

A Mathematical Look at the Assassination of President John F. Kennedy

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"Overall, the tests by the FBI, the Army Ballistics Lab, and CBS News show that on the average, trained marksmen could not do what Oswald is purported to have done, in the time limit required."

Note by the Author: Originally this article was part of a mathematics lesson and slide presentation for the seventh and eighth grade classes at Holy Family-Holy Name School in New Bedford. The students showed a great deal of interest.

The Firing of the Shots and the Rifle Tests

On November 22, 1963, Abraham Zapruder stood on a four foot pedestal in Dealey Plaza, Dallas, Texas. From that position he filmed one of the most shocking scenes in American history, the assassination of President John F. Kennedy.

The film became an important piece of evidence, for not only does it record the whole assassination, but it actually acts like a clock to record the length of time the assassination took.

Photo expert Lyndal L. Shaneyfelt of the FBI testified that Zapruder's camera was running at 18.3 frames per second. /1/ The Warren Commission determined that the first shot was fired between Z-210 and Z-225 and the last shot was fired at Z-313. /2/ (The exact time of the first shot could not be determined, for at the time the limousine was hidden by a road sign.) Subtracting the frame of the first shot (Z-210 or 225) from the last shot (Z-313) we get a difference of 89 to 103 frames. Dividing by 18.3 (speed of camera) we can see that the time span of the shots was between a minimum of 4.86 seconds to a maximum of 5.62.

The question arises could an assassin fire the bolt action 6.5 Mannlicher-Carcano rifle found on the sixth floor of the Depository, with enough speed and accuracy in the time limit required?

To answer this question the Commission had two different groups test-fire the rifle. The first test was held November 27, 1963, by the FBI. /3/ Three experts (Killion, Cunningham and Frazier) fired at a target 15 yards away in times of 6, 7 and 9 seconds. All shots were high and to the right due to a defect in the scope of the rifle. Robert A. Frazier fired two more series of 3 shots at 25 yards in 4.6 and 4.8 seconds.

In March, 1964, Frazier fired three more series at a target 100 yards away in 5.9, 6.2 and 6.5 seconds.

A second test was conducted in March 1964 by the U.S. Army Ballistics Research Laboratory. Three more experts fired at three silhouette targets located at distances matching the distance of the limousine. The times of the men, all of whom were rated as "Masters" by the National Rifle Association,

were as follows: Hendrix 8.25, 7.0; Stanley 6.75, 6.45; Miller 4.6, 5.5. /4/ The average time for the "masters" was 6.425 seconds with two hits each. Miller later fired a third series in 4.45 seconds with two hits.

It seems important to note that the test gunmen were timed only from the sound of their first shot and received an unlimited time to aim. Yet the hypothetical assassin's view was blocked by a tree, and so he had only a very limited time to take aim. The experts fired at stationary targets, not moving ones. When asked about the effect of aiming at a moving target Special Agent Frazier replied, "It would have slowed down the shooting." /5/ Shims were also added to the rifle to correct the scope's inaccuracy.

So only two of six experts were able to fire within the required time. The average time of the test was 6.2 seconds, more than half a second longer than the maximum time allowed for the shots by the Commission.

CBS News had 11 volunteers practice with rifles similar to Oswald's for a "Special" in June of 1967. They fired 37 runs of three shots each. Although I don't have the exact times of each marksman, I have found that they had rifle problems on 17 of 37 attempts (45% of the time) /6/ and in only ten runs were they able to fire in the time limit required (27% of the time) with an average of 1.3 hits. /7/

Overall, the tests by the FBI, the Army Ballistics Lab, and CBS News (see figure 1) show that on the average, trained marksmen could not do what Oswald is purported to have done, in the time limit required. (See the November 1976 issue of "PURSUIT" for a chart of FBI and Army ballistics rifle test times.)

The Stair Race

The first person to see Oswald after the assassination was Patrolman Marrion Baker. After the shots, Baker had run into the depository and with building manager Roy Truly started up the stairs toward the sixth floor. As they rounded the second floor corner, Baker caught a glimpse of someone in the vestibule outside the lunchroom, and went to investigate. Truly came back and identified the man as Lee Oswald an employee of the depository. Baker and Truly then continued up the stairs, and Oswald walked into the lunchroom.

In an effort to determine if Oswald could have fired the shots from the sixth floor and still gone down to the second floor in time to meet Baker, two tests were run by the Commission. It should be pointed out that these tests could not prove Oswald's
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echoes in the area, noises originating from either place tend to sound the same.

In any event, no one present at the time saw anything at all suspicious.

Thus we came, gradually and finally, to the end of our assignment. We had become masters of much more information than we had expected to gather, veterans of many more twisting trails than we had expected to follow. We spent nearly two months writing our massive report — on which all of us, with our different backgrounds, are agreed.

This report is the truth as we see it, as best we know it, and on this, we rest.

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Washington, DC 20515

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guilt; but if they proved a man could not have gone down to the second floor in time, they could prove Oswald's innocence.

In the first test run by the Commission it took a stand-in for Truly/Baker 1:30 and a stand-in for Oswald 1:18. In the second test run it took Truly/Baker 1:15 and Oswald 1:14. If you take the Oswald test time of 1:18, and the Truly/Baker time of 1:15, then Oswald would have arrived after Baker. If you add the time needed for the hypothetical assassin to leave his boxed-in "sniper's nest," hide the rifle, etc. he probably would have arrived 5 or more seconds after Baker. /8/ It is also inter-

A Radical Analysis of Political Assassinations and Conspiracies Is Needed

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To the Editor:

"Truth is always revolutionary": this is a golden rule in political analysis.

1. Reasonableness not Exaggeration. When we examine political assassinations and government conspiracies, we must not exaggerate the facts of these atrocities. A careful, well-documented presentation can speak for itself. When we inflate corporate/government conspiracies, we undermine our own efforts towards radical change.

2. The Nature of the System. We must examine the nature of the system itself. It is a pitfall to paint a picture of well-oiled conspiracies that mar an otherwise decent system. We must look at the day to day horrors of the system: rats in the ghetto, speed-up on the factory line and inadequate food and health-care for hundreds of thousands. We must look at our economy that is so heavily dependent on arms and munitions manufacturing.

3. Not CABALS but a SYSTEM. When we consider the failure of the established media to examine and reveal the truths of political assassinations, we should not be lulled into believing it is simply the work of the CIA or other cabal. We must recognize that the media monopolies have a vested interest in the stability and affirmation of the system — something that could be threatened in exposing conspiracies and cover-ups.

4. The Kennedys Support the System. We must be cautious not to represent the Kennedys as innocent victims. We should remember their complicity in war, counter-insurgency and cover-ups. The Kennedy silence on the assassinations of RFK and JFK is not necessarily the result of having been misled or blackmailed. It could be attributed to "reasons of state" and concern for the stability of the system.

5. Imperialism. The approach of radical researchers and "counterspies" should stem from the conviction that the system is basically imperialistic. Years of careful research and unhygienic explanations will be required to expose the monster, the system, which runs for the benefit and wealth of the few rich and for the harm and the oppression of the many poor.

esting to note that Victoria Adams ran down the same stairs allegedly used by Oswald after the assassination and saw no one. /9/ Needless to say, the Commission's tests failed to prove that Oswald could have dashed down the stairs in time to meet Baker.

(To be continued in the next issue)

A Mathematical Look at the Assassination of President John F. Kennedy - Part 2

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(Continued from "People and the PURSUIT of Truth" for October 1976, page 6.)

The Testimony of the Film

Recall that FBI expert Robert Frazier test-fired the rifle "to determine the maximum speed at which it could be fired." /10/ To work the bolt and fire three shots (aiming time excluded) took a minimum of 4.6 seconds. The Commission divided by two and determined that the minimum time to work the bolt and fire was 2.3 seconds. With the Zapruder film running at 18.3 frames per second, the time span between the shots on film should be 42.09 frames. /11/

A problem arises with anyone's viewing of the film, for Connally appears to be reacting too soon for his reaction to have been a separate shot from Oswald's bolt action rifle. When viewing the film for Life Magazine in 1966 Connally picked Z-234 as the hit frame. /12/ This is approximately 1.3 seconds after the Kennedy hit. Photo-optical expert Robert Groden picks Z-237 as the hit frame. /13/ Connally's chest surgeon, Dr. Robert Shaw, picked Z-236 as the point of impact "give or take 1 or 2 frames." /14/ Dr. Charles Gregory picked Z-234 to 236, and Josiah Thompson, author of "Six Seconds in Dallas," picked Z-236. /15/

It seems clear that no one sees Connally as wounded until after Z-230, far too soon for another shot from Oswald's gun. It is also obvious that Connally can be seen holding his stetson in his right hand, which was supposedly shattered by the bullet. Now either Connally was struck by the same bullet which wounded the President and is suffering a delayed reaction, or there was another gunman firing in Dealey Plaza that day. It is as simple as that; Oswald could not have fired twice in less than 2.3 seconds.

Whether or not Connally is suffering from a delayed reaction is probably for medical experts to decide. The Commission itself was split on the issue with Senators Russell and Cooper and Representative Boggs doubtful of the "single bullet theory" and Rep. Ford, Mr. Dulles and Mr. McCloy in support of it. /16/ But there are still problems with it from a mathematical standpoint.

The Vertical Angles

Commission Exhibit 387 is a "schematic drawing showing side view of entry and exit wounds to the neck area of President Kennedy." Commission Exhibit 689 is a drawing showing the path of a projectile as indicated by examination of the wounds of Governor Connally.

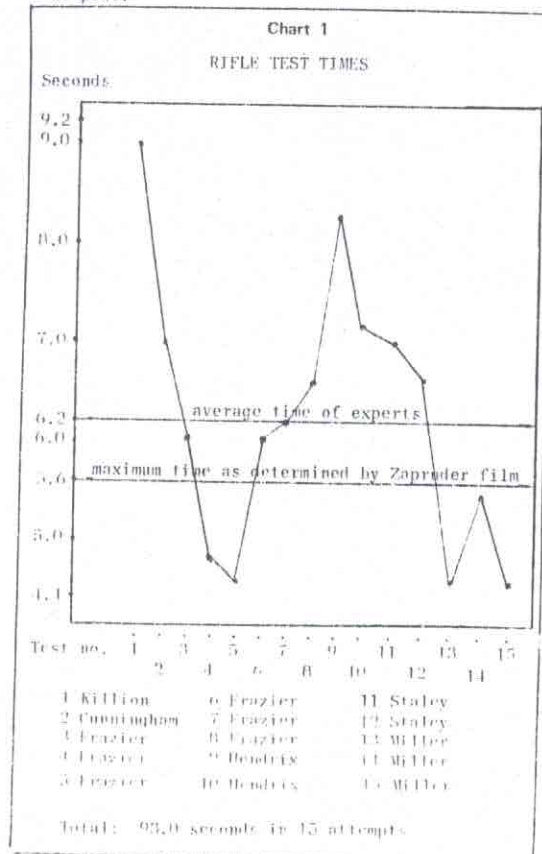
Connally's wound was measured as at a trajectory of 2°, whereas Kennedy's wound appears to be a very flat angle (approximate measure of 10°). To

the naked eye, these flightpaths simply do not line up. But let us allow for the time being that these are simply rough drawings.

The Lateral Angles

In 1969, Robert B. Cutler, an architect, tested the flightpath of the single bullet theory. His tools were (1) a surveyor's plat of Dealey Plaza showing the relationship of the Texas S.B. Depository to Elm St. and (2) a dimensioned drawing of the limousine for proper positioning of the President and Governor.

Mr. Cutler took great pains to get his measures correct, and travelled to Dallas to get a print of the plat.



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Using individual frames of the Z-film (from Life Magazine, Paris Match, and the Warren Exhibits) he was able to estimate the position of the men in the car. (It should be noted that there were over 20 photographers in the Plaza that day located on both sides of the motorcade.)

A travel line was drawn tangent to the curved route. The intersection of the travel line with the flightpath provided the basis for measuring the angles. (Afterward the flightpath was transferred to the detail of the limousine and the position of the men.)

The Commission determined that JFK was struck between Z-210 and Z-225. Cutler tested five Z-frames Z-106, Z-198, Z-210, Z-225, and Z-234. The angle from the earliest frame to the last was 17° to 7° from right to left. The average measure of the angle was 11°, and in each of the tests the flightpath failed to provide for a wound on Connally's right side, near his right arm pit. As a matter of fact all the flightpaths passed on Connally's left side or missed him altogether. /17/

Summary and Conclusions

What can one conclude from the information presented in this article?

1. We can conclude from the rifle tests that, on the average, experts cannot do what Oswald allegedly did.
2. We can conclude from the stair race that if Oswald was the assassin he may well have arrived on the second floor after Officer Baker.
3. We can conclude from the work of Robert Cutler that the single bullet theory is mathematically improbable to say the least.

Footnotes

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- /3/ Epstein, Edward J., Inquest, Viking Press, 1966, p. 142
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- /6/ White, Stephen, Should We Now Believe the Warren Report?, MacMillan Company, 1968, p. 225
- /7/ Thompson, Josiah, Six Seconds in Dallas, Bernard Geis Associates, 1967, p. 204
- /8/ Roffman, Howard, Presumed Guilty, Associated University Press, 1975, p. 63-4
- /9/ Cutler, Robert, The Umbrella Man, Betts and Mirror Press, Danvers MA, 1975, p. 45, 98
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- /13/ Model, F. Peter, and Robert J. Groden, JFK: The Case for Conspiracy, Manor Books, Inc. 1976, p. 147
- /14/ Warren Report, Hearings, Volume IV, p. 120
- /15/ Thompson, op. cit., p. 71
- /16/ Ibid, p. 210
- /17/ Cutler, op. cit., p. 37-44