not atypical. While there are, of course, differences between people in skeletal sizes and proportions the matters with which we will be concerned are basic characteristics of the human skeleton and beyond the range of normal variations between individuals.

Observation of the shoulder and neck area of a skeleton shows clearly that there is a great deal of bony structure there--the scapula (shoulder blade), clavicle (collar bone), sternum (breastbone), ribs and the neck and back vertebrae. (see figure 1) The freedom of a bullet to pass through this jumble of bones without hitting any of them is extremely limited. The Commission apparently did not take this into account.

We know quite precisely where the wound was located in front. Bullet holes in the shirt in the two overlapping portions just below the collar button, a nick in the knot of the President's necktie, and the fact that the wound was at the site of a tracheotomy incision all locate the wound in the midline of the body between the Adam's apple and the sternum. The bullet would have to have passed just above the sternum and between the right and left clavicles.

Just behind this point though, are the neck vertebrae. Regardless of the size of its downward angle, a bullet not striking the neck vertebrae and passing through this point would need to be traveling at an angle of 30 to 45 degrees sideways to the left. (see figure 2)

I suggest that this matter of lateral or sideways angle is a crucial factor which has been ignored in analyzing evidence in all previously published material about the assassination from the Warren Report itself up to and including Thompson's recently published book. Sideways angle alone would rule out the possibility of the bullet striking Governor Connally. If the bullet would have struck anyone it would have been either Mrs. Connally or William Greer, the driver.

There is only one way in which a bullet traveling at such an angle sideways through the President's body could have struck Governor Connally and that is if the President were himself turned at a 30 to 45 degree angle. The Zapruder film and other pictures show clearly that this was not the case as his body was facing squarely ahead in the car. His head was turned to the right at about the time the first shot was fired but this

would not affect his chest or shoulders. The reader can check this for himself by placing a finger on the hollow of his throat between the Adam's apple and breastbone and turning his head. The lower part of the neck moves hardly at all.

What we have seen about the necessary sideways angle of bullet travel makes the single bullet theory untenable. The assassination could not have happened the way the Warren Commission says it did.

An Attempt to Explain What Did Happen

While physical facts of anatomy enable us to determine what did not happen, we must piece together different kinds of evidence to try to determine what did happen. My concern here is only with the non-fatal shots. I have no basis for rejecting Thompson's conclusion that more than one fatal shot struck the President in the head and that at least one assassin could have been concealed behind the fence on the greasy knoll. If there was more than one assassin, there is no reason why there could not have been several.

I agree with Thompson on the matter of the President and Governor Connally being struck by separate bullets. Both Governor Connally and Mrs. Connally testified before the Commission that he was struck by a second bullet after the President was hit. The Governor later studied the Zapruder films frame by frame and reaffirmed this in a magazine article. Thompson also arrived at the same conclusion. The sideways angle of bullet travel described above confirms them and requires two bullets striking at two different times.

I differ from Thompson regarding the nature of the President's first wound. At the time of the autopsy the wound in back was found to be shallow--less than the length of a finger--and at a 45-60 degree angle downward. I shall come back later to both the matter of the angle and the depth of wound. It should be noted here though that this angle is about twice as great as could be obtained from the highest vantage point on any building in the area.

Thompson believes that the wound in back was shallow and thinks that the neck injury in front was caused later by a fragment of bone or bullet from the fatal head shots. I tend to disagree. The President was bringing his hands up toward his neck as the car emerged from behind the road sign at Zapruder frame 225. In this and subsequent frames, he holds his hands as if he were wounded in the neck and not just in back. In addition, there is the matter of the location and timing of the shot with respect to the one which hit Governor Connally. This will also be discussed later.

Let us assume that the first bullet passed through the President's body in a sideways direction. If the bullet exited toward the left of the President and was going at a downward angle, how could it have avoided landing in the car? The window beside Mrs. Connally was even partly raised so that a bullet would have to be traveling almost horizontally in order to miss the car. This raises the question, just what was the downward angle of the bullet?

The downward angle of approximately 18 degrees determined by the Commission was established by surveying techniques based on both the position of the car at the time the shot was assumed to have been fired and the position of the sixth floor window of the Depository building.

This angle then is predicated on the assumption that the shot came from what is thought to be Oswald's position. But where the shots came from is what the Commission was trying to establish--the position should have been a conclusion of the Commission rather than one of the assumptions used in arriving at a conclusion. The Commission used circular reasoning.

There is another way of determining the downward angle of the shot, and that is to ascertain the angle of the bullet through the President's body. We already have seen that the exit was at a point approximately at the center of the necktie knot. We can determine the downward angle if we can establish the point of entrance in back.

Before attempting this though, let us look at the skeletal structure of the shoulder, which is a very complicated part of the body. Not only are there many bones in the area, but they are related to each other in complex ways. The back vertebrae and ribs form a relatively solid unit, frequently called the ribcage. The neck vertebrae are somewhat more free to move, and the head pivots forward or backward on the uppermost vertebra.

The bones of the shoulder--the clavicle and the scapula--are only loosely attached to the ribcage. It is this flexible attachment which permits us to move our shoulders up and down and to the front and back. Most of the muscles of the upper back are attached to the scapula and control it. Thus, movements of the scapula are associated with (indeed, are caused by) movements of the muscles in back. Also, as the muscles move so will the skin covering them.

With the amount of bony structure in the shoulder area, it is clear that any bullet which passes through the area and does not strike any bone has only a limited number of paths it could follow. Specifically, there would be only three possible paths.

The first path would be outside of and over the top of the ribcage. The other two would both be through the ribcage between the scapula and the vertebrae. The second path would be between the first and second ribs, and the third would be between the second and third ribs (see figure 3) A bullet following the latter path would be traveling in practically a horizontal direction. A point of entrance lower than this would require an upward direction of travel which would have been impossible under the circumstances.

Our task now is to determine which of these three possible paths the bullet actually followed. We have four sources of information about the point of entrance that should enable us to do this. These sources are:

- 1) the verbal description given in the autopsy report;
- 2) measurements on the President's body locating the wound also given in the autopsy report;
- 3) statements of observations made by FBI and Secret Service agents who saw the wounds either in Dallas or during the autopsy;
- 4) bullet holes in the President's shirt and jacket measured, photographed, and reported on by the FBI.

We might expect that the first two sources would agree with each other--that the verbal description of the bullet path would be supported by the autopsy measurements. They do not agree.

The autopsy report states, "The [non-fatal] missile entered the right superior posterior thorax above the scapula" (emphasis added) and damaged soft tissues and muscles above the scapula and clavicle along the right side of the neck.

As the illustrations show, if the bullet entered "above the scapula" the entrance would be very high on the shoulder and the bullet would need to be traveling at a downward angle of about 30 degrees to exit in the area of the necktie knot. More important though is the sideways angle of the bullet following such a path. Even if the bullet passed over the scapula at its extreme edge nearest the center of the body, the entrance would be three or more inches to the right of the midline. It is obvious that if it exited at the midline it would necessarily be traveling at an angle to the left. Pictures taken at the time of the assassination show clearly that the President was seated squarely in the car. His head was turned to the right, but this would not have affected his shoulders. Given the downward and crossways angle of the bullet, it would have been impossible for it to have struck Governor Connally--particularly in the area of his right shoulder. It also could not have escaped the car.

The verbal description of the bullet path does not seem to agree with the other three sources of information about the location of the wound, all of which would place it lower on the body. Let us now look at the second source, the autopsy measurements.

We have already seen that the scapula and flesh of the upper back move about quite freely outside the ribcage. We cannot automatically assume that the position of the flesh at the time of the autopsy measurement was the same as at the time the wound was received. As a matter of fact, there is evidence that it was not.

The location of the bullet hole was determined by measuring down from the mastoid process. The latter is a bony knob on the lower part of the skull just behind the ear. The autopsy measurements located the wound as being 14 centimeters (5 1/2 inches) down from the mastoid process. Measuring from a point on the skull can introduce some error because of flexibility of the neck and variation in the position of the head.

A much greater error is caused by the fact that when the body is in a prone position the shoulders have a different relationship to the rest of the body than they do when the person is standing or sitting erect. In the prone position, the shoulders fall forward and downward closer to the head and front of the body than they are in the erect position. (see figures 7 & 8) This difference in shoulder position produces a measurement difference of from 1 1/2 to 2 inches. Observations on people varying considerably in size and shoulder-neck proportions shows this difference to be a fairly constant one.

What this means is that a point on the shoulders which measures 5 1/2 inches (14 cm) down from the mastoid process in the prone position would be 7 to 7 1/2 inches down with the person erect. In the actual sequence of events, the order was reversed. The President was sitting

erect when hit with a bullet entering 7 to 7 1/2 inches below the mastoid process. In the prone position during the autopsy, his head and shoulders were closer together so that a measurement of 5 1/2 inches resulted. In other words, the bullet hole as observed during autopsy was not in line with the path of the bullet through the rest of the body.

This should help us to explain a conflict between the autopsy report and the FBI Summary Report of 9 December 1963 and Supplementary Report of 13 January 1964. The information about the autopsy in the FBI reports is based on the observations of two FBI agents who were present during the autopsy. The agents reported that the missile path extended downward at an angle of 45 to 60 degrees and was less than a finger length in depth.

It has never been explained how a bullet traveling at a downward angle of approximately 18 degrees (as determined by the Commission) could make a wound at an angle of 45 to 60 degrees, and also why a bullet which traveled through the President's body would not have left a path that could have been probed all the way. What we conclude here is that the angle observed at autopsy was determined not by the actual angle of travel of the bullet, but rather by the change in the position of the President's shoulders caused by being in the prone position. This would also produce a bend in the bullet path which would make the wound appear to be a shallow one. I suggest that had the doctors arranged the President's shoulders in their natural position while erect, they could have run a probe through the body following the bullet path. (See diagrams A and B)

We still need to inquire into the two other sources of information about the back wound to see if they support either of the first two or raise still more problems. Statements by Secret Service and FBI agents who saw the wound either in Dallas or during the autopsy show a considerable amount of agreement in placing the wound four to six inches down on the back. The two FBI agents present at the autopsy described the wound as "below the shoulders." While the statements of agents do not pinpoint an exact location, there is nothing from this source to support the verbal description indicating a high location of the wound.

The fourth source, definitely in the category of "hard" information, is the bullet holes in the President's clothing. They were to the right of center and were located 5 3/4 inches down from the top of shirt collar and 5 3/8 inches down from the top of the jacket collar. These measurements may be confirmed by photographs.

The clothing measurements would place the wound lower on the body than would the autopsy measurement of 5 1/2 inches from the mastoid process. Edward Jay Epstein noted this discrepancy. Various people have suggested that the shirt and jacket could have ridden up on the President's shoulder as he waved his arm. If the clothing were bulged or folded a wound high on the shoulder would appear to be lower when the clothing was flattened out and measured. This explanation has been widely accepted and until now the matter has not been pursued further.

We can now resolve this apparent conflict. We saw earlier that differences in shoulder position would result in the point of entrance actually being 7 to 7 1/2 inches below the mastoid process at the time the wound was received. The top of the President's shirt collar would have been about 1 1/2 inches below the mastoid process. Subtracting this amount from the 7 to 7 1/2 inch measurement shows us that the bullet would have entered the body 5 1/2 to 6 inches down from the top of the shirt collar. This is exactly where measurements on the shirt place the bullet hole, as do the jacket measurements. There is no necessity to speculate that the clothing rode up or was folded, for which there is no evidence in various pictures taken at the time.

We have looked at four indicators of the location of the wound in back and have seen that three of them agree very closely with each other. Reports of agents, the bullet holes in the President's clothing, and the autopsy measurements as explained here all place the wound at about the same location. When we keep in mind that the verbal portion of the autopsy report was written well after the autopsy itself and was attempting to piece together information from the autopsy plus telephone reports of doctors in Dallas, that Dr. Humes burned his original autopsy notes, and that ~~the~~ ^{he could well have been influenced by knowledge of} the location of the presumed assassin, ~~we~~ we cannot have utmost confidence in the verbal description.

Agreement between indicators is only part of the picture though, because we have an objective way of verifying the bullet path. Our task is simple because there are only three possible bullet paths, and two of

them can be ruled out. If the bullet traveled either over the outside of the ribcage or entered between the first and second rib, it would have been traveling in a downward direction and could not have escaped either hitting someone else in the car or being trapped and discovered in the car. Because of the sideways angle of the bullet it could not possibly have hit Governor Connally.

This leaves only the third possibility--that the bullet entered between the second and third rib, the place suggested by three of the four sources. But this place is level with the point of exit in front and while the bullet would have been going in a sideways direction it would not be traveling at a downward angle. (see figure 9) There are two implications to this: 1) the bullet must have come from near the street level and not from the sixth floor of the Texas School Book Depository, and 2) a bullet traveling in that direction could have escaped the car out the side window and buried itself in the grass in Dealey Plaza.

While the horizontal direction of the bullet was determined on the basis of autopsy measurements supported by evidence from clothing and agents' reports, it is thus confirmed by the fact that the bullet was not found in the car. The absence of the bullet in the car is what suggested the one-bullet theory in the first place, because Arlen Specter concluded that if the bullet were fired from above and did not land in the car the only place it could go was into Governor Connally. But we have seen that the sideways angle of the bullet would make it impossible for it to hit the Governor.

The evidence we have looked at here supports the testimony given before the Commission and the subsequent statements of one of the principals in the case--Governor Connally. The Governor has said that he heard the first shot, had time for it to register on his consciousness, turned to the right to look at the President, could not see him from that direction so started to turn to the left, and was hit only after he was in the process of turning to the left. Mrs. Connally's recollection is similar-- that she had time to turn around and observe the effect of the shot on the President's facial expression before her husband was struck. The Commission chose to disregard the Governor's view that the President had been hit by a different and earlier bullet than the one which struck the Governor in the shoulder.

We may note in passing that the path of the bullet which struck Governor Connally as determined from the location of his wounds is quite consistent with a shooting position on the sixth floor of the Depository building. The path was in a downward and right-to-left sideways direction. The bullet entered by the Governor's right armpit and finally stopped in his left thigh. A bullet fired from the same position would have followed a similar path if it struck the President. It would have traveled downward and to the left. It could no more have struck the Governor in the right shoulder than could the bullet which actually struck the Governor have gone ahead to hit the right shoulder of secret service agent Roy Kellerman in the front seat of the car.

Consideration of sideways angle leads me to question whether the President and Governor Connally ever were both in line with the Depository window in a way assumed by the Commission and required by the locations of their wounds. The idea that they were so in line is based on casual observation and pictures made with telephoto lenses--which distort distances and perspectives.

Let us look first at their relationship to each other in the car. (See diagram C [schematic of limousine]) Governor Connally was seated more toward the center of the car than was the President, but the bullet supposedly travelled from the center of the President's body to the right shoulder-armpit area of the Governor. This would offset their differences in position and result in a line of bullet travel parallel with that of the car.

Reference to the scale map of Dealey Plaza shows that at the time the Commission said the President was first hit the car was at a 15 degree angle sideways to a line connecting it to the sixth floor depository window. This, of course, is only half the angle required for a bullet to clear the neck vertebrae. The sideways angle of the car relative to the depository is clearly evident in Commission Exhibit 893, showing the re-enactment of Zapruder frame 210. In this exhibit, although the person representing the Governor appears to be in line with the vertical crosshair, it is the center of his body and not the right side.

Exhibit 893 also permits some observations about downward angle. One can see that the horizontal crosshair is in line with the small of the back of the person representing Governor Connally, and with the back of the

jumpseat. A bullet entering in the area of the President's shoulder and traveling at a downward angle of 18 degrees would, of course, strike lower on the body of the Governor than the shoulder-armpit area.

Because of the 27 degree downward angle of the bullet ~~which struck~~ ^{path in} Governor Connally, Thompson considers it most likely that the bullet was fired from the top of the Records Building on the corner of Elm and Houston opposite of the Depository. A bullet fired from this position, however, would be traveling left-to-right direction with regard to the car and its occupants whereas the Governor's wounds were made by a bullet traveling in a right-to-left direction. Here is another case of the sideways angle being completely overlooked. A bullet traveling toward the right and striking the Governor by the right armpit would not have followed the path through his body that it did. A drastic deflection of at least 60 degrees would have been required and there is nothing in the area of the armpit to produce this and no evidence that it took place. I can only conclude that the bullet was fired from the Depository and that in striking one of the Governor's ribs (which we know it did) it was deflected somewhat increasing the downward angle by no more than 10 degrees.

The sixth floor of the Depository can thus be located as the point of origin of the shot which struck Governor Connally. Having already eliminated the single-bullet theory, we can rule out the upper floors of the Depository as the source of the first shot which struck the President, because the motorcade was blocked from view from there until less than two seconds from the time the Governor was struck--a period of time insufficient to have fired the Mannlicher-Carcano rifle twice. This in turn eliminates the possibility of a shallow back wound on the President being due to out-of-date Mannlicher-

Carcano ammunition because there is no evidence that the first wound was from such a rifle.

Keeping this in mind we can go back to an issue discussed earlier, namely the entrance-like characteristics of the neck wound. If the bullet involved were from a gun other than ~~the~~ a Mannlicher-Carcano we can not make any assumptions about the bullet type or velocity. The smaller the bullet and the lower its velocity the more its exit wound would tend to resemble a wound of entrance.

To say that a person was shooting from near street level raises the questions of his location, the location of the car at the time, and the time of the first shot. These questions are all interrelated. The bullet angle sideways can be estimated by reference to the Presidential limousine taking into account the President's location in the car and possible exit paths in back of or just in front of the vertical glass panel on the side of the car. The angle, as determined by the layout of the car, would be between approximately 38 and 45 degrees. This angle is within the same range as that determined by skeletal anatomy. (See diagram of car and compare the angle with that shown in figure 2.)

We can give a more exact definition to the term "near street level." Allowing for the fact that the President's neck was somewhat above the level of the car door and taking into account the length of bullet travel inside the car I estimate that a bullet could have had a downward angle of five degrees and still cleared the car.

While skeletal evidence will allow us to establish the bullet path as being in a near-horizontal direction it cannot determine the exact angle of travel because the data are not that precise and could also be influenced by variations in body position. We do not know the exact vertical angle at which the President was sitting at the instant he was struck. A five degree downward angle is thus just as much in accord with our evidence as an angle of zero degrees. This would allow a position of origin of the shot to be up to 12 feet off the ground for every one hundred feet of distance away, even more if we take into account the incline of Elm Street itself.

The Commission concluded that the President was first struck at about Zapruder frame 210. This would place the car at approximately the beginning of the fourth road stripe on Elm Street. If we project backwards from this point with the angle range of 38 to 45 degrees we see that possible locations for a rifleman are a window on ~~the~~ a lower floor on the west end of the Depository, the roof of the one story irregularly shaped portion of the Depository on the west, inside the one story portion of the Depository, or a car or truck parked in front of the Depository toward its western end. Regardless of the specific location, the general area is near the western end of the main Depository building.

In view of the location determined by the approach used here it is interesting to consider File 1546, a report of FBI Agent Robert P. Gemberling. On pages 66-68 of this report Gemberling refers to a bullet mark on a sidewalk in Dealey Plaza reported to him by a Dallas resident. This citizen said that the mark had been shown on television shortly after the assassination and he was surprised that no mention had been made of it in the Commission Report which had then just been released. Two FBI agents investigated the next day.

Gemberling's report said they found that, "In the area of the second lamppost, approximately thirty-three feet east of the post, in the sixth large cement square, four feet from the street curb and six feet from the parkside curbing, is an approximately four inches long by one-half inch wide dug-out scar, which could possibly have been made by some blunt-end type instrument or projectile....This particular scar is in line with the western end of the multifloor section of the Texas School Book Depository Building." The report also states that the line of the scar is such it could not have come from the sixth floor window the Commission said Oswald fired from.

This scar is in line with the position we have determined here as the location of the first shot. I suggest that the scar was made by a second shot from this position which missed and struck the sidewalk instead.

If a bullet did pass through the President's body, which the Commission said it did, I do not see how it could have happened in a way other than the one described here.

We can summarize what has been said so far in the following steps:

1. The location of the front wound can be established with considerable accuracy.
2. Any bullet passing through this location would necessarily have to be traveling at a 30-45 degree angle to the left in a sideways direction for it to miss the vertebrae (as the autopsy said no bones were struck).
3. A bullet traveling at this angle sideways could not possibly have hit Governor Connally.
4. It struck no one else in the car and did not land inside the car.
5. The only other possibility is that it exited from the car.
6. It would not have exited from the car unless it were traveling in a near-horizontal angle.
7. A near-horizontal angle is the only one which is strongly supported by the various sources of information about the location of the wound in back.
8. A bullet traveling at this angle would have to have been fired by someone near the street level.
9. Given that at least one shot was fired from the Depository, the evidence shows there was more than one assassin.

I have not been concerned with trying to prove either Lee Oswald's guilt or innocence. Neither have I sought to determine the identification or motivations of others involved in the assassination. Also, I do not believe that because an act is of such crucial importance either in itself or in its consequences it could not be the work of one unbalanced individual. I simply have been forced to the conclusion by hard physical evidence that more than one assassin was involved.

Thompson believes that the throat wound in front was caused by a fragment of bullet or bone from the fatal head shots. Having accepted that the wound in back was a shallow one, the throat wound must then result from some other bullet. The only other bullet possible within Thompson's framework is one which inflicted the fatal head wounds. Thompson therefore concludes that the throat wound was made by a fragment from that bullet or (more likely) a piece of bone from the head. This would mean that the throat wound was not inflicted until the fatal shot(s) at Zapruder frame 313. Yet, from frame 225 on the President may be seen bringing his arms up toward his throat and acting as though there were a wound in front.

A flat fragment of bone might seemingly best account for the fact that the holes in overlapping portions of the shirt were more like slits than round holes. However, a flat bone fragment would be unlikely to make the small round throat wound observed by the Parkland doctors.

A suggestion by John Page, a senior anthropology student, indicated how a round bullet could make a slit-type of hole in clothing. The circumstances under which a bullet makes a hole in clothing are different depending on whether the bullet is entering or leaving the body. In the case of an entering bullet, the clothing is supported or backed up by the body so that it does not give and the bullet punches a hole through the clothing in the process of entering the body. This leaves a regular hole in the clothing.

An exiting bullet, however, pushes the clothing away from the body and only exerts a substantial stress on it when it can no longer give freely. The clothing not being supported, the force of the bullet makes itself felt as a strain exerted at one point on the cloth and the cloth then tears.

I have confirmed this through investigation. In my first attempt, I clamped a piece of cloth at one end, and holding it firmly at the other end jabbed at it with a one quarter inch metal rod rounded at the end as a bullet would be. A neat tear-slit in the cloth resulted. Experimenting further, I tried shooting at pieces of cloth backed up by corrugated board, and at pieces of the same kind of cloth unsupported in back but fastened to a wooden frame along the edge. While definite holes resulted in the cloth with backing, the unsupported cloth usually produced tear-slits. (see samples).

Thus we can see how a round bullet could produce a slit in the clothing. The fact that there were slits rather than holes in the clothing in front supports the idea that the front wound was made by an exiting rather than an entering bullet.

We should also consider the possibility raised by Thompson that the front wound was made by a fragment of either bullet or bone from the fatal head shots. What path would such a fragment take? As in the case of shoulder area, we can narrow down the possibilities greatly.

The whole front portion of the skull in front of the spinal column can be ruled out. This is the area of the palate, or roof of the mouth. An object penetrating this area would produce considerable bleeding in the mouth which would have been very obvious to the Parkland doctors.

Likewise, most of the rear part of the skull behind the spinal column can be eliminated because a fragment from that area would be blocked by the vertebrae from exiting in front. This leaves as a path for a fragment only a small area more or less alongside the spinal column.

The lower part of the braincase extends down only about as far as the ear (see photos) so that a fragment exiting the braincase would still have to travel the whole length of the neck to reach the area of the front wound. Furthermore, it would be traveling parallel with the neck and would thus have to change direction to exit at the site of the wound.

Precise calculations are impossible because there are too many unknown variables, but we can note the kinds of problems that would be involved in assuming a fragment of bullet or bone. The main question is whether a bullet would have sufficient kinetic energy or momentum.

Let us consider the successive losses of kinetic energy. First would be a significant loss as the bullet penetrated the bone of the skull. Second would be loss in traveling within the brain. Third would be the loss from the forces causing fragmentation. Each fragment of the bullet would have only a fraction of the kinetic energy of the whole bullet even without these other losses. Yet a fragment was still supposed to have had enough energy to penetrate the lower part of the skull, travel through approximately six inches of tissue in the neck, change direction to exit in front, and penetrate the shirt.

In the case of a bone fragment the problems would be even greater. These would be an additional loss caused by the bullet imparting its energy to the bone. Furthermore, bone would not have as much mass as lead and would be more quickly slowed down in passing through tissue. It would seem impossible for it to have enough kinetic energy to traverse the length of the neck, change direction, and exit. An irregularly shaped fragment would be unlikely to make the small round wound observed by the Parkland doctors.

Taking into account the various kinds of evidence we have surveyed, I believe the evidence most strongly supports the view that the President's back and front neck wounds were both made by one bullet which passed through the President's body. We have seen how such a bullet could not have also struck Governor Connally.

If both wounds were not made by one bullet, what other alternatives are possible and what do they imply about the number of people taking part in the assassination?

Alternative 1, -- The back wound was in fact a shallow one and the front neck wound was made by a separate entering bullet.

A bullet making such a front wound would have to have been fired from a position other than the Depository, and consequently there would have been more than one assassin.

Alternative 2, -- The back wound was a shallow one and the front wound was made by a fragment of bullet or bone from the fatal head shot(s).

The shallow back wound and the wounds to Governor Connally would then have to have been inflicted by different bullets. The time difference between them would not have been sufficient for both to have been fired from the same bolt action rifle--thus there was more than one rifle and more than one assassin.

There seems to be no alternative to the conclusion that the assassination was not the work of just one person.

I have not been concerned with trying to prove either Lee Oswald's guilt or innocence. Also, I do not believe that because an act is of such crucial importance either in itself or in its consequences it could not be the work of one unbalanced individual. I simply have been forced to the conclusion by hard physical evidence that more than one assassin was involved.

Legends for photographs (Figure number in pencil on back of photo).

Figure 1

The shoulder area is a veritable jumble of bones. Obviously, the places a bullet can go through this area without striking any bones are quite limited. Note how little space there is between the front of the neck vertebrae and the breastbone.

Figure 2

View of shoulder area from top with skull removed. Sideways angle of 42 degrees is the minimum possible as rod touches the neck vertebra. Somewhat smaller sideways angle is possible if path is between ribs rather than over top of ribcage. In this picture rod represents same path as in Figure 4.

Figure 3

Shoulder area viewed from the rear. There are only three places through which bullet could pass: 1) over top of ribcage; 2) between first and second ribs; 3) between second and third rib. All three positions would result in a 30-42 degree angle of travel sideways.

Figures 4, 5, and 6

Wooden rod shows the path of bullet travel for each of the three possible positions of bullet entrance. It can be seen that each of the three possible paths is at a definite sideways angle. The approximate downward angles of the three paths are respectively 30 degrees, 20 degrees, and zero degrees. Bullets following either of the first two paths could not escape the car or another person in the car.

Figures 7 and 8

Anthropology instructor William Gerritsen serves as a model to demonstrate difference in shoulder relationships to head according to body position. Spot behind ear marks tip of mastoid process. Mark is made on shoulder 5 1/2 inches (14 cm) from mastoid process while Gerritsen is in prone position. When he is in the erect position, the mark is 7 3/8 inches from the mastoid process. A bullet entering at this point would appear to have entered almost two inches higher when measured in the prone autopsy position.

Figure 9

Anthropology instructor William Gerritsen sits in front of skeleton and slightly to the left in position occupied by Governor Connally. Bullet path would have been to the left of Governor Connally. Bullet could not possibly have struck the Governor in the right shoulder. If bullet struck anyone else, it would have been either Mrs. Connally or the driver.

Note to the editor:

The article could be supplemented with pictures of President Kennedy's clothing as given in the FBI reports and reproduced in Epstein's Inquest, Exhibit 385, news pictures of the Presidential car in the motorcade, and a diagram or picture of the Dealey Plaza area including the building north of the Dal-Tex building.

Credits:

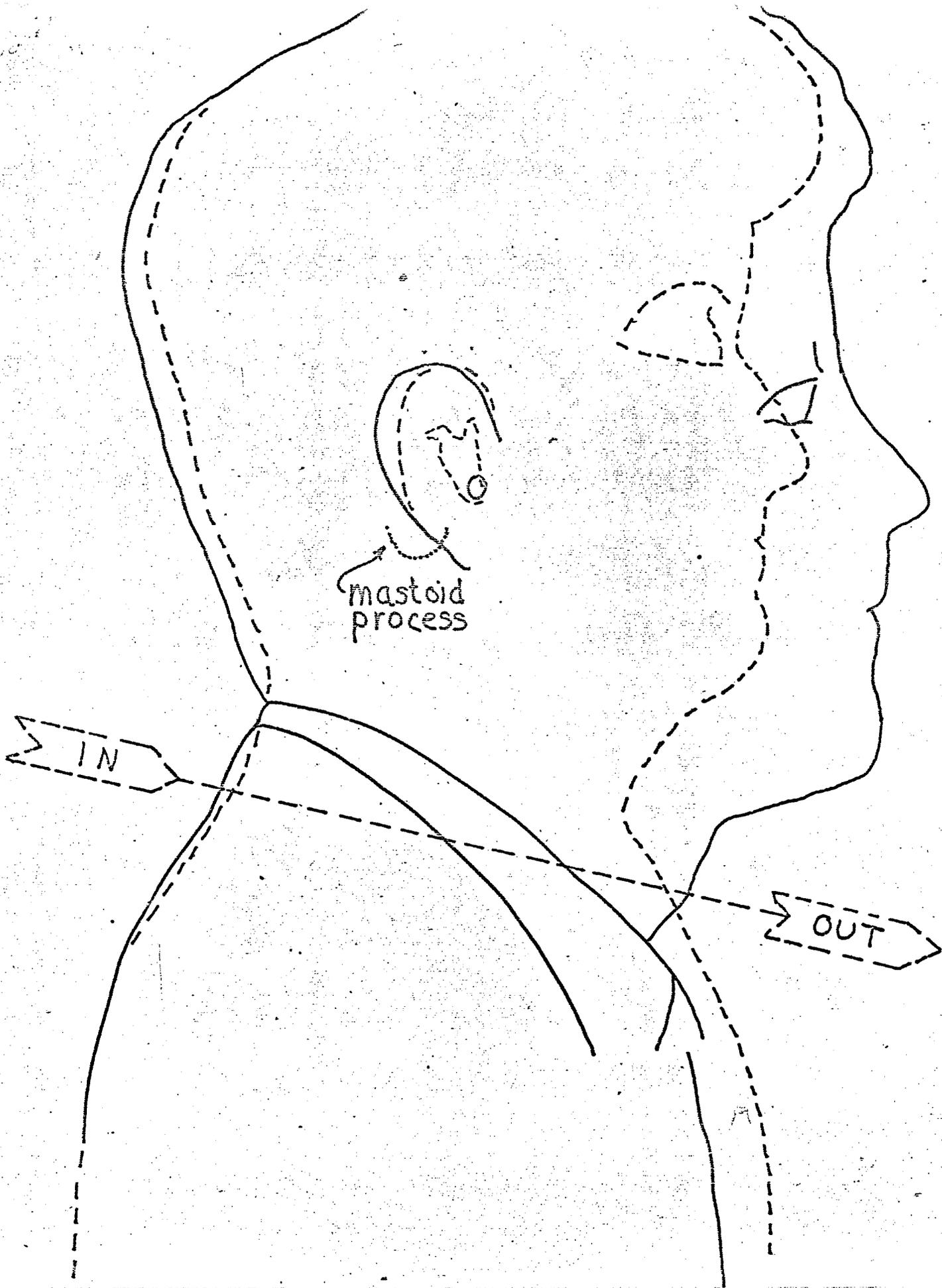
Photos -- William Krueger
Drawings -- Ruth Forman

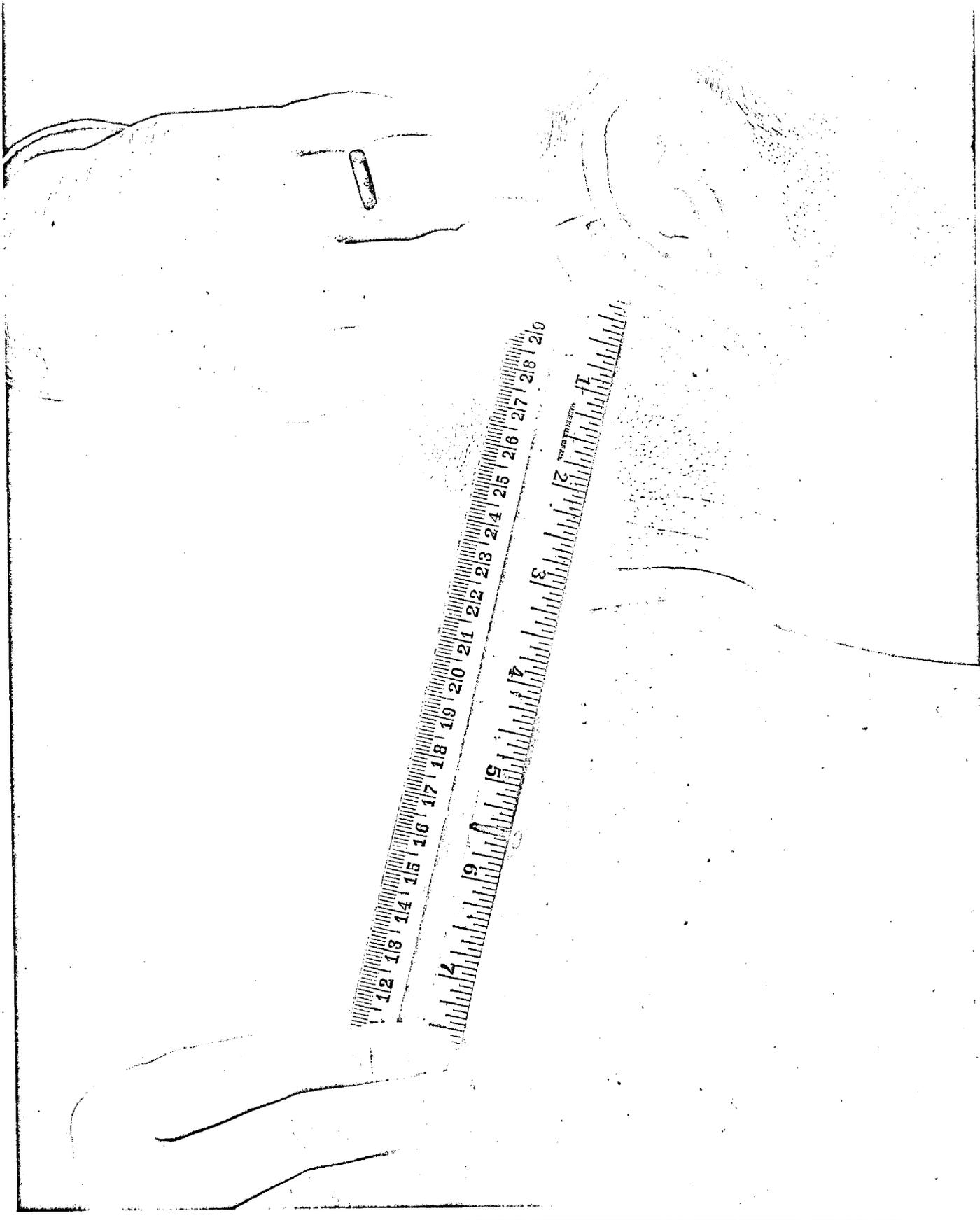
Legend to accompany profile outlines of the President

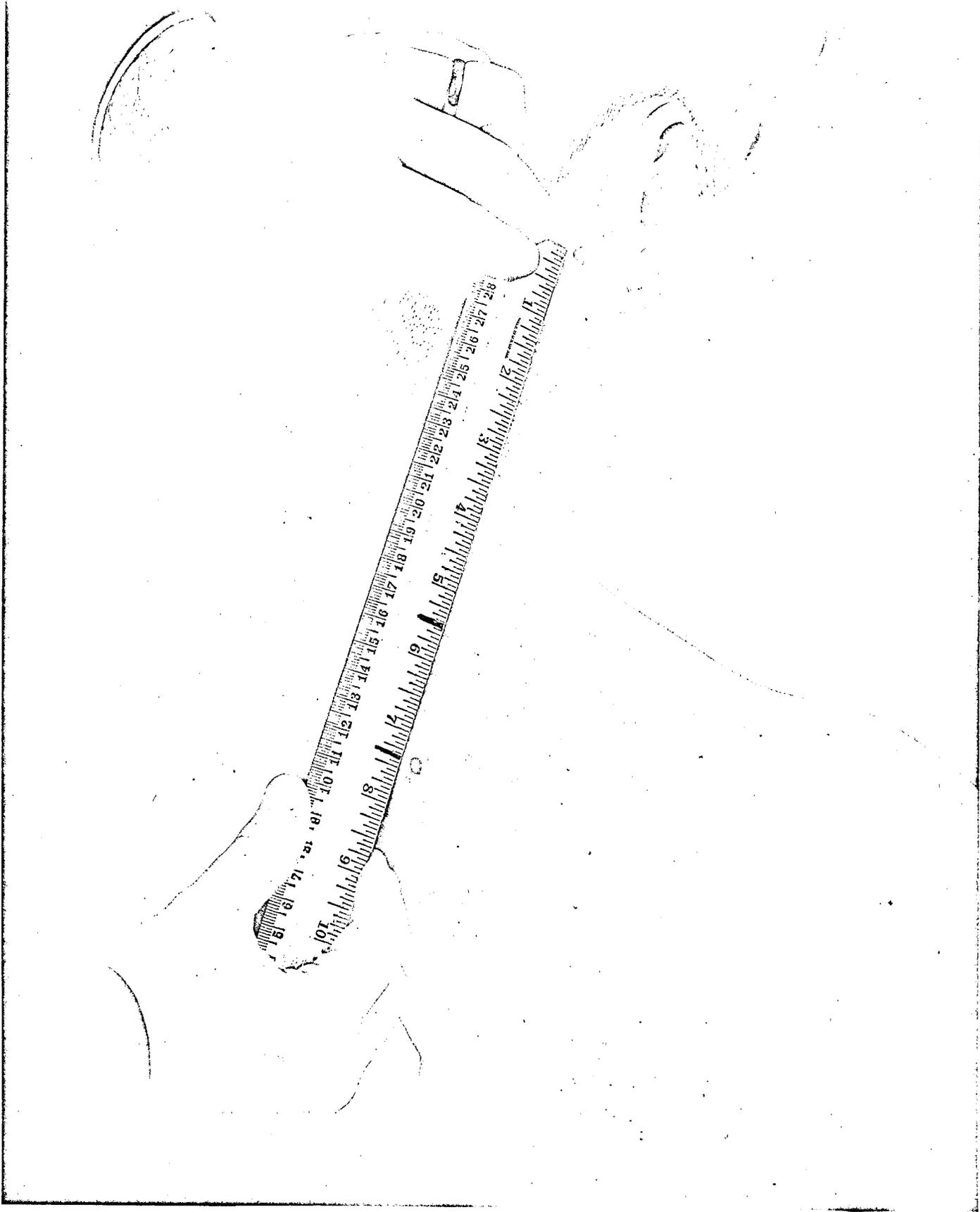
Dotted profile is taken from Commission Exhibit 385. Profile with solid lines is taken from photograph of the President. Exhibit 385 does not pretend to be to scale, but there is little excuse for it not being so. The two profiles were lined up according to the ear because of its relationship to the mastoid process which was a reference point for the measurement of bullet wound location during the autopsy.

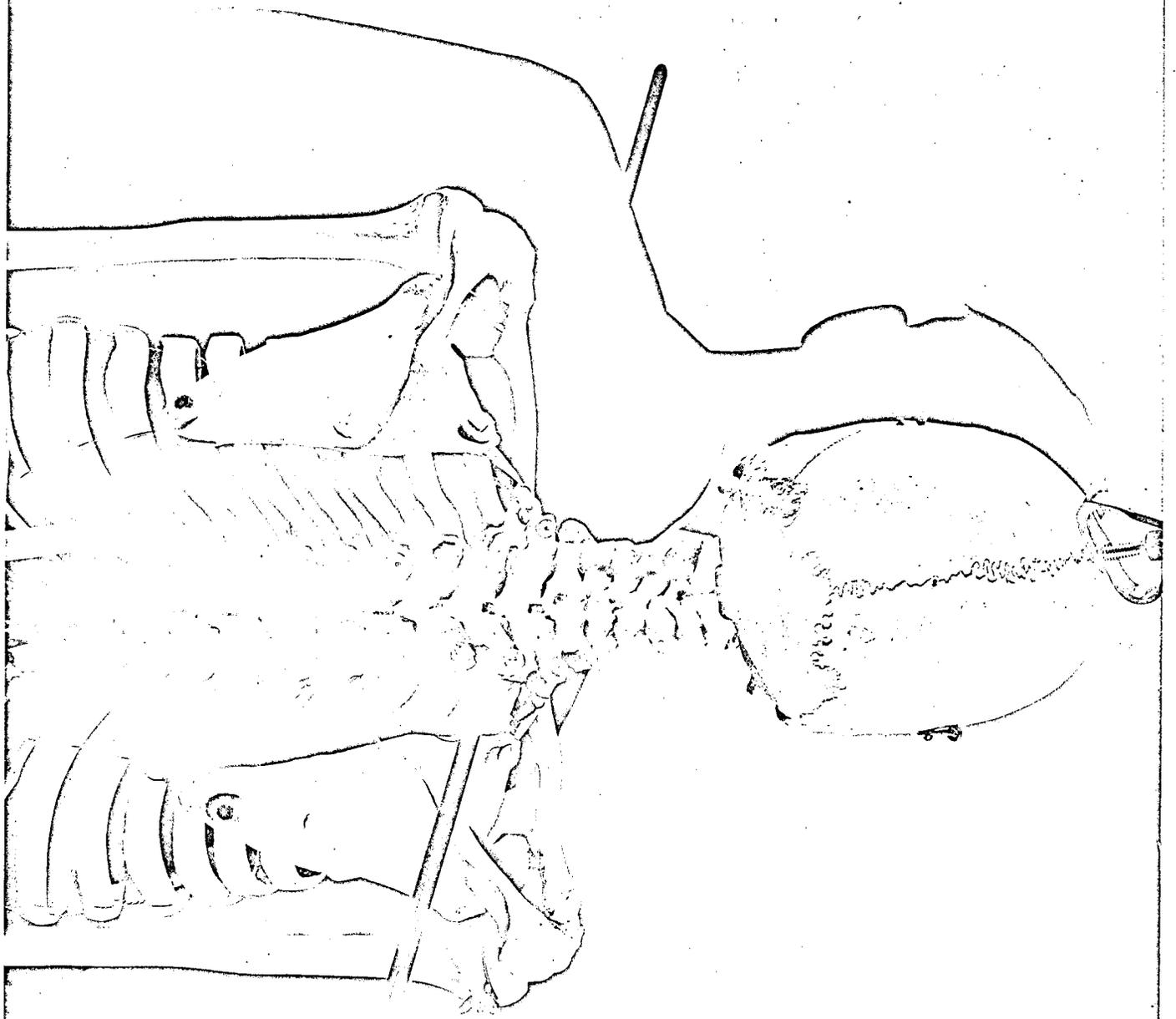
The downward bullet angle shown in Exhibit 385 is inaccurate, being 10 degrees rather than the 18 degrees established by the Commission. A bullet exiting just below the collar button ~~would~~ at an 18 degree downward angle would have entered higher than is indicated by either autopsy measurements or bullet holes in clothing. Such a bullet entering where these indicators show would have exited well below the neck area.

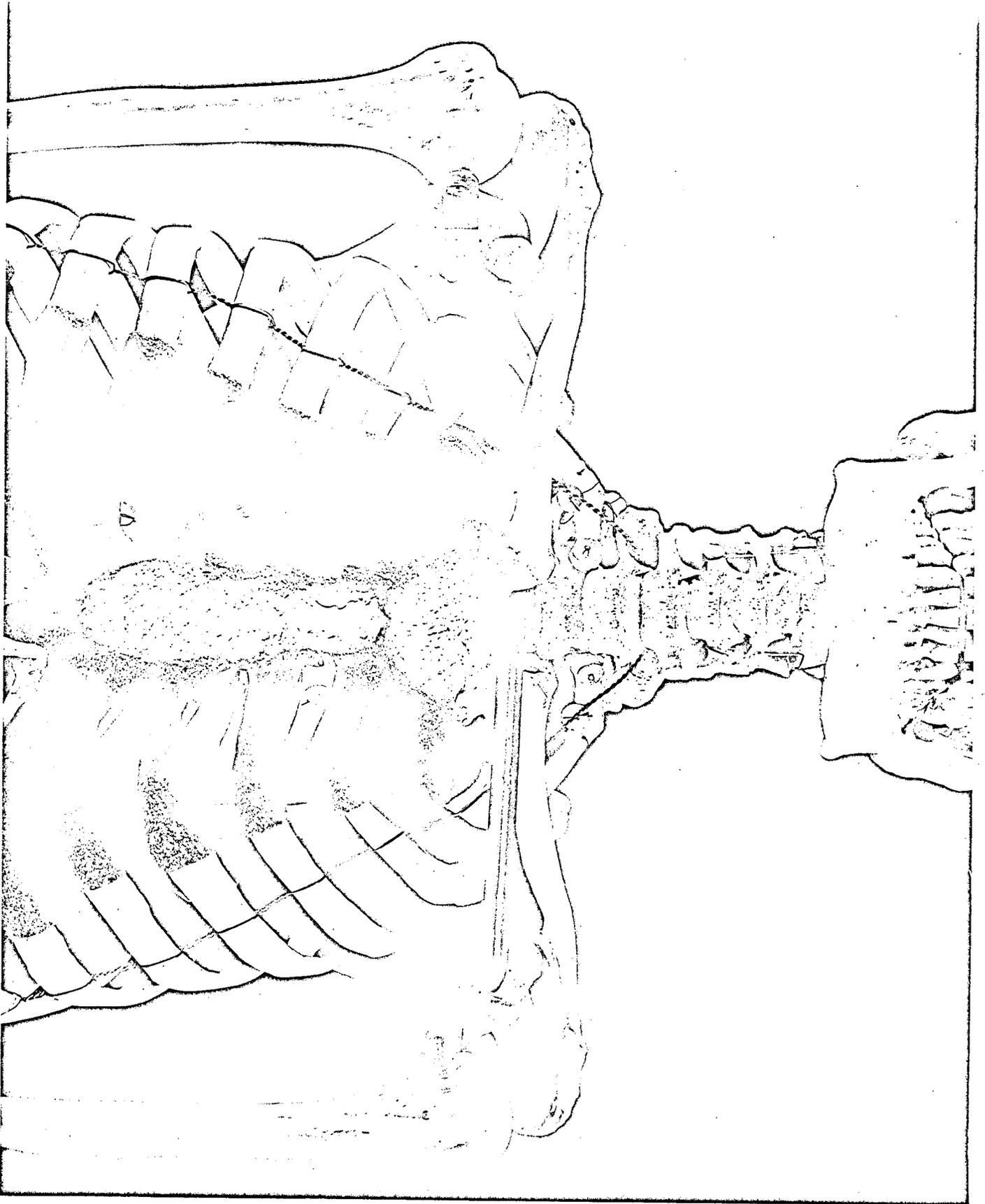
The most serious error in Exhibit 385 is that it implies that a bullet can pass through the neck area traveling in a near straight-ahead direction.

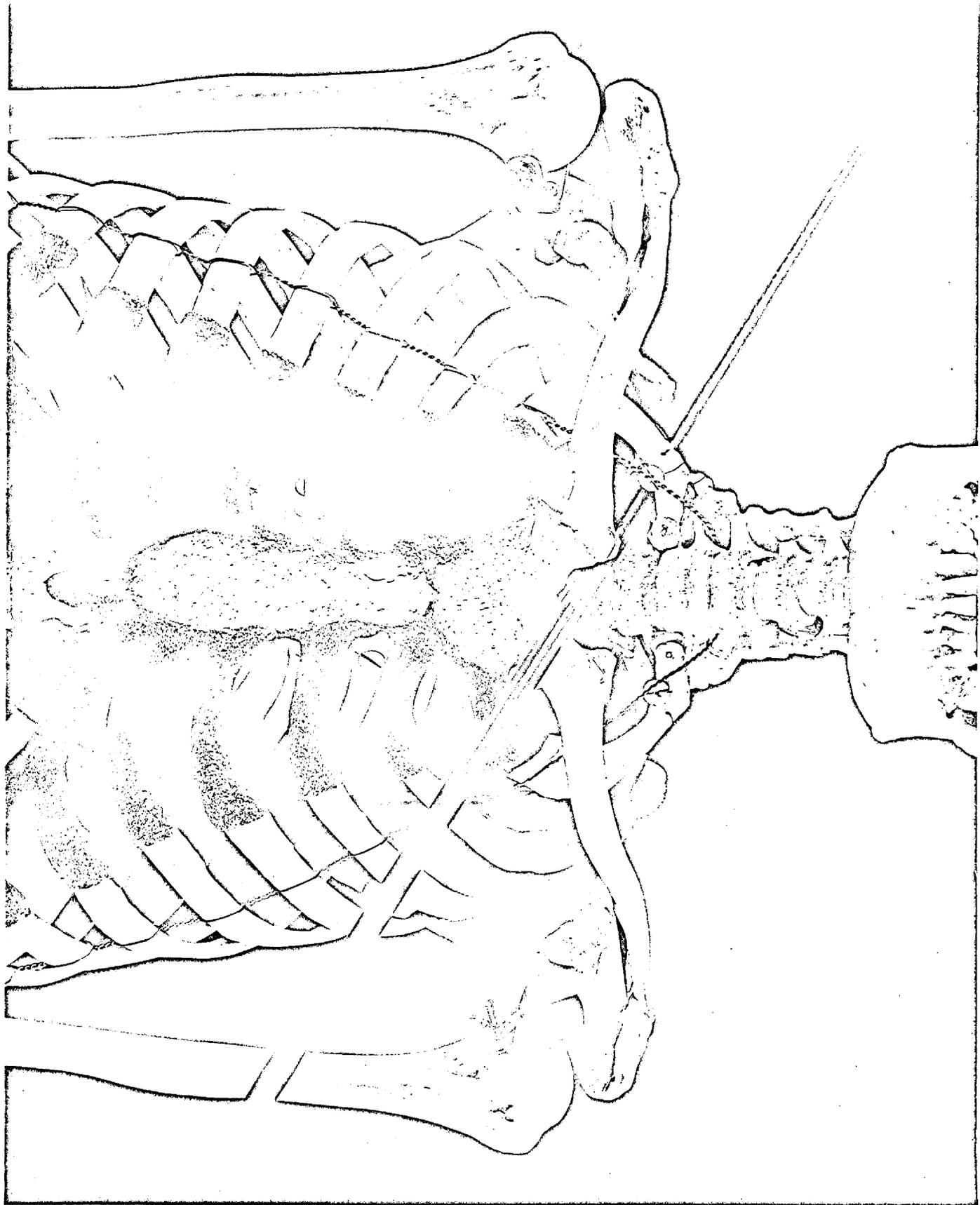


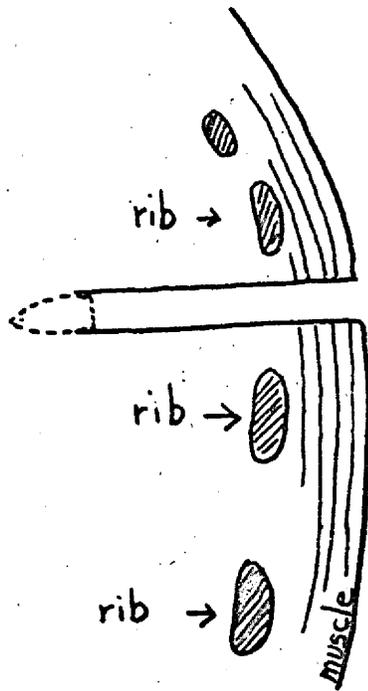










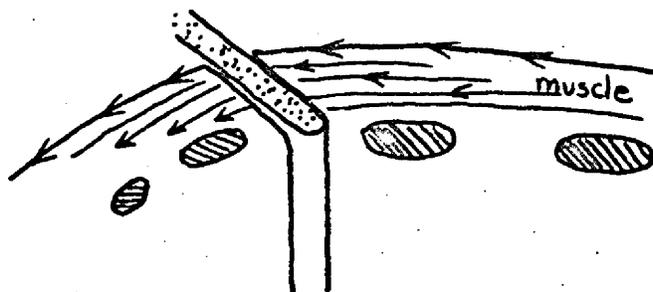


~~Figure~~ Diagram A

Bullet entered in straight line
when President's body was in
erect position.

~~Figure~~ Diagram B

In prone position during autopsy, shoulders fall forward
toward head. Bullet hole appears to be at 45-60 degree
angle and to have no point of exit.



Legend to accompany revised schematic diagram^C of passenger compartment
^

- A. Postulated path of first bullet striking the President. Bullet travels in a near-horizontal direction so that it exits car out left front window. Sideways angle is about 38 degrees.
- B. Assumed path of bullet according to the Warren Commission. Bullet approaches car at a 15 degree angle sideways and 18 degree angle downwards. In order to strike the Governor in the armpit, bullet must change angle laterally to travel parallel with car. Downward angle also must change to about 12 degrees.
- C. Actual path of bullet striking Governor Connally. Direction downward is about 25 degrees. Sideways angle is about 30 degrees.
- D. Path of bullet striking Governor Connally according to Josiah Thompson. Bullet approaches from left side and would need a lateral deflection of over ~~50~~⁶⁰ degrees.

There is no evidence to support the deflections required either by the Commission's or Thompson's view of what happened. In at least Thompson's case, the deflection would have to have occurred before the bullet struck Governor Connally's rib. A bullet from the ^{sixth-floor easternmost} Depository window striking Connally directly would need a total deflection of no more than 10 degrees which could result from striking his rib.

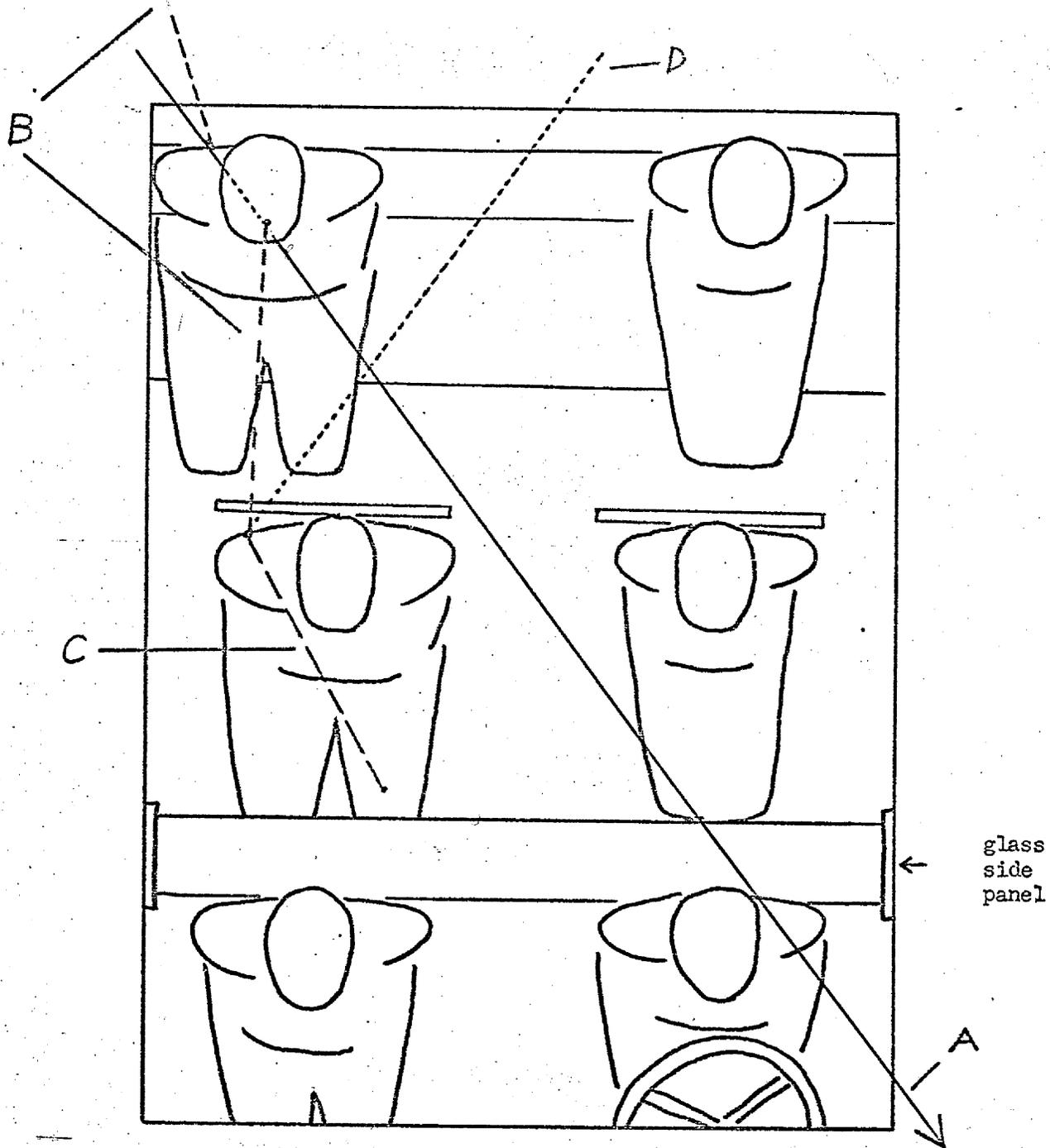
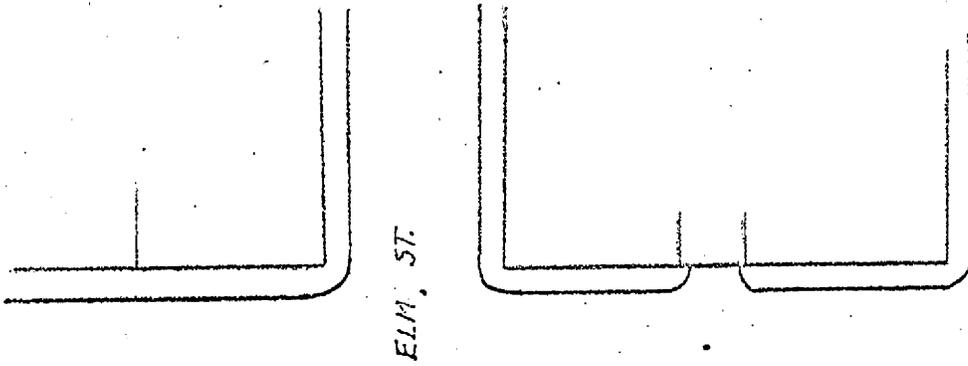


Diagram C
~~Figure~~

Scale schematic illustration of passenger compartment of Presidential limousine showing most likely approximate bullet path. Sideways angle shown is 38 degrees.

EAST



HOUSTON ST.

NORTH

DEPOSITORY

ELM ST.

MAIN ST.

SOUTH

Z 210

LOCATION &
ANGLE OF
SCAR ON
SIDEWALK
(SEE TEXT)

DEALEY PLAZA

ELM ST.

WEST

SCALE MAP OF DEALEY PLAZA