

7/12/69

Dear Don,

I am glad to get your paper, as Gary suggested. I read it this morning while resting a bit. By now you may be en route to Dallas (Gary has not given me your exact schedule). In that event, you will get this on your return. While what I have read is fresh in mind, however, I offer these comments you may care to consider and I also ask for a copy of the Howard Sprague-Itek letter for the completion of my files on that aspect.

In a paper for police science studies your approach necessarily is more limited than any literary approach. In this excellent study, however, I fear you have permitted the partisanship of an adversary in a judicial proceeding to dominate. Whether or not this is the basic cause, I fear you have a single basic and totally untenable conclusion, that the photographic evidence shows no necessity for a single-bullet theory to postulate a single assassin.

Here you have fallen in the error the Commission, belatedly, felt it dare not risk, the only reason they switched to the single-bullet theory. You can make no such formulation without doing one of two things, both of which you entirely ignored:

- a) specify the firing acknowledged by the Commission to have taken place;
- b) advance your own beliefs of the actual firing.

You have accounted for neither. I challenge you to do either in terms of your paper.

Had you been a prosecution witness, which I presume is the potential of a police-science major, you'd have been ruined on the stand and any competent, prepared lawyer would have seriously damaged your reputation.

If there is any reason you deemed this essential to your paper, it is not clear to me.

Your conclusion on this is even worse, for you have, again needlessly, added further disqualification ("by no means reasonably to be considered", etc.) and in a complete impossibility, "Subtraction of the frame numbers...gives 41 frames, which compares favorably with the 42-frame minimum". The latter is like saying having no more compares favorably with having one dollar. It is possible to justify your acceptance of what you must know cannot be accepted, that the total requirements of an accurate, aimed shot by anyone can reasonable be stated as a 42-frame minimum, for you can say you do this to be in accord with the government statement, etc. But there are two things you simply cannot do: one is to equate the man alleged to have been the riflemen, a duffer, with the world's best shots, and second, to say that if it is possible to do this in 42 frames, where there is no scintilla of evidence it can be done, it therefore follows it can readily be done by a duffer in 41 frames.

You have in no sense "freed" the Commission "from some difficulties".

This is a fine paper, I regret you weakened it, for whatever reason, by the injection of what could earn the approval of your professors but did not either prove or attempt to prove.

Your use of what others of us omitted (for example Hickey), is very good.

I make few suggestions about specific formulations in the even you consider any other or further uses of this good material in the future:

Page 2, Life did not publish the Zapruder film and has done everything it

could to prevent publication of the entire film. I have charged without denial that what it actually bought was the right to suppress the film and that, to the degree it felt it dared, it had. I have challenged suit, specifically and by being the first to use their film on TV, and there has been no response. As you must know, they have even refused to let me have copies of the copies of the missing frames after announcing they were "releasing" them. As it stands, this is an inaccurate and very misleading statement.

"///the fatal head wounding is clearly visible at frame number 313." This requires reformulation, for there is no conclusive proof that shot that was actually fatal is the one you refer to. I do not buy Thompsons slit of some of his six seconds, but you cannot ignore it. I also believe there is convincing evidence of an earlier head shot from the rear. It could have been the real cause of death, whether or not that at 313 would have been fatal. I suggest any possible reformulation put it in the Commission's terms.

In your stipulation on this page and elsewhere of the actuality of the position of the foliage on the tree you have made the Commission's not-accidental error of assuming that the extent and position of the foliage in May 1964, a different season of the year, was the same as it had been in the early winter, which cannot be done even with live-oak trees, particularly because we know there was a pruning operation in the Plaza after the assassination. More, we also know there was a strong wind 11/22/63. And, while I would not argue with an acceptance of the conclusion that at any one point the camera may have been operating at 18.3 frames or even that at no point was it operating at any other speed, I contest any assumption that this was proved. If you are not familiar with the camera, take this up with Gary, who has seen how my duplicate of it operates. Especially because your field is police science. From the above, it follows that you can say only that the Commission said there was a one-frame gap at 186. You cannot accept it, except for argument. Reference to the FBI "determining" camera speed is atop p.3. They didn't. They assumed the speed and reported a single of the two fixed rates and ignores the infinite variable possibilities.

Page 9: Being neither a police scientist nor a lawyer nor a doctor, I ~~would~~ would nonetheless dispute your unequivocal statement "reaction times and physical responses to bullet wounds are speculative areas". This is true only under some circumstances. In those at point, generally and specifically, I doubt it. In this connection, I assume you did your own work with regard to the documents you begin quoting on 11. In that event, you have specific, credible sources to cite on precisely this point. I believe you should have and wonder why you didn't.

Without making actual fresh comparison, I cannot make a positive statement. However, I believe Ray Marcus' 237-8 is more persuasive than your 234.

These are not intended as negative or antagonistic criticisms. It is a fine paper. But again, because this is a police-science paper, I wonder why you ignored such things as the deliberate mislocating of Willis and the requirements of the law and evidence in locating him. I think it weakens your work.

Please pardon me ~~for~~ for not taking the time to correct the numerous typing errors. And if you get this before you leave for Dallas, I encourage you to discuss Z with Mary Farrell. We discussed her observations last night. You may or may not agree with some of them (some are in accord with some of my own beliefs and she may have carried this further), but I think you and Gary should pay close attention (esp. to 308-9, etc.).

Good luck and thanks,

Harold Weisberg



July 9, 1969

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Dear Mr. Weisberg:

In correspondence with Gary Schoener I gathered that you might be interested in seeing a copy of a brief paper of mine to the effect that President Kennedy may have been struck by an "early" shot during the assassination.

This paper sums up a portion of the research which I did under the direction of a professor of Police Science at Michigan State University, from which I have just graduated with a B.S. in physics. I will be going to Berkeley in the fall as a physics graduate student; at present I am at the Toledo address below.

In the course of my reading I found that many of the points which I observed in the 26 volumes and the Archives had been noticed independently (and far earlier) by yourself, Ray Marcus, and others. You will see that several points of my paper will be very familiar to you already. In some cases I did not accept some of the previous points, while other minor points of mine may not have been mentioned before.

I hope that these pages may be of some interest to you, if only to serve as corroboration of points of evidence which you had noted long ago.

Sincerely,



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## PHOTOGRAPHIC EVIDENCE AND THE ASSASSINATION OF PRESIDENT KENNEDY

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The evidential value of photographs taken by witnesses is discussed in relation to the assassination of President Kennedy. In particular, photographic evidence is presented to show on the one hand, that the "single-bullet theory" is not a necessity for the lone-assassin hypothesis of the Warren Commission, and on the other hand, that the first shot to strike the President was an extremely difficult shot if fired from the alleged position of the assassin.

### INTRODUCTION

The common photographic techniques of criminal investigation are generally called into use only after a crime has been committed. However, it may occasionally happen that photographs of evidential value are taken by bystanders during the crime itself.

One of the most striking examples which comes to mind is the assassination of President Kennedy. Strangely enough, perhaps the first recorded case of this type of "accidental" evidence was also in a Presidential assassination -- that of President McKinley in 1901. Kinematographs from the original Edison Laboratory recorded the events of the address at the Buffalo Exhibition, right up to the firing of the fatal shots. Investigators who studied the films easily identified the assassin Czolgosz, as he made his way through the large crowd toward the President. Enlargements and drawings of the frames were studied in unsuccessful attempts to detect Czolgosz exchanging glances with some confederates.<sup>1</sup>

The assassination of President Kennedy was a particularly well-photographed event. Over twenty-five photographers were present on November 22, 1963, in Dealey Plaza of Dallas, Texas. Witness Phil Willis, for example, was able to take six important color slides of the Presidential limousine.

Unlike the McKinley case, however, the Kennedy assassination has raised wide controversies which show little signs of easy resolution. Some fifty books have been written, defending the Warren Commission findings, attacking them, or proposing various alternatives to the official lone-assassin theory.

Only the conduct and findings of the President's autopsy at Bethesda may have received more attention than the discussions and interpretations of the abundant photographic evidence -- particularly the 8-mm color film of Abraham Zapruder, well-known through its publication in Life magazine.<sup>2</sup> This paper will show how the photographic evidence is used to analyze the events of the assassination and to examine some of the problems raised by the Warren Commission reconstruction of the event.

#### BACKGROUND INFORMATION

Some background information is necessary prior to the photographic analysis of the gunfire which killed President Kennedy and seriously wounded Governor Connally. The events of the assassination are generally placed in time sequence relative to the Zapruder film frames, which were sequentially numbered by the FBI. (18H1-80)<sup>3</sup> For example, the fatal head wounding is clearly visible at frame number 313.

During the frames 208-224 of this film, the President was blocked from Mr. Zapruder's camera by the Stemmons Freeway road sign at the curb of Elm Street. (R98)<sup>4</sup> This left a certain ambiguity, for many people believe that the President is first wounded during this interval.

It should also be noted that during the time of Zapruder frames 166-209 the view of the President from the alleged assassin's window in the Texas School Book Depository was blocked by a tall live oak tree also along the north side of Elm Street. Only for about a tenth of a second at frame 186 of this interval was the President visible through a gap in the foliage. (R98) Thus the period of frames 210-224 also represents the first time at which an assassin in the south-east window of the 6th floor could have had a clear shot at the President.

FBI tests on the Mannlicher-Carcano assassination rifle established a minimum time of 2.3 seconds for the firing of two successive shots (R97), although this time did not include allowance for aiming at a moving target.



Since the FBI had determined that the Zapruder camera ran at 18.3 frames per second (R97), one can calculate that about 42 frames of film time must elapse between any two shots, under the lone-assassin theory. Thus if an assassin fired a clear shot as early as frame 210, his second shot could not follow until frame 252 or later.

#### WARREN COMMISSION HYPOTHESIS

An FBI report prepared for the Commission included:

"Shot one was fired from a gun probably braced for a steady shot sighted-in on a predetermined point on the parkway just clear of tree foliage."<sup>5</sup>

According to the analysis of the Warren Commission:

"President Kennedy was first struck by a bullet which entered at the back of his neck and exited through the lower front portion of his neck, causing a wound which would not necessarily have been lethal." (R19)

"...the evidence indicated that the President was not hit until at least frame 210 and that he was probably hit by frame 225. The possibility of variations in reaction time in addition to the obstruction of Zapruder's view by the sign precluded a more specific determination...".  
(R105)

The above Commission statements do not seem unreasonable, since the FBI photographic analysts noted nothing unusual in the frames prior to number 210, and since President Kennedy is obviously seen in violent reaction to a wound in frames 225-227, as he comes from behind the sign. These Commission hypotheses are not without some difficulty, however. It was the firm belief of Governor Connally, as well as all the commenting witnesses, that Connally was struck with the second shot fired. Yet the Zapruder film shows the Governor reacting to a wound substantially before the frame 252 at which a second shot could have been fired, and significantly after the frame 225 in which the President is seen reacting. In fact, the Governor seems to undergo no change until frame 234, at which point he slumps suddenly; he is in violent reaction to the shock by frame 242. On these grounds it would seem that the following "single-bullet theory" is necessary to avoid the conclusion that a second rifleman was firing at the motorcade:

"...there is very persuasive evidence from the experts to indicate that the same bullet which pierced the President's throat also caused Governor Connally's wounds." (R19)

Thus one bullet, Commission Exhibit 399 (the so-called "magic bullet"), was believed to have caused the wounds to the President's neck, and to the Governor's chest, right wrist, and left thigh. The Governor was theorized to have experienced a delayed reaction to his wounds in believing that he had been struck by a second shot, distinct from the one which wounded the President.

Although it was not possible to rule out completely that the assassin had taken an early wild shot through the tree, the Commission strongly hinted that such was not the case, on the reasonable grounds that there was no motivation for such a blind shot:

"...it is unlikely that the assassin would deliberately have shot at him with a view obstructed by the oak tree when he was about to have a clear opportunity. It is also doubtful that even the most proficient marksman would have hit him through the oak tree." (R98)

The Commission seems to be on solid ground in favoring that the first shot to strike the President was indeed the first shot fired. Virtually all of the witnesses were of this opinion. Representative testimony is that of Secret Service Agent Clint Hill:

"...I heard a noise from my right rear, which to me seemed to be a firecracker. I immediately looked to my right...and I saw President Kennedy grab at himself and lurch forward and to the left...This is the first sound that I heard; yes, sir. I jumped from the car, realizing that something was wrong, ran to the Presidential limousine." (2H138)

#### ALTERNATE HYPOTHESIS

Besides the statements of Agent Hill, much related testimony and evidence will be presented in the following sections. In light of the previous discussions, the frames prior to number 210 may be referred to as the "early frames." The following sections of this paper will present evidence to support the following thesis regarding this portion of the assassination:

Contrary to the theory of the Warren Commission, the evidence developed will show that President Kennedy was first wounded in the early frames of the Zapruder film, prior both to the time when he disappeared behind the Stemmons Freeway sign and to the point at which a clear shot was possible from the alleged position of the assassin. Specifically, at

a time of about frame 193 of the Zapruder film, the first shot fired struck President Kennedy and threw him forward and to the left.

Nine points relative to the photographic evidence will be developed.

(1) Phil Willis

Witness Phil Willis took his fifth color slide from a vantage point on the south curb of Elm Street. Willis can be seen in the early Zapruder frames; e.g. number 183, where he identified himself as: "the individual who stands almost directly behind the first motorcycle policeman in that picture...With my camera raised...". (7H493)

Willis indicated that the first shot came just before this picture. He testified about the fifth slide:

"...in fact, the shot caused me to squeeze the camera shutter, and I got a picture of the President as he was hit with the first shot. So instantaneous, in fact, that the crowd hadn't had time to react...". (7H493)

"Mr. Liebeler. Do you remember hearing the shot?

Mr. Willis. Absolutely. I, having been in World War II, and being a deer hunter hobbyist, I would recognize a high-powered rifle immediately.

...  
Mr. Liebeler. And you heard it just about the time you took the picture that has been marked?

Mr. Willis. That's right.

Mr. Liebeler. Prior to the time you took the picture, which is marked Hudson Exhibit No. 1?

Mr. Willis. Absolutely." (7H495)

Fortunately, there is a simple and accurate method for the determination of the time of exposure of the Willis slide. Just as Willis is shown in the Zapruder frames, so is Mr. Zapruder visible in the Willis slide, which shows him standing on a pedestal of a concrete arcade. The view of the motorcade captured by the Willis slide must correspond to only one point of the Zapruder film. Furthermore, the direct line joining the two cameras is a quantity remaining undistorted between the two perspectives. In the Willis slide this line passes just north of the Stemmons Freeway sign. Directly below this two-camera line is the edge of the left shoulder of Agent Clint Hill, who rides the left front running board on the Presidential follow-up car. Study of the Zapruder frames reveals that the corresponding view over Hill's



shoulder is realized only at an instant which lies between frames 201 and 202. Corroboration for this analysis is noted, as Willis takes a forward step at 202 and seems to be lowering his camera from his eye in succeeding frames.

Study of the motion of the motorcade in the Zapruder frames will confirm the accuracy of the above analysis. FBI Agent Shaneyfelt, analyzing this same picture for the Warren Commission in Shaneyfelt Exhibit 25, used a triangulation of the positions on a map of Dealey Plaza. He concluded that the Willis picture:

"...was taken in the vicinity of the time that frame 210 of the Zapruder picture was taken...generally during the period that the President was behind the signboard." (15H697)

Although this testimony agrees perfectly with the Warren Commission hypotheses on the first shot, Shaneyfelt committed an error of some significance in placing Willis' position about seven or eight feet too far back from the curb relative to the actual position as shown in the Zapruder frames. Thus his triangulation calculated too high a frame number and placed the car too far down Elm Street. The testimony of Phil Willis and accurate analysis of his photograph actually give strong evidence that the first shot may have been fired in the early frames prior to number 201.

(2) Mrs. Kennedy

Mrs. Kennedy was seated to the left of the President in the rear seat of the limousine. Regarding the first shot, she testified:

"...I was looking this way, to the left, and I heard these terrible noises. You know, And my husband never made any sound. So I turned to the right. And all I remember is seeing my husband, he had this sort of quizzical look on his face, and his hand was up...". (5H180)

Three witnesses mention Mrs. Kennedy's actions at the time of the first shot. Phil Willis, very near the car, testified:

"Mrs. Kennedy was like-wise smiling and facing more to my side of the street. When the first shot was fired, her head seemed to just snap in that direction, and he more or less faced the other side of the street and leaned forward, which caused me to wonder...". (7H496)

S.M. Holland viewed the motorcade from the Triple Underpass directly

ahead of the car on Elm Street. He testified that prior to the shots Mrs. Kennedy had been looking off:

"...In the southern direction...about that time he went over like that and put his hand up, and she was still looking off, as well as I could tell...that was the first report that I heard...she turned around facing the President and Governor Connally. In other words, she realized what was happening...". (6H243)

Kenneth O'Donnell, riding in the follow-up car, commented similarly:

"She appeared to be immediately aware that something had happened. She turned toward him." (7H449)

The Zapruder film lends evidential value to the above observations. In the beginning frames of the film Mrs. Kennedy is indeed looking off into the crowd on the left side of the street. The point at which she suddenly snaps her head around to the right is extremely striking in the film. Study of the individual frames shows that this turn occurs at the frames 195-197. After that point Mrs. Kennedy seems to be looking directly into the President's face.

Mrs. Kennedy's actions, corroborated by several witnesses and the film, are a strong indication that the President may have been struck by an early shot.

### (3) Agent George Hickey

Secret Service Agent Hickey was seated in the left rear seat of the follow-up car. He is easily located in the still photographs of Phil Willis and Hugh Betzner, as well as the Zapruder frames, where his head and shoulders are visible above the windshield of the follow-up car. Agent Hickey is the man who handled the AR-15 rifle just after the assassination shots were fired.

Discussing his reaction to the first shot, Hickey stated:

"...I heard a loud report which sounded like a firecracker. It appeared to come from the right and rear and seemed to me to be at ground level. I stood up and looked to my right and rear in an attempt to identify it...".  
(18H762)

The beginning Zapruder frames shows Agent Hickey watching the crowd on the left side of the street, up until frame 194. At frame 195, however, he can be seen to begin turning about to the right. Half-standing in the rear seat, Hickey continues turning to the right for as long as he can be seen in



the frames; i.e. up to frame 207, at which point he is looking off to the right of the motorcade. A still photograph, taken by James Altgens and identified by the Commission as having been taken at frame 255 (R112), shows Hickey and several other agents twisted around and looking back in the direction of the Depository building.

Agent Hickey seems to be a good witness; his actions are another indication that an early shot was fired.

(4) President Kennedy

It is clear that the actions of President Kennedy in the early Zapruder frames are of interest. Agent Shaneyfelt testified about these frames:

"...in some frames it is obvious that he is smiling...His arm is up on the side of the car and his hand is in a wave...I see nothing in the frames to arouse my suspicion about his movements...as he disappears behind the signboard...". (5H151)

Frame 183 shows the essential features described by Shaneyfelt. The President is apparently relaxed in that he is sitting back against the seat at the extreme right end of the rear seat. His right elbow extends well down below the chrome strip on the outside of the car as he waves to the crowd on the right. His head is turned almost directly to the right.

There is room for difference of opinion on Shaneyfelt's conclusions, however, for in the frames immediately following number 193 the President's body seems to undergo a short sharp lurch forward and to the left. This motion, on the order of six or seven inches, begins in frame 194 and continues through about frame 200. The President seems to move away from the seat back and to tilt to the left, away from the window ledge. The witness statement of Kenneth O'Donnell may again be noted:

"He was leaning out waving. He may have just been withdrawing his hand. And the shot hit him, and threw him to the left...looking at the manner of the President's movement, I would think you would have to feel the thrust of the shot was from the right rear." (7H449)

Study of the frames reveals further information. On the interval 193-200 the President's body is seen to narrow somewhat to the view, indicating that

he not only leans to the left front, but also is rotated to the left. The rotation of the shoulders begins in frame 194. By frame 204 the President's head is facing almost directly forward.

As the President moves and rotates to the left, his right arm is pulled back into the car. While his elbow had been resting outside the car, it comes up noticeably in frames 195-199, the motion becoming very irregular at frames 201-203, perhaps because the President's arm is bouncing in and down on the window ledge. As Kennedy disappears behind the sign, his right arm is in a particularly unusual position, with the right elbow raised abnormally high.

These motions are mentioned in such detail for purposes of comparison with three of the most detailed witness descriptions:

"Mr. Holland. And the motorcade was coming down in this fashion, and the President was waving to the people on this side (indicating).

Mr. Holland. And about that time he went over like that (indicating), and put his hand up, and she was still looking off, as well as I could tell.  
Mr. Stern. Now, when you say, 'he went like that,' you leaned forward and raised your right hand?

Mr. Holland. Pulled forward and hand just stood like that momentarily.

Mr. Stern. With his right hand?

Mr. Holland. His right hand; and that was the first report that I heard."  
(6H243)

David Powers: "President Kennedy was sitting on the extreme righthand side of his automobile, with his arm extending as much as two feet beyond the right edge of the car...the first shot went off and it sounded to me as if it were a firecracker. I noticed then that the President moved quite far to his left after the shot from the extreme right hand side where he had been sitting." (7H473)

William Newman: "We were looking back up the street to see if the motorcade was coming and the first two shots were fired, and of course the first shot, boom, the President threw his arms up like that, spun around sort of...and then it looked like he was looking in the crowd, you know, like he was looking for something, just kind of a wild expression."<sup>6</sup>

Of course, these witnesses are describing exactly what can be observed in the Zapruder frames 193-206: the lurch forward and left, the spinning to the left, and the abnormal motion of the right arm. While reaction times and physical responses to bullet wounds are speculative areas at best for forensic science, the above testimony is certainly suggestive. Given the previous analyses of the Willis picture and the actions of Mrs. Kennedy and Agent Hickey, the observations



of this section provide good evidence that the first wounding of the President was not blocked from the record by the road sign but is in fact occurring in the "early frames" of the Zapruder film.

Further evidence will be given in the following sections.

(5) Linda Willis

Witness Linda Willis, a daughter of the witness whose photographs were mentioned above, can be located in Zapruder frame 183, in which she is dressed in a red dress and white scarf and is at the extreme right of the frame. She described for the Warren Commission:

"...well, I followed along the street with the car...I was directly across when the first shot hit him...I was right in line with the sign and the car, and I wasn't very far away from him...When the first one hit, well, the President turned from waving to the people, and he grabbed his throat, and he kind of slumped forward...I stayed there...where the Stemmons sign is...". (7H498)

In all the Zapruder frames up to 199 Linda Willis can be observed as she runs along the grass on the south side of Elm Street, following the Presidential limousine. At frame 200, however, she abruptly stops running. In succeeding frames (200-204) she turns sharply and looks back to the right and rear of the motorcade. At this point the car is indeed directly between her and the Stemmons Freeway sign. Linda Willis remains frozen to the same spot for as long as she is visible, i.e. up to frame 222.

It is reasonable to suggest that these frames are showing Linda Willis reacting to the sound of an early first shot.

(6) Governor Connally

It is well known that the Governor and his wife believe that the President was struck with the first shot and that the Governor was hit by the second shot. The Governor has stated:

"My recollection of that time gap, the distinct separation between the shot that hit the President and the impact of the one that hit me, is as clear today as it was then. They talk about the 'one bullet' or 'two bullet theory,' but as far as I'm concerned, there is no 'theory.' There is my absolute knowledge, and Nellie's too, that one bullet caused the President's first wound, and that an entirely separate shot struck me."?

After hours of study of the clear Life magazine enlargements, Connally chose frame 234 as the point where he was hit by the second shot. No one thought to ask the Governor when he thought the first shot had come, even though he claimed a clear recollection of the time gap. Fortunately, he had volunteered his opinion on this point during an earlier session with the Zapruder pictures, on April 21, 1964. At this Commission screening of 35-mm slides prepared from the frames, Connally's opinion was recorded in a Memorandum For The Record:

"...He felt the President might have been hit by frame 190. He heard only two shots and felt sure that the shots he heard were the first and third shots. He is positive that he was hit after he heard the first shot, i.e., by the second shot, and by that shot only."<sup>8</sup>

Governor Connally's estimate for the time of the President's reaction to the first shot is striking corroboration for the previous analysis of this report. The above Memorandum was not introduced into evidence and thus did not become a part of the Commission's published record.

#### (7) Blurred Frames

In connection with the analysis of the first shot it may be noted that frames 195 and 196 are both more blurred than most frames in this section of the film, and that 197 in particular is violently blurred in a horizontal direction. Observation of the street sign and the tree on the edge of the frames seems to indicate that Zapruder's camera swung to the right at 197 and back to the left at 199. The tree entering the picture at 198 goes off-camera and returns only at 203-204.

Interpretation of these "movements" is speculative. It is possible that Zapruder is reacting to the sound of the first shot. It is also possible that these are just the normal instabilities in panning the camera as the road sign begins to confuse the view. Some reason for labelling 195-197 the beginning of a nervous reaction is the similarity of this area of the film to 318-320, which three blurred frames almost certainly start the reaction to the head wounding



visible at frame number 313. Mr. Zapruder only recalls the first shot and the head wounding and did not hear the second shot. (7H571)

Other apparently random blurred frames could have been caused merely by imperfections in the alignment of the camera mechanism, where the film did not seat perfectly on the sprockets which advance it through the camera gate. For example, the top portions of frames 221 and 227 are extremely sharp and detailed, much more so than most of the frames in the Zapruder sequence. However, the pattern of blurring, streaking, and distortion of street in the lower portions of the frames indicate that the lower sprocket holes may have seated improperly and bent the bottom of the frames forward and away from the focal plane of the camera lens.

With such difficulties in the business of identifying blurs as possible reactions to shots, the blurring of the film frames is inconclusive in itself. It can, of course, be said to be certainly consistent with a first shot fired near frame 193.

(8) Hugh Betzner, Jr.

Witness Hugh Betzner, Jr., took the last of a series of three black-and-white still photographs from a vantage point on the south curb of Elm Street. His location can be established from his photograph and the Zapruder frames; frame 183 shows Betzner at the curb, with his camera raised to his eye. He is dressed in white and is some 10 to 12 feet down from the corner of Elm and Houston Streets.

In a carefully stated affidavit of November 22, 1963, Betzner reported that the first shot came just after he took his last picture:

"I took another picture as the President's car was going down the hill on Elm Street. I started to wind my film again and I heard a loud noise. I thought that this noise was either a firecracker or a car had backfired."  
(19H467)

The same method can be used here that was used for the Willis slide to calculate the time of exposure. In Betzner's case the two-camera line passes over the fifth lady standing east of the Stemmons Freeway sign and by a curious

coincidence with the Willis picture also passes over the left shoulder of Agent Clint Hill. Comparison shows that the corresponding Zapruder frame can only be number 186.

This result is of some interest, for it is in perfect agreement with the previous analysis that the first shot came near frame 193, just after the Betzner picture was taken. This result further serves as a strong indication that the first shot did not come before the Presidential car went under the tree at frame 166; no witness places a shot that early, moreover.

The exposure times of both the Betzner and Willis pictures are now known. Given the average speeds of the Presidential limousine as 11.2 miles per hour (R49) and of the Zapruder camera as 18.3 frames per second (R97), it is possible to estimate the distance travelled by the car between the two pictures. Two alternate methods of this calculation are based on the FBI survey measurements of Dealey Plaza (17H902) and the known dimensions of the car (17H867). The three figures derived are 14, 15, and 14 feet respectively.

While the Betzner photograph was not used by the Warren Commission, it was printed in Life magazine.<sup>9</sup> Part of the text there mentioned an analysis by Itek Corporation, an expert in photoanalysis:

"Itek, using a technique called resectioning to determine the time of exposures, computed the President's car to be five feet farther along Elm Street in Willis' picture than in Betzner's. Similar analysis places the time of the Willis picture as just before the first shot."

Both of these statements are contradicted by the analysis of the present report. In fact, Howard Sprague, Jr., Vice President of Itek, has acknowledged by letter the error in the first statement, for reasons similar to Agent Shaneyfelt's erroneous triangulation:

"We have analyzed the distance question since November of 1967...and have found the distance to be 13.5 feet with one method using single frame resections, and 15.5 feet with a second method in which the two photographs were positioned by synchronization with a Zapruder frame...Our discrepancy occurred because we lacked reliable information concerning the exact locations of Betzner and Willis."

get 1



Regarding the second "Itek" statement above, Mr. Sprague said that the Itek Report contained "no insinuated relationship with the sequence of gunshots."<sup>10</sup> Thus the second sentence quoted above is exclusively a Life conclusion and has no scientific support from Itek.

In summary, the Betzner and Willis pictures, while similar in view, provide an interesting contrast of the beginning and the end of a period of particular interest in the Zapruder film.

(9) Secret Service Reconstruction

This final point consists more in corroboration of the above points than in further evidence. Surprisingly, documents in the National Archives show that an agent of the Secret Service made observations of President Kennedy in the Zapruder film very similar to those of section (4) of this report. An FBI document, filed on November 29, 1963, includes:

"SA JOHN JOE HOWLETT, U.S. Secret Service, Dallas, advised that with the aid of a surveyor and through the use of 8 millimeter movie films depicting President John F. Kennedy being struck by assassin's bullets on November 22, 1963, Howlett was able to ascertain that the distance from the window ledge of the farthest window to the east in the sixth floor of the Texas School Book Depository Building, 411 Elm Street, to where the President was struck the first time in the neck was approximately 170 feet. He stated this distance would be accurate within two or three feet...SA Howlett advised that it had been ascertained from the movies that President Kennedy was struck with the first and third shots fired by the assassin, while Gov. Connally was struck with the second shot."<sup>11</sup>

A map was included, which showed a point "A" at 170 feet from the window, with the notation: "President struck with first bullet."

The reference to distance of firing clearly indicates that Agent Howlett meant neither the "blind" period behind the sign (indeterminate to about 12 feet) nor the frames of obvious reaction after 225 (all further than 191 feet from the window). (18H90) Indeed, Howlett's figure of 170 feet corresponds to about frame 199 or 200. It can be recalled from section (4) that at that point of the film the reaction of President Kennedy first becomes particularly noticeable.

The above document, filed within a week after the assassination (on the same day that the Warren Commission was formed), clearly represents the original

Secret Service analysis of the assassination, before the permutations of rifle speed and the single-bullet theory had been added. One other relevant Archives document concerns a screening of the 35-mm slides for which Howlett was present in Washington on April 14, 1964. A Memorandum For The Record contains remarks almost certainly attributable to Agent Howlett:

"(b) The reaction shown in frames 224-225 may have started at an earlier point -- possibly as early as frame 199 (when there appears to be some jerkiness in his movement) or, with a higher degree of possibility, at frames 204-06 (where his right elbow appears to be raised to an artificially high position)."<sup>12</sup>

After the detailed FBI reconstruction of May 24, 1964, which established the obstruction by the oak tree prior to frame 210, there is no indication that the Commission investigators gave serious consideration to the clues given by Howlett's report and later comments.

Neither of the two documents mentioned was introduced into evidence or the published record.

#### CONCLUSIONS

The Warren Commission conclusion of a first wounding occurring at the frames 210-224 used to some extent the process of elimination, based on the blocking by the road sign, the conviction that the first shot was fired clear of the tree foliage, and the ignorance of evidence in the early Zapruder frames. The evidence developed in this report supports the conclusion that President Kennedy was first wounded at a point near the frame 193 of the Zapruder film. Even if the first shot came at the earliest possible consistent frame -- number 186, with the gap in the oak tree foliage -- the shot would be an extremely difficult one if fired from the alleged assassin's position at the south-east end of the Depository sixth floor. As the Warren Report acknowledged:

"It is also doubtful that even the most proficient marksman would have hit him through the oak tree." (R105)

On the other hand, it can be recalled that Governor Connally believed himself struck by a second shot at frame 234. Evidence could be given to show that his

statement is very likely an accurate one. Subtraction of the frame numbers 234 and 193 gives 41 frames, which compares favorably with the 42-frame minimum rifle speed figure, particularly under the hypothesis of the second shot missing the President. Thus, contrary to many such statements in the assassination controversy, the "single-bullet theory" (long recognized as a major weakness of the Warren Commission reconstruction) is by no means reasonably to be considered a sine qua non of the lone-assassin theory. 11

Thus this paper has reached a two-pronged result, freeing the Commission from some difficulties while raising others. One thing, nevertheless, can be concluded with some certainty: the exact events of President Kennedy's assassination did not happen as described in the Warren Report. 1

#### ACKNOWLEDGMENTS

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To anyone familiar with the writings on the assassination, it is unnecessary to add that the conclusions of this report are not to be taken as necessarily representing the views of the persons mentioned here.



FOOTNOTES

1. Hans Gross, Criminal Investigation, Carswell Company Ltd., Toronto, 1962, Richard Jackson, editor, p. 146.
2. Life: November 29, 1963; October 2, 1964; November 25, 1966.
3. 18H1-80 (This notation will be used throughout to refer to the 26 volumes of the Hearings Before the President's Commission on the Assassination of President Kennedy, United States Government Printing Office, 1964; e.g. 18H1-80 indicates Volume 18 of the hearings, pages 1 through 80. Hereafter this notation will be left in the text.).
4. R98 (This notation will be used throughout to refer to the Report of the President's Commission on the Assassination of President John F. Kennedy, United States Government Printing Office, 1964; e.g. R97 indicates page 97 of this report. Such notations will also hereafter be left in the text.).
5. National Archives, Commission File 298, p.14.
6. Private interview, Josiah Thompson, Six Seconds in Dallas, Bernard Geis Associates, New York, 1967, p. 37.
7. Life, November 25, 1966, p. 48.
8. National Archives, Commission Administrative File.
9. Life, November 24, 1967, p. 92.
10. "Life-Itek Kennedy Assassination Film Analysis," Itek Corporation, Lexington, Massachusetts 02173.
11. National Archives, Commission File 5, p. 117.
12. National Archives, Commission Administrative File.