

HYPOTHESES
~~Zapruder Film~~

Reference Material needed - LIFE, 11/29/63

171

LIFE MEM. - 12/2/63 (approx)
LIFE (WARREN REPORT) - 10/2/6
Comm. EX. VOL. XVIII

Hypothesis A

Hypothesis: That Warren Commission conclusion (R-19)--". . . it is not necessary to any essential findings of the Commission to determine which shot hit Gov. Connally" -- is false; and that, in fact, if Connally was not hit by the first bullet to hit JFK, and if first JFK-shot fired by CE-139, then Connally-shot could not have been fired by CE-139.

1. FBI maintains JFK not hit prior to Zapruder frame 210, because he was obscured from TSBDB window by tree, (Shaneyfelt, 5/157). They say he was first hit between 210 and 225 (R-115). He is clearly reacting by 226 (color panel #2, LIFE Mem. 12/2/63 and by 225 (Shaneyfelt, 5/152).
2. To permit maximum possible leeway to official version, assume JFK first hit in 210, during the first 1/18 second assassin could have had clear view from TSBDB window.
3. FBI says minimum time between shots possible on CE-139 is 2.3 seconds (R-115). We can accept this figure for purposes of the hypothesis, since they would have no reason to overstate the minimum time-lapse. 2.3 seconds = 42 frames (18 FPS) (R-97)
4. From 2 and 3, if Connally not hit by first bullet to hit JFK, he couldn't have been hit until 252, even assuming the assassin got this shot off in the minimum time possible after the previous one.

BUT --

5. By 244 Connally is slumping, and his mouth has opened. His right shoulder is sharply depressed. This is more clearly seen in Life, Nov. 29, '63, in comparing black-and-white picture #9 (fr. 244) with #8 (fr. 237).
6. Therefore since Connally ~~was~~ hit in less than the minimum between-shot time span required with CE-139, he was either hit by the same first shot to hit JFK; or the two shots in question could not have both been fired by CE-139. Contrary to Warren Commission's contention, question as to which bullet hit Connally is absolutely critical to their lone-assassin theory.

(I believe the point is made even more clearly when we consider the virtual impossibility of an assassin hitting JFK from the TSBDB window in frame 210, the first clear view after emerging from behind the tree. This would mean the assassin, even assuming he was able to roughly follow his target through the tree, would have 1/18 second to sight him in the cross-hairs and squeeze off his shot; and therefore, considering the extreme improbability of the preceding, a separate shot hitting Connally from CE-139 would be correspondingly later than frame 252).

[NOTE - Zapruder frames appearing in LIFE magazine were given frame numbers by comparing with numbered frames in Vol. XVIII, pgs. 1-80]

1. That Connally was not hit by the same shot that first hit JFK.
 2. That Connally was hit from a left-rear direction, and therefore, not from the TSBG building.
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1. That Connally was not hit by the same shot that first hit JFK.

- a. Connally's back, chest, and wrist wounds all caused by one bullet. It entered his back near right armpit, went down at 25° angle, taking out fifth rib and exiting below right nipple; then entered back of right arm about two inches above wrist joint on thumb side, exiting from palm side of wrist approximately 3/4 inch above the crease, (R-93). (I accept these descriptions as accurate. There never was the history of confusion surrounding his wounds as there was with JFK; the various doctors* testifying as to his wounds were generally consistent; particularly Dr. Gregory's testimony, which seemed very authoritative and reliable).

- b. Examine color panel #2, LIFE 10/2/64 (which is frame 232). (I believe that this picture, considered with knowledge of Connally's wounds, and accepting the conclusions of Hypoth.A, disproves the lone-assassin theory).

- (1) JFK clearly reacting
- (2) Connally not yet hit

- (a) his right hand is resting on hold bar at top of front seat-back (hold bar seen more clearly in next color panel, #3; and another view, 17/869).

- (b) inverted triangle-like appearance of Connally's hand indicates it is resting on bar with knuckles up, fingers forward and down. It does not appear that hand is clenched around bar, although this is not critical to hypothesis.

- (c) if by this frame, 232, bullet had entered top of his right wrist, smashing bones and exiting under side of wrist, it would also have instantly knocked his hand down onto his lap. Since hand is clearly visible on top of hold-bar, he has not yet been struck. (JFK reacting by 225-26; Shaneyfelt 5/152; and color panel #2, LIFE Mem. 12/2/63).

- (d) Connally's right hand, while in position shown in 232, couldn't have been hit by bullet entering at right shoulder blade, and exiting from below right nipple. Hand not even close to necessary position for this to be possible.

2. That Connally was hit from a left-rear direction, and therefore, not from TSBG building?

- a. from (c) and (d), he was not yet hit by 232.

- b. for same reasons, he could not have been hit as long as right hand remains visible--and therefore, elevated.

c. right hand remains visible-- and therefore, elevated -- at least through 235. Starting with color panel #2 (232) as reference;

(1) use Zapruder frames in Vol. 18 to follow white spot representing right hand from 232-235. In these frames, the space between Connally's right hand and the right side of car gets smaller, indicating right hand is moving to that side.

(2) at same time, he has apparently raised left hand to hold-bar alongside right, and he is moving them both towards right as he begins turning to right. (As reference for right hand, check color panel #3, LIFE 10/2/64, which is frame 258, 1-1/16 seconds later--note coat sleeve, then white shirt cuff, then left hand).

(3) beginning 236-237, hands are no longer on hold-bar as he continues turning to right. By this point he is no longer in position to take bullet from TSB building, and resulting in wounds he sustained.

d. Connally clearly reacting ~~at~~ 244 (LIFE blk/wht #9, 11/29/63), with mouth wide open and right shoulder sharply depressed as compared with preceding LIFE blk/wht #8 (which, as fr. 237, is app. 1/3 second earlier). As between 237 and 244, note that while his left shoulder-line is only slightly changed, remaining relatively horizontal, his right shoulder-line angles downward much more sharply, and the point of his right shoulder is markedly closer to the side of the car. This indicates a bullet coming from the left rear, striking him in the back in the area of the right shoulder, and driving it forward and down.

e. Checking backward from ~~244~~ in Vol. 18, I believe this reaction first begins in 241. Since I consider it established that he was not hit prior to 236, I hypothesize he was hit 237-240.

*Recent views
(LIFE) look to be
in error*

→ (I now believe he was hit immediately prior to fr. 238 (see photo panel JC-1). The sharp drop of his right shoulder appears in 238, as compared with 237. (236 in vol. 18 shows the corner of his shoulder more clearly than 237, the last pre-hit frame)

Hypothesis C

4.

Hypothesis: That first bullet to hit JFK could not have come from TSBD building window because:

1. JFK first hit prior to Zapruder frame 210, and
2. FBI proves he couldn't have been hit from window prior to 210.
 - a. FBI agent Shaneyfelt says JFK obscured from TSBD window by oak tree from 167 through 209, except for 185 (5/157).

- (1) JFK not hit prior to 167 -- no reaction apparent at least through 183 (clear color photo shown as #1 in LIFE Memorial Issue, 12/2/63)

- (2) JFK beyond reasonable doubt could not have been hit during split second opening (1/18 second) of 185; too brief--it requires 1/16 seconds for image to register in eye.

- b. According to Mrs. JFK, she was looking to her left (5/180) until after at least one shot was fired. By 221 she was clearly looking at JFK to her right. Further, she was apparently already looking to her right by 212 (compare her hat and hairline in 221 with portion visible above sign in 212--covering her face in 221, remaining portion appears identical with 212, indicating she was already looking to her right). From her testimony, she wasn't particularly startled by noise of shot-- she thought it was motorcycle backfire -- and she turned to look at JFK on hearing Comally cry out, "Oh, no, no, no." As she turned she says JFK had hand to throat.

- c. Therefore, if her testimony is correct as to her having turned only after she heard the shot, JFK had to be hit before 210, allowing minimum imagineable reaction time for her of $\frac{1}{2}$ second from time she heard the shot and turned to face him. ($\frac{1}{2}$ second=9 frames; 212 less 9 = fr. 203, a time when he was obscured by tree from window and would have remained so till 210).

- d. Since hypothesis based on whether or not Mrs. JFK turned to face JFK only after hearing shot, note the following as partial corroboration:

- (1) Dulles (while viewing Zapruder films, (5/156) says (re 225), "And Mrs. Kennedy has apparently turned around and looking at him."

- (2) S.M. Holland, witness from overpass said she turned after second shot. (6/243)

- e. significant omissions that might have served as corroboration, or revealed other facts pertinent to shooting sequence:

- (1) complete Nix films
- (2) complete Muchmore films

(by checking against Zapruder films and comparing background features, these probably could have established exact point where Mrs. JFK turned to face JFK. Only a few scattered frames of Nix and Muchmore films presented (18/81-84), and none showing Stemmons Freeway sign--- discussed later).

- (3) Nix Testimony
- (4) Muchmore Testimony

(neither called to testify---their films of JFK car taken through telephoto lens -- therefore they may have been sighting through telephoto view-finder).

- (5) complete versions of Zapruder, Nix and Muchmore films omitted but mentioned as CE 904-907 by McCloy - Shaneyfelt, 5/178.
- (6) Zapruder frames prior to 171.
- (7) Zapruder frames subsequent to 334, including all of Mrs. JFK crawling on to back of car and returning to seat.
- (8) Zapruder frames 208 thru 211 not shown (18/19); although 210 is shown separately (18/89) -- these frames were cut out of film, and film then spliced back together. Note Liebeler's gaff in referring to 210 while questioning Zapruder, 7/574 (top). Method of determining that 208-211 were actually cut out of film explained at bottom*.
- (9) "Stemmons Freeway" sign evidently moved or removed completely some time after assassination. (this might have served as important photographic reference point in co-relating specific frames of Nix, Muchmore and Zapruder films, as well as Hudson Ex.1 --- a still taken by Willis).
 - (a) Emmet Hudson, groundkeeper of Dealey Plaza, upon examining FBI photos said "they have moved signs..." (Testimony 7/52) (FBI pictures 17/886-7)
 - (b) Stemmons sign missing in following photos:
 - (1) LIFE, 10/2/64, pg. 75
 - (2) TIME, 10/2/64, pg. 46
 - (3) NEWSWEEK, 10/5/64, pg.35(I've seen no photo showing Stemmons Freeway sign taken after Nov. 22)
 - (c) comparing Willis photo (207/183) showing Stemmons sign at time of assassination with FBI photos taken during recreation (17/886-7) which shows R.L.Thornton sign; note that Stemmons sign does not appear.

* Proof of cut-and-splice ---

1. each picture of CE 885 has three frames represented; the primary frame in the center; the bottom portion of the preceding frame at the top; and the top portion of the following frame at the bottom. For example, picture labeled Frame 205 actually shows bottom of 204 (portion of sign) at top; 205 in center; and top of 206 (bushes, people) at bottom. Frame 206 shows bottom of 205 at top, 206 in center, and top of 207 at bottom.
2. In frame 212 we actually have normal part of 207 at top, then part of normal 208 immediately below, down to dark horizontal line just above middle, indicating cut in 208, and also representing lower extremity of overlap of spliced area.

Hypoth. C

SLICE(continued)

- ~~x~~ note offset in tree-trunk at right (above and below dark horizontal line)-- area below dark line is frame 212, down to bottom of sign; then 213 below sign.

- 3. Note horizontal line below middle of frame 207. This represents upper extremity of underlap for splice. Cloudy area below it caused by cement used in splice.

Hypothesis D

7.

Hypothesis: That JFK first hit at frame 189 (and therefore, beyond reasonable doubt, that shot could not have come from TSBD building, since car was obscured from window by tree from frame 166-210, (Shaneyfelt, 5/149, 5/157); except for 1/18-second opening at frame 185, discussed in Hypothesis C.

1. Zapruder frames are extremely blurred, 190-192. Zapruder thought shots came from behind him (7/572). As sound of first shot reached him, a reflex jerking-motion would have been virtually certain, causing a blur for several frames (3 frames--1/46 second). Zapruder, while viewing these frames at this approximate point, says, "I know what has happened...this was after that happened...something had happened" 7/573
2. Mrs. JFK looked toward her husband after hearing shot. She said he was already reacting, hand at throat, as she saw him (5/180) and she is facing him by 206.
 - a. Mrs. JFK head movements, indicating time when she turned, can be verified from the Zapruder films. Use color enlargement, panel #1, LIFE 10/2/64, as primary reference frame --(this is frame 183).
 - b. In 183, she is facing forward. (Note angle of line indicated where her hairline and hat-line meet -- hereafter referred to as H/H --In this frame, H/H is horizontal and parallel to bar at top of windshield. (Wherever discernible, visible portion of her face checked in relation to H/H).
 - c. Locate H/H in frame 183 of Vol. 18. Check backwards by frame, noting the H/H. Although some frames less distinct than others, in most H/H clear enough to note changes in its angle to windshield bar. (I circled her head in each frame of the sequence)
 - d. Checking forward from 171 to 177, note H/H at first is at sharp upward angle to right (as it appears in frame). This indicates she was facing to her left (172), (further verified by still taken immediately previous to this by Willis, Ex.1, 21/769). Angle gets progressively less sharp (174) and reaches horizontal(177). This 7-frame sequence represents approximately 1/3 second, and shows she was turning from her left to forward.
 - e. During next 6 frames (178-183), virtually no change in H/H, indicating she momentarily remained facing forward.
 - f. From 185 to 189, H/H angle goes slightly up to left (in picture), indicating turn slightly to her right away from center. (I believe JFK hit by 189).
 - g. No discernible H/H change from 189-197, up to left (in picture).
 - h. In 200, H/H angle much sharper up towards left in frame, showing she has turned more sharply toward JFK; she continues and by 206 she is fully facing him.
 - i. From 206 on, due largely to the fact that 208-211 are missing, use curve of her hat as well as H/H for comparison. In 222 she is clearly looking directly towards him. (That she was doing the same in 206 can be verified by covering her face in 206 and 222, leaving hair and hat showing, and comparing with 212.

3. JFK started clutching-motion toward throat with right hand within minimum imagineable time after 189. (He was raising hand in a wave before then; started lowering it to throat immediately after).
- a. Again use color panel #1, LIFE 10/2/64 (183) as reference. Note position of JFK's right hand in relation to face and head, specifically noting distance from highest part of hand to hair-line.
 - b. Note position of hand in picture #3 of black-and-white frames in LIFE, 11/29/63. In this picture (which I approximate at 166) hand is in front of his chest.
 - c. In Vol. 18, check position of hand between 166 and 183; note that he is raising it to wave (174, 176); hand crosses his face (179), continuing upward to highest point by 189. The sequence from 166 (LIFE blk.-and-wht. #3) to 189 equals $1\frac{1}{4}$ seconds.
 - d. After hypothesized hit at 189, his hand has started to descend by 193, crosses his face, and continues down and apparently in towards his throat (202-207).

(At 195 there begins another 3-frame blur. This may record a second shot; but, while I feel certain that a reflex-jerk would have been inevitable when Zapruder heard the first shot -- assuming it was loud enough to startle him--I think the co-relation might be less definite for subsequent shots, if, indeed, the 195-197 blur does represent a shot, and the $\frac{1}{2}$ second time-lapse would have been so brief as to make the two sound like a single shot to many).

- e. Compare 226 (color panel #2, LIFE Mem. 12/2/63) where JFK obviously reacting, with his hand at his throat, to 204 in Vol. 18. The relative positions of the right hand represent a logical, continuous motion, covering the frames between, as does the entire two-second sequence from 189 to 226, as his wave becomes a move to his throat.

(Note that, further, in $\frac{4}{5}$ second sequence from 189 to 204, hand has moved from top of wave -- with fingers at height of top of head, -- downward to chin level. But in next $1\frac{1}{5}$ -second sequence, from 204 to 226, there is little additional downward motion of hand).

Hypothesis E

9.

Hypothesis: That JFK struck approximately 227; and that this was not a head shot.

1. Note sudden raising of both arms in 1/5 second from 226-230. Specifically note sharp rise of both elbows.
2. If this violent, extremely rapid movement does record a hit, it doesn't seem possible as a head shot, since there is no perceptible movement of his head in these frames, or for many frames thereafter.
3. I note-- without understanding its significance, if any, that the occupants of the car are extremely ~~stunned~~ in 227.
blurred

Hypothesis: That JFK struck in head from left rear in 247.

1. In 238, JFK facing forward. By 246 he appears to be facing slightly to his left. The change begins to appear in 242. The turn looks as if it reached its maximum leftward direction by 246 (compare with 238). Since the turn of his head is accomplished between 241 and 246, it represents less than 1/3 second. This seems too fast for an involuntary slumping of a dead or unconscious person. I believe it was a voluntary movement. It might raise the possibility of a shot hitting his head from the right front, but, if this were the case, I believe the reaction would have been much quicker (as in 312-313, discussed in Hyp. G).
2. Comparing 246 with 249, there appear the following changes:
 - a. A change in his head position from facing slightly leftward, as a result of turn described in #1, returning to a forward-facing position by 249, as in 238; but with the head tilted slightly downward, compared to 238. The 3-frame sequence 246-249 indicating a return to center-facing position is 1/6 second, and, therefore, seems too fast either for voluntary motion or unconscious ~~looking motion.~~ ~~marked change in head position, 246-249 slumping-- although it could be an unconscious jerking motion. Note marked change in head position, 246-251.~~
 - b. At 249 there begins to appear a more rapid lowering of his right hand, as compared with relatively stable position, 235-247. Note marked change in 1/3 second, 249-255.
 - c. While his body remains relatively upright, and his head relatively level, in all frames from the time he emerges from behind the sign in 225, until approximately 247; from there on, his head tilts forward and his body sinks lower in a continuous slump to its lowest point 3 seconds later, in 298, after which, Mrs. JFK apparently supports him until the head-shot in 313.
 - d. If this hypothesis is correct, circumstances indicate it was a tangential shot, entering forward part of left side of head and exiting front, probably, from left forehead-- rather than right-angle shot.
 - (1) if the shot entered at right-angle to his skull, motion of head would have been much more pronounced, as in 313.
 - (2) if bullet had exited from right side of head, it would have caused blood to run down the right side of his face by 323, which is approx. 4 seconds later -- but none appears on the right side of his face, as seen in this frame, represented as color panel #6, LIFE, 10/2/64.
 - (3) it would seem that a more direct shot, such as in (1) or (2) would cause instant death or unconsciousness; and, to a layman, it would, therefore, appear that his arms and hands would instantly drop from view, to his sides or lap. However, although his arms are dropping, his right hand remains in view through 280, 33 frames and after hypothetical hit at 247.

Hypothesis F (continued)

11.

- (4) the circumstances bring to mind Dr. McClelland's "left-temple" wound as entry and Father Huber's "terrible wound over the left eye" as exit.
- e. Note blur in 250-252 (note virtual obliteration of holes in wall). As mentioned in page 8, Hypoth. D, I have less confidence in significance of blurs subsequent to 190-192. However, I believe they should be considered when accompanied by other visual changes. The timing of the blur in 250-252 is of interest in relation to hypothetical hit at 247. The $1/46$ second 3-frame time-lapse, as compared with the 1-frame time-lapse following 189 to blur 190-92, is consistent with the 247-shot coming from a considerably greater distance from Zapruder than the 189-shot; thereby allowing for a longer time-lapse between frame in which bullet struck, and frame in which sound reaching Zapruder caused him to jerk camera.

(accepting 2,000 feet per second as speed of rifle bullet, it would travel 109 feet per frame; whereas, the speed of sound, at 720 MPH, would be 58 feet per frame).

Added notes re: 247

*③ note - Samuel A. Kinney (S.S.) typed statement 11/7/73, 11/22/63, "... The first shot was fired... it... appeared he had been shot because he slumped to the left. Immediately he sat up again. At this time the second shot was fired and I observed hair flying from the right side of his head.

(On Kinney statement 11/30/63 & 11/7/73, no mention of underlined passage)

④ S.S. Sgt. Bennett, 24/542, - after seeing shot hit JFK 4 inches down from right shoulder, Bennett says, "a second shot followed immediately and hit the right rear high of the bosses head"

(I believe the use of the word "immediately" by both Kinney and Bennett following the back hit which I am certain occurred at 226-227 -- to describe the time-lapse to a head shot, is more consistent with a head shot at 247 than the obvious one at 313. "Immediately" seems more consistent with the one-second from 227-247, rather than the five-second from 227-313.

5. a cow-lick of hair rises at the rear, top of his head (most noticeable at 249 and 253), finally subsiding by 255.
6. further aid in noting movement of his head 240-246: In 240 the shadow-line extending down the side of his face from his hairline is in front of his ear: as he turns left, the shadow intersects the ear (see shot 240)

Hypothesis G

Hypothesis: That head-shot at 313 came from right front.

1. No doubt that 313 was a head shot.
 - a. cloud-- presumably of blood and matter -- at JFK's head.
 - b. marked change in head position from 312-314.
 - c. large, obviously bloody area visible on right side of head, color panel #6, LIFE, 10/2/64, (323).*
2. At instant of impact, JFK's head is facing somewhat leftward, and tilted sharply forward (see 312). From this position, (which offered a broadside attitude to the grassy knoll) it moves sharply back and to the left; appearing to contact seat-back by 320, 2/5 second later. The motion of his head in reaction to the head-shot is absolutely consistent with a bullet from the right front; and absolutely inconsistent with the bullet having come from the TSBD building.

* - this panel was not the same as that appearing in some eastern editions of Life, which was fr. 313, showing the large splash of red.

SUMMARY OF HYPOTHESES A through G

Based on sudden motions ~~as~~ by JFK and JC as indicative of hits-- motions apparently too rapid to have been voluntary -- it is hypothesized that JFK was hit four times and JC, once; with a separate bullet.

Hyp. D : JFK hit at fr. 189 (from other evidence, from the front, entering the throat. See Salandria, March '65 "Liberation")

Hyp. E. : JFK hit in body, fr. 226-227 (from other evidence, from the rear entering back approx. 6" below collar. See Salandria, ibid.)

Hyp. F : JFK hit from rear in left-forward part of head at fr. 247.

Hyp. G : JFK hit in head from right side in fr. 313. (Revised to double hit on JFK -- see notes JFK-1)

Hyp. B : JC hit from the rear in fr. 237-238. ~~fr. 238~~
(the JC -1 photo panel was made sometime after this hypothesis was worked up, and I now believe he was hit immediately prior to fr. 238. Note sharp drop in shoulder line as compared with fr. 237, accompanied by opening of mouth.) (fr. 236 shows corner of shoulder more clearly than fr. 237).

Hyp. A : JC not hit with same bullet that hit JFK (and since -- contrary to ~~the~~ W.C. contention -- this is critical to maintenance of Warren Commission's lone-assassin theory, there were at least two gunmen)

R. Marcus

R.M.
March '65