

be position A, would it not?

Mr. Shaneyfelt. Yes.

Mr. Specter. Have you a photographic exhibit depicting that position?

Mr. Shaneyfelt. Yes. In each of the positions that we established, we used, insofar as possible, the Zapruder pictures to establish the position, or we established it from the window, and made photographs from the position Mr. Zapruder was standing in.

This chart has been marked as Commission Exhibit 885.

(The document referred to was marked Commission Exhibit 885 for identification.)

Mr. Shaneyfelt. This shows the photograph that was made from the point where Zapruder was standing ^{looking} towards the car, and is a point that we have designated as Position A because it is in a position that did not appear on the Zapruder film.

The Zapruder film does not start until the car gets farther down Elm Street.

Mr. Specter. What is that exhibit number?

Mr. Shaneyfelt. 886.

Mr. Specter. And why was that location selected for the position of the car?

Mr. Shaneyfelt. This location was selected as the first point at which a person in the sixth floor window of the Book Building at our control point could have gotten a shot at the

President after the car had rounded the corner from Houston to Elm.

Mr. Specter. And what position is Station C?

Mr. Shaneyfelt. Station C is ^{on} a line drawn along the west curb line of Houston Street in a direct line, and Station C is at a point along that line that is in line with where the car would have turned coming around that corner. It is on a line which is an extension of the west curb line of Houston Street.

Mr. Dulles. Where is Position A on that chart?

Mr. Shaneyfelt. Position A is here.

Mr. McCloy. That is before you get to the tree?

Mr. Shaneyfelt. Yes. He isn't under the tree yet.

Mr. Specter. And what occupant, if any, in the car is Position A sighted on for measuring purposes?

Mr. Shaneyfelt. All of the photographs made through the rifle sight that are shown on the exhibit in the lower left-hand corner were sighted on the spot that was simulating the spot where the President was wounded in the neck. The chalk mark is on the back of the coat.

Mr. Specter. When you say that Position A is the first position at which President Kennedy was in view of the marksman from the southeast window on the sixth floor of the School Book Depository Building, you mean by that the first position where the marksman saw the rear of the President's stand-in?

Mr. Shaneyfelt. That is correct.

Mr. Specter. So that would be the first position where the marksman could focus in on the circled point where the point of entry on the President was marked?

Mr. Shaneyfelt. That is correct.

Mr. Specter. Could the marksman then have taken a shot at the President at any prior position and have struck him with the point of entry on that spot, on the base of the President's neck?

Mr. Shaneyfelt. I don't quite understand the question.

Mr. Specter. Was there any prior position, that is a position before Position A, where the marksman from the sixth floor could have fired the weapon and have struck the President at the known point of entry at the base of the back of his neck?

Mr. Shaneyfelt. No, because as the car moves back, you lose sight of the chalk mark on the back of his coat.

Mr. Specter. And what is the distance between that point on the President and Station C?

Mr. Shaneyfelt. That is 44 feet from Station C.

91.6 feet to the rifle in the window from the actual chalk mark on the coat. All measurements were made ~~on~~^{to} the chalk mark ~~on the coat.~~ on the coat.

Mr. Specter. On the coat of the President?

Mr. Shaneyfelt. That is correct.

Mr. Specter. The President's stand-in?

Mr. Shaneyfelt. Right. The angle to the rifle in the window

Mr. Specter. And what is the other data?

Mr. Shaneyfelt. The distance to the overpass was 447 feet, and the angle to the overpass was ^{minus zero degrees,} 27 minutes; *that is, 27 minutes below the horizontal.*

Senator Cooper. May I ask a question there?

How did you establish the location of the rifle in making those calculations?

Mr. Shaneyfelt. The location of the rifle was established on the basis of other testimony and information furnished to us by the Commission, photographs taken by the Dallas Police Department immediately after the assassination, the known opening of the window.

It was an estimation of where the rifle most likely was, based on the knowledge that the Commission has through testimony.

Mr. Specter. Senator Cooper, Mr. Frazier is present and has been sworn, and he is going to identify that. He could do it at this time, to pinpoint that issue.

Senator Cooper. I think we can just make a note of that, and go ahead with this witness.

Mr. Specter. Fine.

We will proceed then with this witness and Mr. Frazier will testify in due course.

Mr. Shaneyfelt. I might say that this position was determined by Mr. Frazier in the window. We moved the car around until he told us from the window, viewing through the rifle, the point where

he wanted the car to stop and he was the one in the window that told us where the point A was. Once we established that, we then photographed it.

Mr. Dulles. Could he see the mark on the back of the coat from the window?

Mr. Shaneyfelt. Yes. Through the rifle scope, he could see the mark.

Mr. Specter. Does the picture designated "Photograph through Rifle Scope" depict the actual view of the rifleman through the actual Mannlicher Carcano weapon?

Mr. Shaneyfelt. That is correct. At Point A.

Senator Cooper. When Mr. Frazier testifies, then, will he correlate this photograph with a frame from photographs taken of the actual motorcade at the time of the assassination?

Mr. Shaneyfelt. No. We cannot correlate this with a frame from the motion picture because ~~the motion picture~~ Mr. Zapruder didn't start taking pictures until the car had passed this point.

So we, therefore, on this frame and for the next two or three points, have no picture from Mr. Zapruder, since he wasn't taking pictures at that time.

Mr. Dulles. Off the record.

(Discussion off the record.)

Mr. Dulles. Back on the record.

Do I understand that you are not suggesting that a shot was necessarily fired at this point A, but this was the first point

where this particular vision of the President's back could have been obtained?

Mr. Shaneyfelt. That is correct. It is only an arbitrary point showing the first possible shot that could have entered the President's coat at this chalk mark.

Rep. Ford. What criteria did you use for determining that you could see the chalk mark? Was the criteria a part of a whole of the chalk mark?

Mr. Shaneyfelt. The actual manner in which it was set up -- let me see if this answers your question. As we moved the car around, Mr. Frazier ^{was} in the window looking through the actual ~~scope~~ scope of the rifle, and ^{could} ~~can~~ see very clearly the President or the man taking the President's place, as the car moved ^d around.

And the instant that he ~~can see~~ ^{could first see} that chalk mark is the point where he radioed to us to stop the car, and is the first point at which ^a ~~the~~ shot could be fired that would go ⁱⁿ ~~to~~ where the chalk mark is ^{located}.

Mr. Dulles. And that is Point A?

Mr. Shaneyfelt. That is Point A.

Does that answer your question?

Rep. Ford. I think it does.

Is that picture in the lower left-hand corner of Exhibit 886 an actual photograph taken through the sight of the weapon that was allegedly used in the assassination?

Mr. Shaneyfelt. That is correct.

Rep. Ford. And the chalk mark we see there is through that sight?

Mr. Shaneyfelt. That is correct. And that is exactly what an individual looking through the sight would see.

Mr. Specter. Then at point A, could the rifleman see the entire back of the President's stand-in as well as the specific chalk mark, as depicted on the exhibit?

Mr. Shaneyfelt. He could see only a portion of the back.

Mr. Specter. And the portion which he could not see, is that which is below the seat level?

Mr. Shaneyfelt. Yes.

Mr. Dulles. You didn't say the President's stand in, did you?

Mr. Specter. Yes -- stand-in.

Mr. Shaneyfelt, for the purposes of illustration would you produce the photograph at this time showing the mounting of the motion picture camera on the weapon found on the sixth floor?

I now hand you a photograph which is being marked as Commission Exhibit No. 887 and ask you to state for the record who that is a picture of. And what else is in the photograph.

(The document referred to was marked Commission Exhibit 887 for identification.)

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Mr. Shaneyfelt. Commission Exhibit 887 is a picture of me that was taken on May 24, 1964. My location was ^{at} the 6th floor window of the Texas School Book Depository that we have ~~been~~ designated as our control point. I have the rifle that ~~was~~ ^{is} ~~the~~ the assassination rifle mounted on a tripod, and on the rifle is mounted an ~~Ariflex~~ ^{ARRIFLEX} 16mm motion picture camera, that is aligned to take photographs through the telescopic ~~sight~~ ^{sight}.

This ~~Ariflex~~ ^{Ariflex} motion picture camera is commonly known as a reflex camera in that, as you view through the view finder a prism allows you to view directly through the lens system as you are taking your photographs so that as I took the photographs looking into the view finder I was also looking through the scope and seeing the actual image that was being recorded on the film.

Mr. Specter. Was the view recorded on the film as shown on 886 the actual view which would have been seen had you been looking through the telescopic sight of the Mannlicher Carcano itself?

Mr. Shaneyfelt. Yes.

Mr. Specter. How did you determine the level and angle at which to hold the rifle?

Mr. Shaneyfelt. I placed the rifle in the approximate position based on prior knowledge of where the boxes were stacked and the elevation of the window and other information that was furnished to me by representatives of the Commission.

Mr. Dulles. You used the same boxes, did you, that the

assassin had used?

Mr. Shaneyfelt. No, I did not.

Mr. Specter. Were those boxes used by Mr. Frazier.

Mr. Shaneyfelt. They were used by Mr. Frazier and used in making the measurements. I had to use a tripod because of the weight of the camera and placed the elevation of the rifle at ~~an~~ ^{an} approximate height ~~at that~~ ^{in a} position as though the boxes were there.

Mr. Specter. Was Mr. Frazier present at the time you positioned the rifle on the tripod?

Mr. Shaneyfelt. Yes, he was.

Mr. Specter. Did he assist in describing for you or did ^{you} have an opportunity to observe the way he held a rifle to ascertain the approximate position of the rifle at that time?

Mr. Shaneyfelt. That is correct.

Mr. Specter. May it please the Commission, we will with Mr. Frazier indicate the reasons he held the rifle in the way he did to approximate the way we believe it was held at the time of the assassination.

What is the next position which has been depicted on one of your exhibits, please.

Mr. Shaneyfelt. The next position that we established ^{during} during the re-enactment is frame 151 of the Zapruder motion picture film.

Mr. Specter. Permit me to mark that if you would as Exhibit

No. 888.

(Commission Exhibit No. 888 was marked for identification.)

Mr. Shaneyfelt. This position which has been designated ~~X~~ by us as frame 161 and as Commission Exhibit 888, was established as the last position that the car could be in where the rifleman in the window could get a clear shot of the President in the car before the car went under the covering of the tree.

Mr. Spector. How was that position located, from the ground or from the 6th floor?

Mr. Shaneyfelt. This was positioned by Mr. Frazier in the 6th floor ^{window}. In addition we knew from the Zapruder photographs the relative position of the car in the street as related to the curb and the guidelines or the lane lines.

Following those lane lines we then moved the car down to a point where Mr. Frazier radioed to us ^{that it} was the last point at which he could get a clear shot ^{we} and stopped the car there.

Mr. Spector. How did you then select the appropriate frame from the Zapruder film?

Mr. Shaneyfelt. After Mr. Frazier had stationed the car at this point, I then went to the position of Mr. Zapruder. Based on his motion pictures, a comparison of the photograph that we made with the photograph of the film, ~~and~~ was able to state that because of the relative position of the car in the street and in relation to other objects in the background, ~~that~~ ^{it} corresponded to frame 161 of the motion picture.

Mr. Specter. Do you have on 813 a reproduction of frame 161?

Mr. Shaneyfelt. Yes. The upper lefthand corner is a reproduction of ~~the~~ frame 161 of the Zapruder motion picture. The picture on the upper right is a photograph that I made with a speed graphic camera from Zapruder's position of the car re-established in that location.

The photograph in the ~~lower right hand corner~~ was

~~Mr. Specter: lower lefthand corner?~~

~~Mr. Shaneyfelt:~~ lower lefthand corner, is a photograph of the view through the rifle scope that Mr. Frazier saw at the time he positioned the car there. This is the view that you would obtain from looking through the rifle ^{scope from} the 6th floor window.

Mr. Specter. Was the automobile in exactly the same position at the time of the taking of the "photograph through rifle scope" and the "photograph from re-enactment,"?

Mr. Shaneyfelt. Yes, approximately the same. We went through all stations with Mr. Frazier in the window and I took photographs from Mr. Zapruder's position, and once establishing a frame position, ^{we} marked it clearly in the street, and after we had taken all of the photographs from Zapruder's position, we then took the car back, and ^I ~~now~~ went to the 6th floor window and mounted the motion picture camera, ^{on the rifle} and these photographs were made by rolling the car in the same position based on the marks we had in the street so it was as accurate as could be done in.

the same position.

Mr. Dulles. There is no one sitting in that right-hand corner of the rear seat, is there in that picture?

Mr. Shaneyfelt. Yes, the person taking President Kennedy's place is sitting in the back seat.

Mr. Dulles. Yes, I see it. It is rather hard to see through the trees.

Mr. Shaneyfelt. Yes. We moved it up to a point where the chalk mark was just about to disappear on the street.

Mr. Dulles. I don't think I see the chalk mark maybe one can.

Mr. Shaneyfelt. It may be covered by the crosshair of the rifle scope.

Rep. Ford. In that picture photographed through the rifle scope on 888 a man standing in for Governor Connally is also in the car, is he not?

Mr. Shaneyfelt. That is correct.

He is mostly hidden by the tree.

Mr. Dulles. Yes, I see.

Mr. Specter. Was there any difference between the position of President Kennedy's stand-in and the position of President Kennedy on the day of the assassination by virtue of any difference in the automobiles in which each rode?

Mr. Shaneyfelt. Yes. Because of the difference in the automobiles there was a variation of ten inches^a vertical distance of

ten inches that had to be considered. The stand-in for President Kennedy was sitting ten inches higher and the stand-in for Governor Connally was sitting ten inches higher than the President and Governor Connally were sitting and we took this into account in our calculations.

Mr. Specter. Was any allowance then made in the photographing of the first point or rather last point at which the spot was visible on the back of the coat of President Kennedy's stand-in before passing under the Oak tree?

Mr. Shaneyfelt. Yes, there was. ~~We~~ After establishing this position ~~where~~, represented by frame 161, where the chalk mark was about to disappear under the tree, we established a point ten inches below that as the actual point where President Kennedy would have had a chalk mark on his back or where the wound would have been if the car ~~that~~ was ten inches lower and we rolled the car then sufficiently ~~far enough~~ ahead to re-establish the position that the chalk mark would be in at its last clear shot before going under the tree, based on this ten inches ~~lower~~, and this gave us frame 166 of the Zapruder film.

Mr. Specter. What Commission Exhibit number has been affixed to that?

Mr. Shaneyfelt. This is Commission No. 889.

(Commission Exhibit No. 889 was marked for identification.)

Mr. Dulles. Is that ten inches difference due to the difference in the two cars?

Mr. Shaneyfelt. That is correct.

Mr. Dulles. That is the President's -- the car the President was in and the car you had to use for this particular test?

Mr. Shaneyfelt. That is correct.

Mr. Specter. On Exhibit 889, is the car in the same position on the "photograph through rifle scope" as it is on "photograph from re-enactment"?

Mr. Shaneyfelt. That is correct, the same position.

Mr. Specter. And what is the comparison between the photograph from Zapruder film on that Exhibit 889 and the photograph from re-enactment?

Mr. Shaneyfelt. The car is in the same position relative to the surrounding area in both the re-enactment photograph and the Zapruder photograph.

Incidentally, the position that was used throughout all of the positioning of the car was the President's ^{his} placement, ~~the~~ in the photograph, and this will be clearer in some of the later photographs, ~~but~~ if the President's head was directly under a stop sign or a street sign or whatever, in the background, this was then the way we positioned the car with the person standing in for the President directly below or slightly to the side or directly below the stop sign and so on, so all of the calculations were based upon the position of the President.

Mr. Specter. Before leaving 161 finally, would you recite the distances which appear from the various points on that exhibit?

Mr. Shaneyfelt. Yes.

At the position that has been designated as frame 161, and appears on Commission Exhibit 888, the distance from the wound mark on a stand-in for President Kennedy to station C was 94.7 feet.

The distance to the rifle in the window was 137.4 feet, the angle to the window was 26 degrees 58 minutes based on the horizontal line, the distance to the overpass was 392.4 feet, and the angle to the overpass was ^{minus zero degrees,} 7 minutes.

Mr. Specter. Are all angles calculated there, based on the horizontal?

Mr. Shaneyfelt. Yes.

Mr. Specter. Was there any street angle taken into consideration in the calculations here?

Mr. Shaneyfelt. Yes. There is a 3 degree street grade that has to be deducted from the angle to the window to determine the actual angle from the street to the window as opposed to the horizon.

Mr. Specter. Will you now --

Mr. Dulles. Frame 161 is 3 degrees on 161?

Mr. Shaneyfelt. Three degrees all along Elm Street.

Mr. Dulles. All along. That applies to all of these different pictures, is that correct?

Mr. Shaneyfelt. That is correct.

Mr. Specter. Would you now read the same statistical data

from frame 166 on Exhibit 889, please?

Mr. Shaneyfelt. Yes.

~~Distance to station C~~ From the chalk mark on the back of the stand-in for President Kennedy, to station C is 95.6 feet, the distance ^{to} rifle ⁱⁿ window, 138.2 feet, the angle to rifle in window based on ^{the horizontal} window is 26 degrees 52 minutes.

Distance to overpass is 391.5 feet. The angle to the overpass is ^{minus zero} degrees 7 minutes.

Mr. Specter. Did the back of President Kennedy ever come into view at any time while he was passing through the foliage of the oak tree?

Mr. Shaneyfelt. Yes.

Mr. Specter. What frame number was ascertained with respect to that position?

Mr. Shaneyfelt. This was determined to be frame 185.

There is a slight opening in the tree, ^{where} as the car passed under

the tree, where a shot could have been fired that would have ^{passed} ~~missed~~ ^{through this opening in} the tree. This again was positioned on the basis of Mr.

Frazier in the window looking through the rifle scope and telling us on the street where to stop the car at the point where he could get a shot through the trees.

Mr. Specter. What Commission Exhibit number has been assigned to frame 185?

Mr. Shaneyfelt. This is Commission No. 890, frame 185.

Mr. Specter. Is the photograph through rifle scope ^{taken with} ~~taking~~

the position of the car at the same place as photograph from re-enactment?

Mr. Shaneyfelt. That is correct.

Mr. Specter. And is the photograph from re-enactment in the same position, as close as you could make it to the photograph from Zapruder's film?

Mr. Shaneyfelt. That is correct.

Mr. Specter. Will you read the statistical data from frame 185?

Mr. Shaneyfelt. Yes, from the ^{point} ~~position~~ of the chalk on the back of the stand-in for the President ^{at} ~~to~~ position 185 to station C is 114.8 feet, the distance to rifle in window is 154.9 feet,

The angle to rifle in window based on horizontal is 24 degrees 14 minutes, distance to overpass is 372.5 feet.

The angle to the overpass is zero degrees three minutes; ^{above horizontal.}

Mr. Specter. Was there any adjustment made for the difference in the height of the automobiles on the location where the back of the President's stand-in was visible through the tree?

Mr. Shaneyfelt. Yes, there was an adjustment made for the ten inch differential ⁱⁿ ~~for~~ the heights because of the different cars, and this was established as frame 186.

Mr. Specter. What Commission exhibit number is affixed to frame 186?

Mr. Shaneyfelt. Commission Exhibit No. 891.

Mr. Specter. On 891 is the car in the same position ⁱⁿ ~~that~~

photograph through rifle scope and photograph from re-enactment?

Mr. Shaneyfelt. That is correct.

Mr. Specter. Are the cars on those two pictures in the same positions on all of the frames which you are going to show this afternoon?

Mr. Shaneyfelt. That is correct.

Mr. Specter. In the photograph from Zapruder film, does that photograph from Zapruder film show the Presidential automobile to be in the same position or as close to the same position as you could make it as is the replica car in the photograph from re-enactment?

Mr. Shaneyfelt. That is correct.

Mr. Specter. Will you read the statistical data from 186, please?

Mr. Shaneyfelt. Yes.

At ~~point from~~ 186 position the distance from the chalk mark on the back of the stand-in for the President was 116.3 feet from the station C. It was 156.3 feet ~~from the window~~ ^{to} the rifle in the window.

The angle to the rifle in the window was 24 degrees 3 minutes based on the horizontal. Distance to the overpass was 371.7 feet. The angle to the overpass is zero degrees 3 minutes.

Mr. Specter. Was the position ascertained where the chalk spot on the back of President Kennedy's coat was first visible from the 6th floor window through the telescopic sight?

Mr. Shaneyfelt. That is correct.

Mr. Dulles. This is later passing the tree.

Mr. Shaneyfelt. Yes.

Mr. Specter. After passing out from under the oak tree.

Mr. Shaneyfelt. Yes.

Mr. Specter. What frame did that turn out to be?

Mr. Shaneyfelt. That was frame 207.

Mr. Specter. Do you have an exhibit depicting the same photographic sequence on frame 207?

Mr. Shaneyfelt. Yes, I do.

Mr. Specter. What Commission Exhibit number has been affixed to that frame?

Mr. Shaneyfelt. Commission Exhibit No. 892.

Mr. Specter. Is the car in the same position on photograph through rifle scope and photograph from re-enactment on that exhibit?

Mr. Shaneyfelt. Yes.

Mr. Specter. Is the car in the same position, as closely as you could make it on the photograph from re-enactment and photograph from Zapruder film?

Mr. Shaneyfelt. That is correct.

Mr. Specter. Will you now read the statistical data from that exhibit?

Mr. Shaneyfelt. Yes.

The distance from the chalk mark on the back of the stand-in for

the President to the station C is 136.6 feet.)

Distance to rifle in the window is 174.9 feet. The angle to the rifle in the window based on the horizontal is 21 degrees 50 minutes. The distance to the overpass is 350.9 feet, and the angle to the overpass is zero degrees 12 minutes.

This is on frame 207, Commission 892.

Mr. Specter. Was an adjustment made on that position for the heights of the automobiles?

Mr. Shaneyfelt. Yes.

Mr. Specter. What was the adjusted frame for the first view that the marksman had of the President's stand-in coming out from under the tree?

Mr. Shaneyfelt. That is frame 210 and has been marked as Commission Exhibit No, 893 and represents the ten-inch adjustment for the difference in the height of the car as compared with frame 207

Mr. Specter. Is the layout of frame 210 exactly the same as that for 207 and 185 that you have already testified about?

Mr. Shaneyfelt. That is correct.

Mr. Specter. In viewing the films on the frames preceding 210, what was President Kennedy doing?

Mr. Shaneyfelt. He ^{was} waving to the crowd, and in some frames it is obvious that he ^{was} smiling, you can actually see a happy expression on his face and his hand --

Mr. Dulles. Which way is he turning, to the left or to the

right?

Mr. Shaneyfelt. He is looking toward the crowd to his right during most of that area, he is looking slightly to his right. His arm is up on the side ^{of the car} and his hand is in a wave in approximately this position and he appears to be smiling.

Mr. Specter. What is the latest frame count where, to your eye it appears that he is showing no reaction to any possible shot?

Mr. Shaneyfelt. Approximately-- I would like to explain a little bit, that at frames in the vicinity of ²⁰⁰ 215 to ²¹⁰ 218 he is ^{obviously} obviously still waving, and there is no marked change.

Mr. Specter. You say 215 to 210?

Mr. Shaneyfelt. Yes, in that general area.

Mr. Dulles. Is 215 to 210 or 210 to 215?

Mr. Shaneyfelt. As he is coming toward me, yes, 210 to 215, yes, I am sorry, 210 to 215 there is very little difference in his appearance from what it was back beyond 210, he is waving.

Mr. Specter. Will you take a look at Exhibit 885 to double-check yourself on that, please?

Mr. Shaneyfelt. I was going the wrong way, you are right.

~~I was correct that~~ In the area from approximately ²⁰⁰ ~~200~~ to 205 he is still, his hand is still in a waving position, he is still turned slightly toward the crowd, and there has been no change in his position that would signify anything occurring

unusual, I see nothing in the frames to arouse my suspicion

about his movements, up through the areas from 200 on and as he disappears behind the signboard, there is no change.

Now, ~~at~~ 205 is the last frame, 205 and 206 are the last frames where we see any of him. Where we see the cuff of his coat showing above the signboard indicating his hand is still up generally in a wave.

From there on the frames are too blurry as his head disappears you can't really see any expression on his face. You can't see any change. It is all consistent as he moves in behind the signboard.

Mr. Specter. When you say "signboard" what do you mean by that, Mr. Shaneyfelt?

Mr. Shaneyfelt. I refer to the sign that is between the photographer, Mr. Zapruder, and the Presidential car.

Rep. Ford. Not any sign post between the rifleman and the President?

Mr. Shaneyfelt. No. This is a sign between the cameraman and the President. So that we are unable to see his reaction, if any.

Mr. Specter. What is the frame at which Governor Connally first emerges from behind the sign you just described?

Mr. Shaneyfelt. That is frame 222.

Mr. Specter. Have you prepared a model demonstration on frame 222?

Mr. Shaneyfelt. Yes, I have.

Mr. Specter. That Commission Exhibit number has just been affixed on that frame?

Mr. Shaneyfelt. Frame 222 has been given Commission Exhibit No. 894.

Mr. Specter. Was the location of the automobile fixed from the window or from the street on frame 222?

Mr. Shaneyfelt. ~~On~~ On frame 222, the position of the automobile was fixed from the street, based on the photograph from the Zapruder film.

Mr. Specter. Are the various photographs on that frame and the various distances the same in terms of general layout as the prior exhibit you testified to?

Mr. Shaneyfelt. That is correct.

Mr. Specter. What is the first frame at which President Kennedy is visible coming from behind that sign?

Mr. Shaneyfelt. This is frame 225.

Mr. Specter. What Commission exhibit has been affixed to frame 225?

Mr. Shaneyfelt. Frame 225 has been assigned Commission Exhibit No. 895.

Mr. Specter. What, if anything, is detectable from a view of the Zapruder film frame 225 as to the positions or reaction of President Kennedy?

Mr. Shaneyfelt. ^{At} frame 225 there appears to be a reaction on the part of the President. This is --

Mr. Specter. Describe specifically what movement he is making in that picture or what his position is?

Mr. Shaneyfelt. In frame 225 his hand is down, his right hand that was waving is down, and has been brought down as though it were reaching for his lapel or his throat. The other hand, his left hand is on his lapel but rather high, coming as though it were coming up, and he is beginning to go into a hunched position.

Mr. Specter. When you say beginning to go into a hunched position is that apparent to you from viewing the motion picture and slides from the frames which succeed frame 225?

Mr. Shaneyfelt. That is primarily apparent from the motion picture because of the two or three or four frames that show as he emerges from the sign.

There is, in the motion picture, you see the President reaching for his coat lapels and going in ~~a motion~~ ^{to} a hunched ^{id} position, leaning forward and lowering his head.

Mr. McCloy. That doesn't exist in 225 yet, does it?

Mr. Shaneyfelt. It is just beginning in frame 225. That is, frame 225 is the first view we have of the President.

Mr. McCloy. Out past the sign.

Mr. Shaneyfelt. As he comes out from behind the sign that obstructs the cameraman from the President.

Mr. Dulles. But there is no obstruction from the 6th floor window?

Mr. Shaneyfelt. No, no obstruction at this point. There is no obstruction from the 6th floor window from the time they leave the tree until they disappear down toward the triple overpass.

Mr. Specter. Do the photographs on 225 depict the same circumstances as those depicted on the prior exhibits?

Mr. Shaneyfelt. That is correct.

Mr. Specter. And do the measurements on 225 cover the same subjects as those covered on prior exhibits?

Mr. Shaneyfelt. That is correct.

Mr. Specter. What is the angle from the rifle to the spot on the President's back on Exhibit 210, please?

Mr. Shaneyfelt. On frame 210, the angle from the rifle ⁱⁿ to the window, based on the horizon is 21 degrees 34 minutes.

Mr. Specter. That is from the rifle to what, Mr. Shaneyfelt.

Mr. Shaneyfelt. From the rifle to the chalk mark on the back of the stand-in for the President.

Mr. Specter. What is the same angle at frame 225?

Mr. Shaneyfelt. It is 20 degrees 11 minutes.

Mr. Specter. Those angles are computed to the horizontal?

Mr. Shaneyfelt. That is correct.

Mr. Specter. What is the range of distance from frame, from the position of the car, frame 210 to the position of the car in frame 225?

Mr. Shaneyfelt. That is ~~15 feet, 15.1 feet~~ no, 14.9 feet.

Between frame 210 and frame 225.

Mr. Spector. What is the position of President Kennedy at frame 210 with respect to position C.

Mr. Shaneyfelt. President Kennedy is 138.9 feet from Station G at frame 210.

Mr. Spector. Station C.

Mr. Shaneyfelt. Yes, station C to President Kennedy on frame 210 is 138.9 feet.

Mr. Spector. What is the distance between station C and President Kennedy at frame 225?

Mr. Shaneyfelt. That is 153.8 feet.

Mr. Spector. Was the car further positioned at frame 231?

Mr. Shaneyfelt. Yes, it was.

Mr. Spector. What Commission exhibit number are we affixing to that?

Mr. Shaneyfelt. That is Commission Exhibit 896.

Mr. Spector. Are the photographs and measurements on 896 the same layout as those affixed to prior exhibits?

Mr. Shaneyfelt. That is correct.

Mr. Spector. Was the automobile stopped at frame 235 and similar photographs and measurements taken?

Mr. Shaneyfelt. That is correct.

Mr. Spector. What exhibit number is affixed to frame 235.

Mr. Shaneyfelt. Exhibit 897.

Mr. Spector. Was the automobile again stopped at frame 240

with measurement and photographs taken similar to those in prior exhibits?

Mr. Shaneyfelt. Yes, it was. That is correct.

Mr. Specter. What Commission exhibit number is affixed to that frame?

Mr. Shaneyfelt. No. 898.

Mr. Specter. Was the automobile again stopped at frame 249 with similar photographs and measurements taken?

Mr. Shaneyfelt. That is correct.

Mr. Specter. And what Commission exhibit number is given to those calculations and photographs on frame 249?

Mr. Shaneyfelt. Commission Exhibit 899.

Mr. Specter. Now, as to frame 249, that is how many frames beyond the first point at which the spot on President Kennedy's back was visible after he passed out from under the oak tree?

Mr. Shaneyfelt. That is 249?

Mr. Specter. Yes.

Mr. Shaneyfelt. It is 42.

Mr. Specter. And does a 42 frame count approximately have any significance with respect to firing time on the Mannlicher Carcano rifle?

Mr. Shaneyfelt. Yes, we have established that the Zapruder motion picture camera operates at an average speed of 18.3 frames per second. And we have been advised that the minimum time for firing the rifle in successive shots is approximately two and

a quarter seconds. So this gives us then a figure of two and a quarter seconds of frames; at 18.3, ^{this} gives us this figure of 41 to 42 frames.

Rep. Ford. Would you repeat that again, please.

Mr. Shaneyfelt. The camera operates at a speed of 18.3 frames per second. So that in two and a quarter seconds it would run through about 42, 41 to 42 frames.

Rep. Ford. Then the firing of the rifle, repeat that again?

Mr. Shaneyfelt. ^{As to} the firing of the rifle, we have been advised that the minimum time for getting off two successive, ^{well aimed} shots on the rifle is approximately two and a quarter seconds. That is the basis for using this 41 to 42 frames to establish two points in the film where two successive quick shots could have been fired.

Rep. Ford. That is with one shot and then the firing.

Mr. Shaneyfelt. Work the bolt and fire another one.

Mr. Specter. At frame 249 was Governor Connally in a position where he could have taken a shot with the bullet entering at the point immediately to the left under his right armpit with the bullet then going through and exiting at a point immediately under his right nipple, ^{assuming the bullet followed an undeflected path?}

Mr. Shaneyfelt. No, ^{continued} if the bullet ~~traveled~~ in a straight ~~line~~ path.

Governor Connally has begun to turn in his seat around in this manner, in such a way, turn to his right so that his body is in a position that a shot fired from the 6th floor window

could not have passed through the path that it took through his body, *if the bullet followed a straight, undeflected path.* However, *I have no personal knowledge that it was undeflected.*

Mr. Dulles. I don't quite get that. You mean because of his having turned this way, the shot that was then -- had then been fired and apparently had hit the President could not have gone through him at that point?

under the stated conditions.

Mr. Shaneyfelt. That is correct *Even a* no other shot independent of the *shot that hit the* President, could not have gone through *in that manner,* a shot coming from the 6th floor window, because *the window is* it was almost directly behind the automobile at that time and the Governor's ~~position~~ was in a position where *the bullet* it couldn't have *gone through his body in the manner* come in. *that it reportedly did.*

It would have come in through his shoulder and out through the other shoulder, in *the way that* ~~that manner~~ he was lined up with the window, *if it followed an undeflected path.*

Mr. Specter. So you say it could have gone through him but it could not have passed through him with the angle of entry as disclosed in the Parkland Hospital records and described by Dr. Shaw?

Mr. Shaneyfelt. That is correct, *if it followed a straight path.*

Mr. Specter. And exiting immediately under his right nipple, again as described in the hospital records at Parkland and by Dr. Shaw.

Mr. Shaneyfelt. That is correct.

Mr. Specter. Have those points of entry and exit been made available to you in your analysis of this situation?

Mr. Shaneyfelt. Yes, they have.

Mr. Specter. Could you elaborate just a little further on the observations and reasoning which you have undertaken to come to the conclusion which you have just expressed?

Mr. Shaneyfelt. We are speaking of frame 249, are we?

Mr. Specter. Yes, sir, 249.

Mr. Shaneyfelt. Could I see that exhibit?

The photograph in the lower left corner of Commission Exhibit 899 is the photograph taken through the scope of the rifle ⁱⁿ on the 6th floor window when the car was stationed in this frame number position. It is noted from this photograph that the rifle is not quite directly behind the car but very nearly directly behind the car.

Governor Connally's body is turned. We have duplicated the position in the Zapruder photographs of Governor Connally and the President in the re-enactment photograph as nearly as possible, duplicated the same body position, and from the 6th floor window then you ^{can} see ^{from the photographs} that the Governor's body is turned to the Governor's right in such a fashion that ^{an undeflected} shot would not go through in the path as described by the Parkland doctors.

Mr. McCloy. I don't quite follow that yet. The President has been shot at 249, according to your theory.

Mr. Shaneyfelt. Yes.

Mr. McCloy. Might he not also have been shot at some earlier frames in -- the indications are the reactions are shown consider-

ably ahead of that frame.

Mr. Shaneyfelt. That is correct.

Mr. McCloy. So, for example, at 237 and at 237 Governor Connally hasn't turned to the right.

Mr. Dulles. But a shot has been fired at this time.

Mr. McCloy. But a shot has been fired at that time.

Mr. Shaneyfelt. Yes.

Mr. McCloy. So at that point he could have been hit, Governor Connally could have been hit.

Mr. Shaneyfelt. Yes, Governor Connally could have been hit by frame 238.

Mr. McCloy. But your point is when he gets further along, he couldn't have been hit, let's say at 249 in the same spot where he was hit.

Mr. Shaneyfelt. That is correct, *again provided the bullet is undeflected.*

Mr. McCloy. Yes.

Mr. Dulles. He made the turn later than those frames you have been discussing at the time apparently of the first shot at the President.

Mr. McCloy. Yes. The first shot, but according to these frames, the first shot hit the President considerably before this.

Mr. Shaneyfelt. Yes, ~~yes~~

Mr. McCloy. And at a time again when Governor Connally's back was square to the window.

Mr. Shaneyfelt. Well, not exactly square. I believe he was

turned slightly to the right as he went behind the sign.

Mr. McCloy. Take 231.

Mr. Shaneyfelt. Yes.

Mr. McCloy. There the President has got his hands up as you put it to his throat.

Mr. Shaneyfelt. Yes.

Mr. McCloy. And here is Connally facing to the front.

Mr. Shaneyfelt. Yes.

Mr. McCloy. So at that point a bullet coming through the President's throat could have hit Connally in the spot where it did hit Connally.

Mr. Shaneyfelt. I am going to defer that question to Mr. Frazier who is in the window with the rifle scope and made a more thorough study of the possible path of the bullet. But he is straight in the car in 231.

Mr. McCloy. But your testimony is in 248 -- 249 Connally couldn't have been hit from this window in the position where he was sitting.

Mr. Shaneyfelt. That is correct, *on the basis stated,*

Mr. Dulles. But you would have then the problem you would think if Connally had been hit at the same time would have reacted in the same way and not reacted much later as these pictures show.

Mr. McCloy. That is right.

Mr. Dulles. Because the wounds would have been inflicted

Mr. McCloy. That is what puzzles me.

Mr. Dulles. That is what puzzles me.

Sen. Cooper. Would you identify the frame in which Governor Connally started turning to the right?

Mr. Shaneyfelt. I might say that as -- in the motion picture -- as the car comes out from behind the signboard, the Governor is turned slightly to his right in this manner. This would be in the first frame, in frame 222, he is turned just slightly to his right, and from there on he turns almost square, straight on with the car momentarily, and there is a jerking motion there at one point in the film about there, at which time he starts to turn this way and continues to turn.

Mr. Dulles. Jerky motion in Connally in the film.

Mr. Shaneyfelt. There is -- it may be merely where he stopped turning and started turning this way. It is hard to analyze.

Mr. Dulles. What I wanted to get at whether it was Connally who made the jerky motion or there was something in the film that was jerky. You can't tell.

Mr. Shaneyfelt. You can't tell that.

Mr. McCloy. Certainly the film is jerky at that point. I mean there is a big blur.

Mr. Shaneyfelt. He does turn.

Mr. McCloy. Just before and after that.

Rep. Ford. But isn't it apparent in those pictures that

after a slight hesitation Governor Connally's body turns more violently than the President's body?

Mr. Shaneyfelt. Yes.

Rep. Ford. The President's only reaction is a motion to his throat or to his neck with his hands.

Mr. Shanoyfelt. That is correct.

Rep. Ford. Whereas Governor Connally actually turns his body rather sharply?

Mr. Shaneyfelt. Yes. He turns ~~as he comes~~ as they go ~~to the~~ behind the signboard, he turns this way and he is turning a little bit this way and as he comes out of the signboard he is facing slightly to the right, comes around ~~straight on~~ and ~~then he~~ turns to his left straight on, and then he turns to his right, continues to turn around and falls over in Mrs. Connally's lap.

But in the motion picture it is a continuous movement as he goes around and falls.

Sen. Cooper. Will you again answer my question which I asked and hasn't been answered and I say with all respect, in what frame did Governor Connally begin to turn to the right after he had placed his position straightforward as you have testified.

Mr. Shaneyfelt. I am sorry. That starts approximately

~~233~~ to ~~234~~.
233 234

Sen. Cooper. In what frame does the photograph show or in what frame is it shown that President Kennedy had moved his hands to his throat?

Mr. Shaneyfelt. It. That shows on frame (it is clearer on frame 226, 225 is the frame where you first see him, and frame

~~226.~~

Mr. Dulles. How many frames between those two?

Mr. Shaneyfelt. From 26 to 33, seven, ~~eight~~. That would be a fraction of a second in time.

That is less than a half second.

Rep. Ford. It can be contended that based on these photographs of films that the shot apparently was fired in frames 220 to 224, in that area.

Mr. Shaneyfelt. Yes, ~~yes~~. I think you have to go back even to 210 because of reaction times; ^{we} you don't know reaction times. But I would say between 210 and 225 because at 225 we have the President reacting.

So, in that 15 frames there ~~it is probably closer to, well, it is just, you can't~~ it is behind the signboard, we can't see what is happening.

Mr. Dulles. What frame first shows him with his hands at his throat?

Mr. Shaneyfelt. 225, 226.

Mr. McCloy. 225, it is not too clear. It is much more pronounced in the next frame is where he puts his both hands to his throat, such as that.

Mr. Dulles. And Mrs. Kennedy has apparently turned around and looking at him.

Mr. McCloy. One hand may be coming down from waving in 225.

Mr. Dulles. That is his left hand there -- no, it is his right hand, your right. His right hand.

Rep. Ford. Then based on the mathematics of how quickly a second shot could be fired the second shot would be fired in approximately what frame?

If you assume ~~it~~ the first shot is from 210 to 224.

Mr. Shaneyfelt. It would be ~~242 to 250, I am sorry,~~ 252 to ²⁶⁶~~260,~~ down in there.

Rep. Ford. That would be the elapsed time of that which would be what?

Mr. Shaneyfelt. Two and a quarter seconds.

Rep. Ford. Two and a quarter seconds.

Mr. Shaneyfelt. That is the very quickest.

Mr. Specter. On fixing the range from frames 210 to 225, where the President was first struck, did you take frame 210 because that was the first point after the President had passed ~~out~~ from under the oak tree?

Mr. Shaneyfelt. Yes. That is the first point ~~from this,~~ and although we are able to see in the films that there is no apparent reaction from the President from ²⁰⁵~~210~~ to ²¹⁰~~205~~ and as he disappears ~~from~~ behind the signboard, we cannot estimate the reaction time.

Mr. Specter. When you say reaction time you mean?

Mr. Shaneyfelt. Of the President?

Mr. Specter Reaction time ^{from} ~~at~~ 205.

Rep. Ford. To 210?

Mr. Shaneyfelt. Yes.

Rep. Ford. But there at frame 210 that is the first point at which the marksman had a clear shot after the President passed out from under the tree.

Mr. Shaneyfelt. That is correct.

Rep. Ford. Then you select frame 225 as the outside limit of the shot which struck the President because that is where you first observe a reaction by the President when he comes out from behind the sign.

Mr. Shaneyfelt. That is correct.

Mr. Dulles. What frames are blanked out because of the sign?

Mr. Shaneyfelt. The President, the last we get any scene of him at all, and this is just the very ^{Top of his} head is ~~205~~ ²¹⁰ above ~~the~~

Mr. Dulles. ²¹⁰ ~~205~~ to two what is blanked out?

Mr. Shaneyfelt. 225.

Mr. Dulles. To 225 is blanked out?

Mr. Shaneyfelt. Yes, that is ¹⁵ ~~20~~ frames.

Mr. McCloy. ²²⁴ ~~204~~ he just begins to appear.

Mr. Shaneyfelt. Yes.

Mr. McCloy. I don't think if you assume the President was hit at 225 and I don't think that is clear at all. I think it begins to get clear about 227 that he had been hit, that the

reaction really develops. But I think that 225 it may very well be that he has not been hit because his hand isn't at his throat, he may be just moving from the position of waving.

Mr. Dulles. But that is about a tenth of a second.

Mr. McCloy. Yes, it is a very short time entirely. But I don't think the frame unequivocally shows the reaction to the bullet at 225. I think it does unequivocally show it at 226 and 227.

Mr. Shaneyfelt. That is correct.

Mr. Specter. Perhaps an additional question on the added clarity of the slide itself as a point of reaction would be in order for Mr. Shaneyfelt, and then may I say parenthetically that we want to have the Commission see these slides this afternoon.

We have them prepared to show them to you so that you can observe for yourself what we are bringing to you through the witness to give you a frame of reference and an orientation.

Mr. Shaneyfelt, then what was your impression as to the disclosure by frame 225 as you viewed it most recently this morning with respect to a possible reaction on the frame made from the original Zapruder film?

Mr. Shaneyfelt. It is my feeling that at frames 225, 226 and 227 you are having a reaction. You have a split second there, and at 225 the reaction is barely discernible, more discernible on the film and the slides than the reproduction you have here but it has to be considered in the light of the motion picture you see as he starts this reaction, and the reaction is by

frame, frame by frame in either the slides (pictures is clearly
~~apparent in 225, and barely apparent in 225~~ clearly apparent
 in 226, and barely apparent in 225.

Mr. Specter. Now, was frame 249 selected as a situs for
 calculations on the possible construction that President Kennedy
 was struck in the back at the first point unadjusted at which he
 emerged from the tree, to wit, frame 207, with an additional
 calculation of 42 frames giving the approximately two and a quar-
 ter seconds for the firing of a second shot to determine through
 this one means and this one means only of checking or determina-
 tion whether there was time for the rifleman to have operated
 the bolt, assuming he made a shot at 207, and to have made
 another shot at the earliest possible time at 249.

Mr. Shaneyfelt. That was the basis for the selection of
 frame 249, yes.

Mr. Specter. Now, going back just a moment, was frame
 231 selected as a basis for analysis as the first frame after
 225 because Governor Connally expressed the opinion when he viewed
 the frames that he thought he was hit by or at frame 231.

Mr. Shaneyfelt. That is correct.

Mr. Specter. And was frame 235 selected as a basis of
 analysis because that was one point at which a number of the
 viewers, including staff and agents of the FBI and Secret Service
 thought that might be the last frame at which Governor Connally
 had turned enough to the right to still take a shot and have the

bullet pass through his body from the 6th floor window at the angle described in the medical reports and by his doctors.

Mr. Shaneyfelt. That is correct. ^{on the basis of an undeflected path.} That is the frame that the doctors selected as the frame beyond which he could not have received this shot and have it travel in the path that it ^{reportedly} traveled.

Mr. Specter. Was frame 240 selected for analysis as being the absolutely last time, based on the observations of those whom you have described as seeing the films that the Governor could have conceivably taken a shot from the 6th floor window and have it pass through the body of the Governor in the way described in the medical reports and by the Governor's doctors?

Mr. Shaneyfelt. That is correct.

Mr. Specter. Was the analysis made on the ability of the Governor to take the shot at each of the positions described based on the position he had at that particular frame in accordance with the amount of turn to the right which he had made at that particular time?

Mr. Shaneyfelt. Yes.

Mr. Specter. Was there a still photograph known as AP photograph which was taken at the time of the assassination or a view seconds thereafter studied by you and others in connection with the analysis that you have been describing.

Mr. Shaneyfelt. Yes, there was.

Mr. Specter. Was the simulated automobile placed in the same position as the Presidential automobile was in when the photo-

graph was made () the AP photographer as closely as it could be positioned at the time of the re-enactment?

Mr. Shaneyfelt. That is correct.

Mr. Specter. What Commission Exhibit number is attached to the photographs of that AP shot and the re-enactment picture?

Mr. Shaneyfelt. That is Commission Exhibit No. 900.

Mr. Specter. Would you describe what photographs appear then on Commission Exhibit 900?

Mr. Shaneyfelt. On Commission Exhibit 900, the top photograph is a photograph purportedly made by an AP photographer shortly after one of the shots. It depicts the side of the Governor's head, the left side of the Governor's head, his ear is visible, he has turned considerably. It depicts the President's hands touching his lapels, and a portion of the President's face.

Secret Service agents on the followup car are seen also. The Texas School Book building in the background.

The re-enactment photograph was made after positioning the car by looking at the photograph, based on the position of the car as related to the lane line in the street, as related to the position of the building, the column of the building and so on to re-establish the location.

We also re-established in re-enactment the position of the agent taking Governor Connally's position in the car used in the re-enactment and the position of President Kennedy to closely approximate the actual photograph made by the AP, Associated

Press. This was then studied, the car in this position was then studied, from the Zapruder position, and was determined to be frame 255.

Mr. Specter. Was an exhibit prepared then on frame 255?

Mr. Shaneyfelt. That is correct.

Mr. Specter. What Commission exhibit number is affixed to frame 255?

Mr. Shaneyfelt. Exhibit 901.

Mr. Specter. Does that have the same layout of photographs and measurements as on frames 225, 222 and those which preceded them.

Mr. Shaneyfelt. Yes, it has. It has the Zapruder photographs, the matching re-enactment photograph, and the photograph through the rifle scope along with the measurements and the angles.

Mr. Specter. On the AP photograph shown on Commission Exhibit No. 900, what reaction, if any, do you observe by the Secret Service agents on the followup car?

Mr. Shaneyfelt. The Secret Service agents on the right-hand of the followup car are looking back and to their right. The one to the front on the left-hand side of the car is looking generally toward the President.

The one in back of him on the left fender is looking slightly to his right.

Rep. Ford. What is the distance on frame 255 between the

President and the rifle?

Mr. Shaneyfelt. The distance to the rifle in the window is 218 feet. This is frame 255, which is well past the signboard, well past 249 which is the last frame we considered.

Mr. McCloy. Well past the first evidence of reaction?

Mr. Shaneyfelt. Yes.

Mr. McCloy. On the part of the President to a shot.

Mr. Shaneyfelt. Well past, and past the point in the film where Governor Connally states he has been hit.

Mr. McCloy. Was that simulated car placed in any other position to duplicate still a subsequent frame?

Mr. Shaneyfelt. Yes.

The frame No. 313 which is the frame that records the shot to the President's head was recorded as frame 313 and was re-established during re-enactment.

Mr. Specter. What Commission number has been affixed to frame 313?

Mr. Shaneyfelt. Commission Exhibit 902.

Mr. Specter. Is this frame, Exhibit organized in a somewhat different fashion from the prior frame exhibits?

Mr. Shaneyfelt. That is correct.

Mr. Specter. Will you start with the photograph in the upper left-hand corner and describe for the Commissioners, please, each photograph or picture which appears thereon and what it represents?

Mr. Shaneyfelt. Yes.

I might state first that all of the other photographs were re-established on the basis of the Zapruder film using reference points in the background of the pictures.

As is apparent here from the photograph of the Zapruder frame 313 there are no reference points. There is just a grassy plot. So there is no reference point on which we can re-establish the position of the car in the roadway.

For this reason it was necessary to use the Nix film of the head shot and the ^{Much} more film of the head shot to establish this position in the road.

The right-hand photograph represents frame 24 from the Nix film, and is the frame that depicts the shot to the head. We used Mr. Nix's camera and a print of this picture and stood in the ^{previously} determined position of Mr. Nix when he took his photographs, and had them roll the car down to a position so that the President's head was directly under the point where Mr. Zapruder is standing on the projection.

Mr. Specter. You are describing the photograph on which side?

Mr. Shaneyfelt. On the --

Mr. Specter. Of the viewer.

Mr. Shaneyfelt. On the upper left-hand side.

Mr. McCloy. I think you said right.

Mr. Shaneyfelt. The upper left-hand photograph is the photo-

graph ~~from the~~ taken from the frame ~~12~~ 24 of the Nix film.

~~The~~ photograph on the right, upper right, is the photograph taken at the re-enactment from the position where Mr. Nix was standing. We then proceeded over to the point that we had established as the position of Mrs. Muchmore, and using frame 42, which is a ~~shot~~ ^{frame} in her film depicting the shot to the head, and using the steps and their relation to the President and the objects in the background in relation to the President as shown in this lower left-hand photograph, which is the Muchmore frame 42 we re-established, we checked the position we had placed the car in, based on the Nix photographs, and found that it ~~co-~~ formed and checked out as being in ^a the closely accurate position, ~~or in a fairly accurate position.~~

~~On this basis we then~~ This is the basis used for establishing the position of the car. After we had established that through the Nix and Muchmore films, we then checked it against the Zapruder photograph, which is the second from the top on the left of Commission Exhibit 902, frame 313 which shows the explosion from the top of the President's head. Just to the right of that, second picture down from the right is the photograph made at the re-enactment from Zapruder's position.

We know from studying the films that just two or three frames before frame 313 we can see a little bit of yellow along the curb, and this checks out because along this area of the photograph from the Zapruder position of the re-enactment is a yellow

strip.

Mr. Specter. When you say this area you are referring to the yellow area which appears on the left-hand curb immediately to the rear of the simulated car?

Mr. Shaneyfelt. That is correct, and this, therefore, checks out, this as being a fairly accurate position for the car in frame 313.

The photograph ~~was~~ then, the third down ^{on} the left is a photograph through the telescope of the rifle, of the car positioned in frame 313.

Mr. McCloy. Would you read off those dimensions from that?

Mr. Shaneyfelt. The dimensions from the surveyor on frame 313 of the distance from the wound on the President's stand-in to the station C is 230.8 feet.

Distance to the rifle in the window is 265.3 feet. The angle to rifle in window is 15 degrees 21 minutes and this is based on the horizontal.

Distance to the overpass is 260.6 feet, the angle to the overpass is 1 degree 28 minutes.

Mr. Specter. What would the angle be considering the adjustment on the angle of the street?

Mr. Shaneyfelt. It would be less three degrees or 12 degrees 21 minutes approximately.

Mr. Specter. When you say approximately is that because the adjustment is somewhat greater than three degrees?

Mr. Shaneyfelt. Yes.

Mr. Specter. How much is it exactly, if you know?

~~Mr. Shaneyfelt. It is 3.9. It is almost four.~~

~~Mr. Specter. Three degrees nine minutes?~~

Mr. Shaneyfelt. Three degrees nine minutes. ~~From source.~~

Mr. Dulles. Would you have to make a similar adjustment to the overpass?

Mr. Shaneyfelt. Yes, because the angle to the overpass is based on the horizontal. The overpass, you would have to add the three degrees, nine minutes.

Mr. Dulles. From the overpass, is this an angle up or angle down?

Mr. Shaneyfelt. This is an angle down.

Mr. Dulles. So it is an angle down in both cases?

Mr. Shaneyfelt. That is correct.

Mr. Specter. When you say that you are reducing the angle of 15 degrees 21 minutes by three degrees and nine minutes to an angle of 12 degrees 12 minutes, is that as the shot passes through the body of the President?

2
Mr. Shaneyfelt. That is correct. It is at that point.

Mr. Specter. How was the speed of the camera ascertained, Mr. Shaneyfelt?

Mr. Shaneyfelt. We obtained from Mr. Zapruder, Mr. Nixon, and Mrs. Muchmore their cameras for examination and in the FBI laboratory ^I exposed film in all three cameras, aiming, focusing the camera on a clock with a large sweep¹second hand. We then ran the camera at the speed and conditions as described by the people who used the cameras. We ran through several tests of film, and then after the film was developed it was studied under magnification, and frames were counted for a period of two to three seconds or for the full running time, and averages were taken.

Mr. Zapruder has stated that his camera was fully wound. Most of the others have stated their cameras were fully wound, so we were able to more or less eliminate the very slow time that occurs when the cameras are approximately run down, and all of these things were taken into consideration and were averaged.

The Zapruder camera was found to run at an average speed of 18.3 frames per second.

The Nixon and Muchmore cameras were both found around ~~at~~ ~~8.5 frames per second.~~ 18.5 frames per second, ~~in an average~~

Mr. Specter. Were you able to ascertain the speed of the Presidential limousine at the time of the assassination?

Mr. Shaneyfelt. Yes. Because we were able to determine the

speed of the camera, and thereby accurately determine the length of time it takes for a specific number of frames to run through the camera at this 18.3 frames per second, and having located these frame positions in the street, we took the farthest distant points we had in the Kaperuder film which ^{were} frames 161 ^{and} through frame 313.

This was found to run (elapsed time from the film standpoint which runs at 18.3 frames a second) ~~run~~ for a total of 8.3 seconds.

This distance is 136.1 feet, and this can be calculated then to 11.2 miles per hour.

Mr. Specter. Is that a constant average speed or does that speed reflect any variations in the movement of the car?

Mr. Shaneyfelt. That is the over-all average from ^{frames} 161 to 313. It does not mean that it was traveling constantly at 11.2, because it was more than likely going faster in some areas and slightly slower in some areas. It is only an average speed over the entire run.

Mr. Dulles. Over the entire run between what points?

Mr. Shaneyfelt. Between frames 161 and 313.

Mr. Dulles. Yes, but where, could you place that on that chart, for example?

Mr. Shaneyfelt. Yes.

Mr. Dulles. And describe the points?

Mr. Shaneyfelt. This is frame 161 which is the frame where

they have just gone under the tree, to frame 313 which is the shot to the head. So that it is that distance there which is 136.1 feet.

Mr. Spector. In referring to those points, will you specify what exhibit number you are referring to there?

Mr. Shanoyfelt. This is --

Mr. Dulles. I wonder if we could mark those points on that exhibit?

Mr. Spector. Of course, Mr. Dullos.

That is Commission Exhibit 883, is it not, Mr. Shanoyfelt?

Mr. Shanoyfelt. Yes.

Mr. Spector. Will you take the first point Mr. Dulles has referred to and mark it as point X, I think we already have some letter designations in the early part of the alphabet.

Mr. McCloy. Where is that point? What significance is that point? The first point?

Mr. Spector. This frame 161?

Mr. McCloy. Yes.

Mr. Spector. Is the first frame we have on the Zapruder film.

Mr. Dulles. It is only to get the speed and distance here.

Mr. McCloy. It has no relation to any shots.

Mr. Dulles. No relation to shots. Speed and distance.

Mr. Spector. It is the first frame we have where he has a -- well, 161 has been correlated also, I believe, with the