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First Draft —.
Please critique !

> RE: Secrets of a Homicide: Exploring the JFK Assassination
>   by Dale K Meyers in *Video Toaster User*, November 1994

Technique

Using current computer technology, former radio announcer Meyers has, by his account, recreated Dealey Plaza in minute detail. This reportedly includes the width, curve, and grade of Elm St, plus lampposts, highway signs, and trees. Likewise, a floor-by-floor reproduction of the Texas School Book Depository (TSBD) is described, including the sixth floor, the "sniper's nest," and the arrangement of boxes. In addition. he purchased a Viewpoint DataLab 1963 Lincoln Continental computer model and altered it to match the dimensions of the 1961 Lincoln used in Dallas. Crestline Software's Humanoid provided stand-ins for JFK and JBC. Using Lightwave, the vehicle was guided down Elm St. The positions of JFK and JBC could be independently controlled. Computer animation was recorded at 30 fps, instead of the 18.3 fps of the Z film. This conversion requires the computer to "expose" 1.639 frames for every frame of the original. To introduce a 3D environment, he matched the motion of his 3D model to a 2D film of the actual event. The final model contained 250,000 polygons and took four months. Rotoscoping all the available films took two more months to create and verify. His intention was to re-photograph the event from Zapruder's site as if he had a 35 mm camera running at 30 fps. The focal length of the Lightwave camera was set at 285 mm.

The Second Shot

The action behind the Stemmons Freeway Sign was interpolated between the first and last frames which show JFK and JBC. JBC is said to be hit at Z-223. With the sign removed, Meyers claims to see both men jump at the same time. To define the trajectory, Meyers chose not to use the wounds of JFK since they are said to be the subject of ongoing debate. Instead he elected to use the incident and exit wounds of JBC as defined by the HSCA. This trajectory is found to enter JFK's throat at the point seen in the autopsy photos. The bullet exits JFK's back "...near the shoulder line." Finally, the trajectory intersects the southeast corner window of the TSBD. The radius of the cone of error at this point is said to be 22.5 feet. He concludes that, to a near certainty, the second shot came from the sniper's nest and struck both men.

The Head Shot

He entertains the reasonable notion that the bullet may have been deflected before exiting the skull, which he states would make accurate trajectory assessment impossible. He next defines a line from the sniper's nest to JFK's head at Z-312 and projects this line forward. This is found to exit the "...top-right-rear of JFK's skull -- within the area blown out upon impact." He concludes that the trauma to the skull is at least consistent with a shot from the TSBD, although he implies that this cannot be proven with certainty. He concludes that a cone for a shot entering the right front of the skull and exiting the lower right rear area is nearly impossible for any shot to the right of the limousine midline.

Critique

It is not my intention here to criticize the computer modeling of Dealey Plaza nor that of the TSBD as achieved by Meyers. If such criticism is warranted at all, I shall leave it to those more familiar with the software employed and more acquainted with the microgeography of Dealey Plaza. Rather, I shall focus on several critical assumptions listed above, specifically as they pertain to anatomy and the trajectories derived therefrom.

Meyers' declaration that he can actually see both men jump in response to the proposed shot at Z-223-- because the sign has been removed -- is both astonishing and perplexing. If the computer has smoothly interpolated the positions of both men, frame by frame, the result should also be a smooth and uninterrupted journey. Left totally unexplained is the data source for such an unexpected acceleration. If it does not appear in the original Z film (that would appear impossible since both men were hidden behind the sign), then where did Meyers find it? This startling assertion is not addressed in his paper.

Meyers asserts that the single bullet trajectory enters JFK's throat at the "point" seen in the autopsy photos. This surely cannot be what he meant to say -- since there is no entrance wound seen on the photos. In fact, the pathologists, despite a careful search of the entire wound perimeter at the autopsy, could not find such an entry site. All that was seen was a large gaping transverse wound, presumably from the tracheostomy. Exactly what Meyers meant to imply by this comment is not clear. What is certain is that there is no "point" of entry in the photos.

He next states that the exit in JFK for this bullet is "...near the shoulder line." In anatomic language, this is abysmally imprecise. It provides not the slightest clue as to exit site -- neither vertically nor horizontally. This statement, following on those above, can only lead one to hope that the remainder of his work is not also plagued by such inattention to detail.

As discussed by Meyers, the second shot, traced to the TSBD, is assumed to have traveled undeflected through both JFK and JBC. Since the bullet shattered a long section of JBC's fifth rib, this straight line assumption might well be questioned. Unfortunately, there is no way of either proving or disproving this conjecture. If Meyers' assumption of a straight line trajectory is incorrect, then his conclusion, which implicates the sniper's nest, is also in question. But there are more serious problems with Meyers' scenario, as we shall see.

The entrance and exit wounds of JBC are described in Volume 7 of the *HSCA*. Their distances from the midline are not given in Fig. 35, the drawing by the surgeon, Dr Robert R Shaw. The text, however, describes the diameter of the exit wound as 5 cm; Fig 35 shows it as nearly circular. In September 1978, Dr Baden personally examined JBC. He measured the distance of the entrance wound on the back as 6 inches to the right of midline. He failed to state the distance of the exit wound on the anterior chest from the midline. (The text also describes the suit jacket: the exit wound was 15 cm to the right of midline. But data based on the clothing itself can hardly provide an accurate trajectory estimate -- since the position of the clothing with respect to the skin is not well defined.)

Without a precise location for the exit wound, an accurate trajectory is simply not possible. Even the Warren Commission affirmed that "...the angle could not be fixed with

absolute precision, since the large wound on the front of the chest precluded an exact determination of the point of exit."

Assuming an AP chest thickness of 22 cm for JBC (typically 20 to 24 cm in hundreds of cases in my experience), it is possible to calculate an error radius based simply on the error inherent in a 5 cm exit wound. At the sniper's nest, I calculate this to extrapolate to about 22.4 feet. It is interesting that Meyers states an error radius of 22.5 feet. Quite possibly we have performed this estimate in the same way. An additional uncertainty derives from imprecise knowledge of the orientation of JBC (about a vertical axis). Both the HSCA and Meyers agree that the uncertainty in his orientation is at least 5 degrees. By itself, this yields a radius for the cone of uncertainty of an additional 17.2 feet at the TSBD. When both uncertainties are included, the error radius increases to about 28 feet. Already this error radius nearly includes gunman sites directly to the rear of the limousine. But the problem is worse than that -- the actual orientation of JBC (not just the uncertainty in his orientation) has not yet been taken into account. Essentially all observers agree that in Z-223 his torso is visibly rotated to the rear, much more than 5 degrees. Such a rearward rotation immediately shifts the location of the error radius significantly more in the direction of the Dal-Tex building.

The major criticism of Meyers' presupposition, however, is much greater than anything stated above. The error radius cannot simply be estimated from the 5 cm size of the exit wound. The chief problem is that the location of this wound with respect to the midline is not known at all! Without such precise knowledge it is not even possible to calculate an approximate error cone! How Meyers resolves this most difficult challenge is nowhere discussed in his paper. It is useful also to recall that even the HSCA did not dare attempt a trajectory analysis based on JBC's wounds, most assuredly because of all the difficulties listed above.

There is another serious problem with the anatomic assumptions of Meyers. Using Cutler's scale model of Dealey Plaza and the location of the limousine at Z-223, the horizontal trajectory angle from the sniper's nest to JFK is about 9.5 degrees. If this angle is then superimposed on a cross section of JFK's anatomy (anywhere in the low C-spine or upper T-spine), a fatal anatomic problem is encountered. If the trajectory passes through JFK's anterior midline, then this angle requires that the bullet pass directly through the spine. I have measured these vertebral body widths directly from the chest X-rays at the National Archives; the AP thickness is given by the HSCA as 14 cm — a very reasonable value, judging from my experience with many patients. Even without taking into account the finite width of the bullet, the trajectory must necessarily pass directly through the spine. The only escape route from this dilemma is to suppose that JFK was rotated so much that the bullet would miss the spine. However, even the HSCA granted that his torso was facing straight forward within a margin of error of 5 degrees (6 HSCA 44). Even if this additional angle is factored in, it is still quite unlikely that a bullet of finite width could have passed through JFK without causing major spinal trauma. If, in addition, the location of JFK's back wound (4.5 cm from midline) is utilized, then the dilemma persists unresolved.

I turn next to the head wound. Meyers suggests that the angle of a grassy knoll shot would have been about 90 degrees. This is surely a gross error. A review of the Dealey Plaza map for Z-313 shows that the angle is much closer to 45 degrees for a gunman behind the picket fence. It must be admitted, however, that even this angle seems unlikely to permit a bullet exit at the right rear of JFK's skull. On the other hand, a shot from the vicinity of the overpass substantially reduces this angle. From this site, a shot entering the right front might possibly exit at the right rear of the skull. This becomes more likely if the bullet was slightly deflected before leaving the skull. Meyers was quite

3

willing to entertain such a deflection for his preferred single gunman scenario -- but when a second gunman is contemplated he appears curiously blind!

In summary, no matter how beautifully Dealey Plaza is recreated, or how well the mannequins are positioned, or how carefully the limousine is driven, unless the relevant wounds are known with great precision, any trajectories must be considered suspect. Furthermore, such trajectories must satisfy basic anatomic constraints. Meyers either does not address these concerns at all or he discusses them only superficially. Until these issues are faced -- and resolved -- any conclusions about single bullet trajectories and head shots must be considered dubious.

To consider these issues in a more positive light, I have found it possible, based on Z-224 (the first frame after the sign to show both men), to construct a 3D coordinate system based on the limousine. Since its dimensions are precisely known the distances between the two men can be calculated, both from left to right and from front to back. This work was done on a greatly enlarged version of Z-224, using a projected 35 mm slide. Assuming that the bullet exits at JFK's midline, I conclude that it must necessarily strike JBC surprisingly close to his own midline -- far from the actual site observed by Baden (near right armpit). The obvious corollary to this, of course, is that no bullet exited from the front of JFK's neck. More likely, that wound was an entry site. Also, of course, the bullet that struck JBC must have been a different bullet. This analysis also shows that, in order for the single bullet theory to be valid, and to match the back wound of JBC, the relative separations of the heads of the two men must be visibly very different from what is seen in Z-224. This required change in separation can be calculated quite precisely. Furthermore, this approach has the distinct merit of internal checks on relative distances -- which are known with great accuracy based on the scale model of the limousine. And finally, this analysis has the singular advantage of not requiring any computer reconstruction at all -- surely a not insignificant matter when one considers the ease with which errors may not only occur, but also proliferate, in any computer program which relies on multiple steps to reach its end result.