

Ballistics and Baloney: Lucien Haag and the JFK Assassination

By Martin Hay



Lucien Haag is widely considered to be an expert on ballistics. He is author of the forensic textbook, *Shooting Incident Reconstruction*, and over the last four decades has contributed over 100 articles to *The AFTE Journal*, the peer-reviewed official publication of The Association of Firearm and Tool Mark Examiners. There seems to be no doubting his expertise. However, when it comes to the assassination of John F. Kennedy, Haag does not behave in the objective manner of which we would like to believe a scientist is capable. It is quite clear from his own writing that well before he carried out his "ballistic testing" he had already decided what the facts of the case were. From there he simply set out to prove himself right.

Haag first entered the JFK debate in 2013 when he and his son, Michael, were the featured experts for the PBS NOVA television special, *Cold Case: JFK*. As I demonstrated in my review of that show, NOVA and the Haags omitted and misrepresented key facts not only about the assassination but the results of their own experiments as well. And Now Haag is at it again with a series of articles published in *The AFTE Journal*, focusing on the Single Bullet Theory and President Kennedy's fatal head wounds. The first of these is titled *Tracking the 'Magic' Bullet in the JFK Assassination* and its content will come as no surprise to those who watched the NOVA special. What is a surprise is to see a man of Haag's obvious intelligence fall at the first hurdle.

The purpose of the article, according to Haag, is to show that a "step by step analysis using the Scientific Method of *excluding* possibilities as one retraces the multiple wounds in...John Connally will lead to only one rational conclusion: this bullet is also associated with the perforation gunshot wound of President John F. Kennedy." He then suggests that "In any scientific inquiry, one should start with what is known and not likely to be in dispute." Which sounds pretty reasonable. The problem is with what Haag believes to be known and not in dispute: "The 'magic' bullet fell off of Texas Governor Connally's stretcher when it was being moved and bumped into a hallway wall by Parkland Hospital's Chief Engineer, Darrell Tomlinson."

Reading a statement like that one can only wonder where Haag has been for the last fifty years. Clearly he's been much too busy to study the assassination in any detail. To begin with, Darrell Tomlinson was never sure that the bullet he found actually came from Governor Connally's stretcher. When Connally was wheeled into trauma room No. 2, he was transferred to an operating table and the stretcher he had occupied was pushed onto an elevator. As Tomlinson told the Warren Commission, he removed this stretcher from the elevator and placed it on the ground floor next to another one which was entirely unrelated to the care of Governor Connally. A few minutes later, he bumped one of the stretchers against the wall and a bullet rolled out. However, Tomlinson made clear in his Commission testimony that he was unsure which stretcher the bullet had rolled off of and, when Commission lawyer Arlen Specter tried to intimidate him into identifying it as

Connally's, Tomlinson shot back, "I'm going to tell you all I can, and I'm not going to tell you something I can't lay down at night and sleep with either." (6H134)

One thing Tomlinson did note was that the stretcher the bullet came from contained one or two bloody, rolled up sheets, "a few surgical instruments...and a sterile pack or so." (Ibid 131) This information appears to eliminate Connally's stretcher because Tomlinson testified that when he wheeled it off of the elevator it contained only sheets and "a white covering on the pad." (Ibid 129) His recollection that the cart wheeled off of the elevator contained no surgical instruments is corroborated by the testimony of Parkland Nurse, Jane Wester, who explained that after Connally was placed on the operating table she personally removed all but the sheets from his stretcher. (Ibid 122-3)

More important than the uncertainty about which stretcher it came from is the fact that the evidence strongly suggests CE399, the 'magic' bullet, is not the actual bullet Tomlinson found. As soon as he discovered said bullet, Tomlinson brought it to the attention of Parkland Personnel Director, O.P. Wright. After the pair had examined the round, Wright turned it over to Secret Service Agent Richard Johnsen. Johnsen then carried the bullet back to Washington, D.C. and passed it along to Secret Service Chief James Rowley who, in turn, passed it along to the FBI. Exactly what became of this bullet remains a mystery because, as we shall see, the evidence suggests a strong possibility that at some point it may have been switched for CE399.

In 1964, the Warren Commission tasked the FBI with "the tracing of various items of physical evidence", including CE399. On July 7, the Bureau provided a 3-page report laying out the bullet's chain of possession and claiming that on June 12, 1964, FBI agent Bardwell Odum had shown CE399 to Tomlinson and Wright, and both men had said that it "appears to be the same one" found on the stretcher but could not "positively identify" it. (24H412) The report also stated that the next two men in the chain of possession, Secret Service Agent Johnsen and Secret Service Chief Rowley "could not identify this bullet as the one". (Ibid) The claim that Tomlinson and Wright had said it appeared to be the same bullet is seemingly contradicted by a June 20, 1964, FBI AIRTEL which was declassified many years later. The memorandum states simply that "neither DARRELL C . TOMLINSON who found bullet at Parkland Hospital, Dallas, nor O.P. WRIGHT, Personnel Officer, Parkland Hospital, who obtained bullet from TOMLINSON...can identify the bullet."

Two years after the FBI provided its report to the Commission, author Josiah Thompson interviewed O.P. Wright and asked him what the bullet he had handled that day looked like. He showed Wright a photograph of CE399 and Wright "rejected" it "as resembling the bullet Tomlinson found on the stretcher." Wright, a former police officer experienced in firearms, explained that the bullet he saw had a "pointed tip" and even showed Thompson a similar .30 caliber round from his own desk. (Thompson, *Six Seconds in Dallas*, p. 175) When interviewed, Tomlinson was less certain saying "only that the bullet found resembled either CE572 (the ballistics comparison rounds) or the pointed, .30 caliber bullet Wright had procured for us." (Ibid)



O. P. Wright believes that the stretcher bullet he examined on November 22 looked like the sharp-nosed bullet above.

In 1998, in an attempt to find out once and for all what Tomlinson and Wright had actually said to Odum, researcher Dr. Gary Aguilar contacted the National Archives. Understanding that it was standard practice for an FBI Agent to submit a FD-302 reporting his field investigation, Dr. Aguilar requested the National Archives search for any reports written by Odum specifically concerning his alleged showing of CE399 to Tomlinson and Wright. After a vigorous search, Aguilar was informed that no report could be found and that “the serial numbers on the FBI documents ran concurrently with no gaps, which indicated that no material is missing from these files.” Put simply, no such report existed. Not yet satisfied, Dr. Aguilar then decided to track Odum down and, in 2002, tape recorded the following exchange:

AGUILAR: ...From what I could gather from the records after the assassination, you went into Parkland and showed (CE399 to) a couple of employees there.

ODUM: Oh, I never went into Parkland Hospital at all. I don't know where you got that. ... I didn't show it to anybody at Parkland. I didn't have any bullet. I don't know where you got that but it is wrong.

AGUILAR: Oh, so you never took a bullet. You were never given a bullet

ODUM: You are talking about the bullet they found at Parkland?

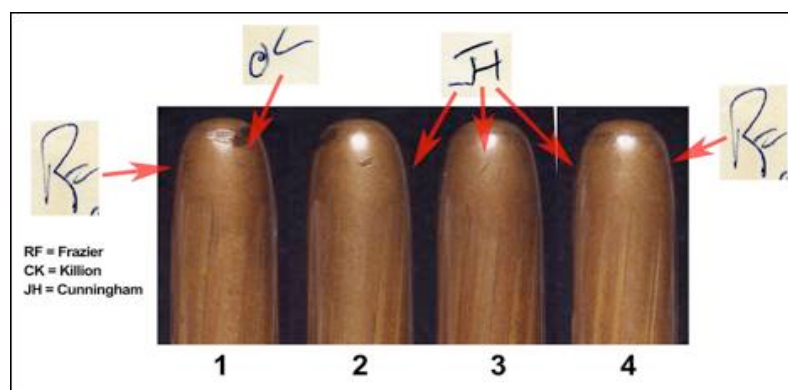
AGUILAR: Right.

ODUM: I don't think I ever saw it even.

Aguilar recalled, "we gently asked Odum whether he might have forgotten the episode. Answering somewhat stiffly, he said that he doubted he would have ever forgotten investigating so important a piece of evidence in the Kennedy case. But even if he had forgotten, he said he would certainly have turned in the customary 302 field report covering something that important and he dared us to find it. The files support Odum; as noted above, there are no 302s in what the National Archives states is the complete file on CE399." (Aguilar, *Review of Reclaiming History by Vincent Bugliosi*)

To recap: Tomlinson, the first person in CE399's chain of possession, was unable to positively identify it. The second, O.P. Wright, denied it was the bullet he saw and gave a description of the stretcher bullet that all but eliminated CE399. The next two links in the chain, Secret Service Agent Johnsen and Chief Rowley, could not identify CE399 as the bullet they handled. And another crucial link in the chain, FBI Agent Odum, denied that he had ever even seen the Parkland bullet let alone performed the actions described in the July 7 FBI report. And, what's more, the record supports his recollection. Unbelievably, that's not all.

The fifth link in the chain was FBI Agent Elmer Todd who was in the White House when he purportedly received the bullet from Rowley. Todd then passed the bullet along to Agent Frazier at FBI HQ, but not before he marked it with his initials. (24H412) And therein lies the problem: Todd's initials are not on CE399. In 2003, meticulous JFK researcher John Hunt proceeded to “track the entire surface of the bullet using four of NARA's preservation photos.” Hunt discovered that there were only three sets of initials on CE399: RF (belonging to Robert Frazier), CK (FBI Agent Charles Killion), and JH (which was the mark used by FBI Agent Cortlandt Cunningham to



avoid confusion with “cc,” the notation for carbon copy). Todd’s mark was nowhere to be found. And as if proving that CE399 possessed not even the semblance of a chain of possession was not enough, Hunt discovered another major problem for the “magic bullet.”

Frazier marked the time he received CE399 on his November 22 laboratory worksheet as “7:30 PM.” He wrote the same time on a handwritten note he titled “History of Evidence” and likely used as a memory aid during his Commission testimony. The problem is, Todd also made a note of the time he received a bullet and according to the handwritten notation he made on the original envelope that contained it, he received the stretcher bullet at “8:50 PM.” So how could Frazier receive a bullet from Todd at FBI HQ one hour and 20 minutes *before* Todd was handed the same bullet at the White House by Chief Rowley? He could not. When considered alongside the fact that Todd’s initials do not appear on CE399, and the fact that the four men preceding him in the chain of possession did not recognise it when shown, it is almost impossible not to conclude that there were two bullets in Washington that day; CE399 and the pointed-tip missile found on a stretcher at Parkland Hospital. CE399 was used to pin the blame for Kennedy’s assassination squarely on Lee Oswald’s shoulders. The stretcher bullet was made to disappear.

Clearly, the above information nullifies Haag's claim that "the association of this bullet [CE399] with [Connally's] gunshot wounds is completely reasonable and should not in dispute [sic] by any rational person." Based on everything outlined above, a rational person would find it difficult *not* to dispute CE399's association with Connally's wounds. However you cut it, the claim that "the 'magic' bullet fell off of Texas Governor Connally's stretcher" is about as far from being an established fact as it's possible to get.

Having failed to authenticate CE399, Haag turns his attention to Connally's wounds. "The terminus for this bullet's flight", he writes, "was a shallow puncture wound in the governor's anterior left thigh. A back-extrapolation from this minor injury leads to the perforating wound to the governor's right wrist." How exactly he has performed this "back-extrapolation" from the left thigh to the right wrist Haag never explains. Most single bullet theorists believe Connally was struck at or before frame 224 of the Zapruder film, at which point his wrist is completely out of view. Obviously, then, the precise physical relationship between the wrist and thigh wounds at the presumed time of impact is entirely unknowable. So how does one extrapolate backwards from the left thigh and arrive at the right wrist?



Haag goes on to state that the wrist wound "was described by Dr. Shaw, the governor's treating surgeon, as having an irregular entry and exit." In point of fact, Shaw was Connally's thoracic surgeon; the wrist wound was treated by Dr. Charles F. Gregory. One is compelled to speculate on why Haag did not make reference to Dr. Gregory. Perhaps it represents simple ignorance on Haag's part. After all, his writing makes clear that there is an awful lot he does not know about the assassination of President Kennedy. On the other hand, maybe he did not want his readers to learn that Dr. Gregory had explained in his Commission testimony that the amount of cloth and debris

carried into Connally's wrist indicated it had been struck by "an irregular missile" (6H98) – a description which hardly fits the near-pristine appearance of CE399. In his second appearance before the Commission, Dr. Gregory expanded on this point, noting “that dorsal branch of the radial nerve, a sensory nerve in the immediate vicinity was partially transected together with one tendon leading to the thumb, which was totally transected.” This, he said, “is more in keeping with an irregular surface which would tend to catch and tear a structure rather than push it aside.” (4H124) Dr. Gregory then specifically pointed to the two mangled bullet fragments found on the floor of the limousine as being the type of missile “that could conceivably have produced the injury which the Governor incurred in the wrist.” (Ibid 128)



Passing over Dr. Gregory's assessment entirely, Haag attempts to convince readers that the "several small lead fragments" found in the wrist were incompatible with the larger fragments and could only have come from CE399. And he does so by referencing, of all things, the now defunct Neutron Activation Analysis of Dr. Vincent Guinn.

Presented for many years as the lynchpin of the lone gunman theory, Guinn's NAA was conducted in the late 1970s on behalf of the House Select Committee on Assassinations, who used it to conclude that all the shots which struck President Kennedy and Governor Connally were fired from Lee Oswald's rifle. Guinn's conclusions rested on his claim that Mannlicher Carcano bullets were almost unique amongst unhardened lead bullets in that they contained varying amounts of antimony. Additionally, he claimed, the antimony levels in an individual bullet remained constant yet were different from the levels found in other bullets from the same box. Therefore, it was possible to trace a fragment to the individual bullet of origin and distinguish it from all others; even if they came from the same box. Thus, Guinn told the HSCA, it could be determined that the fragments recovered from Kennedy's skull and those found on the floor of the limousine all came from one bullet, and the fragments removed from Connally's wrist came from CE399.

Unfortunately for Guinn (and Haag), two scientists from the Lawrence Livermore Laboratory, metallurgist Erik Randich, Ph.D, and chemist Pat Grant, Ph.D, thoroughly debunked his claims in an article published in the *Journal of Forensic Science* in July 2006. To begin with, Randich and Grant showed that Guinn was incorrect in stating that the varying levels of antimony present in Carcano bullets made them unique. Apparently, for his comparison tests, Guinn had used non-jacketed ammunition which has strictly controlled levels of antimony owing to the fact that the hardness of the round is determined by the amount of antimony mixed into the lead. The same is not true of jacketed rifle bullets. Consequently, Randich and Grant reported that the JFK bullet fragments "need not necessarily have originated from MC ammunition. Indeed, the antimony compositions of the evidentiary specimens are consistent with any number of jacketed ammunitions containing unhardened lead."

Turning their attention to Guinn's claim that the antimony content of individual Carcano rounds remained constant, Randich and Grant presented highly detailed photomicrographs of MC bullets cut in cross-section, showing how the antimony tends to "microsegregate" around crystals of lead during cooling. What this means is that a sample taken from one portion of a bullet can very easily

have a level of antimony that is different from another sample taken from the very same bullet. "The end result of these metallurgical considerations", Randich and Grant explained, "is that from the antimony concentrations measured by [Guinn] from the specimens in the JFK assassination, there is no justification for concluding that two, and *only* two, bullets were represented by the evidence...the recovered bullet fragments could be reflective of anywhere between two and five different rounds fired in Dealey Plaza that day."

The work of Randich and Grant was followed in May 2007 by a second scientific paper, this time published in the *Annals of Applied Statistics*. A team led by Texas A&M statistician, Clifford Spiegelman, Ph.D, and an expert in bullet lead analysis, William Tobin, Ph.D, concluded that "evidence used to rule out a second assassin is fundamentally flawed...it is not possible from the compositional bullet lead analysis to conclude that there were only two bullets as the source of the five assassination fragments as Dr. Guinn testified." The result of these two studies is that, as far as the JFK ballistics evidence goes, NAA is now considered a dead issue. Virtually no one defends Guinn's conclusions any more and even former HSCA Chief Counsel Robert Blakey, whose report placed great emphasis on Guinn's NAA, now dismisses it as "junk science".

As a ballistics expert, Haag must surely be aware of the above just as surely as he must be aware that the FBI abandoned NAA and bullet lead examination in 2005, (see Jefferson L. Ingram, *Criminal Evidence*, [twelfth edition] p. 673) yet he repeats Guinn's discredited conclusions as if they remain completely unchallenged. By pretending that Randich and Grant et al. do not exist Haag is able to get away with writing that the NAA "effectively *excludes* any association between the bullet that caused the president's massive head wound and the ballistic injury to Connally's wrist." Obviously, in light of the above, we know this to be completely untrue. And in fact, during a 2013 presentation given at the Cyril H. Wecht Institute of Forensic Science and Law, Josiah Thompson and Keith Fitzgerald used the Zapruder film to show that it is entirely possible Connally's wrist was indeed struck by a fragment which had exited Kennedy's skull.

One thing Haag manages to get right is that Connally's wrist could not have been the first impact point of a bullet. This was established way back in 1964 during tests performed on behalf of the Warren Commission at Edgewood Arsenal. Chief of Wound Ballistics at Edgewood, Dr. Alfred Olivier, explained in his testimony that after firing several Carcano rounds into the wrists of cadavers, he came to the conclusion that "the Governor's wrist was not hit by a pristine or a stable bullet." If it had been, "he would have had a larger exit wound than entrance wound, which he did not." (5H83) Haag takes a different tack. He argues, based on his own tests with Carcano ammunition, that "a direct shot to the Governor's wrist would have a remaining velocity in excess of 1600 f/s – a velocity that would do far, far more than simply produce a puncture wound in his anterior thigh." This would have been a valid point had Haag presented anything which established that the wrist was hit by a Carcano bullet, or that the same missile was actually responsible for the thigh wound. As it is, his argument is pretty much redundant.

Continuing with his "back extrapolation", Haag asks rhetorically, "So what slowed this bullet to the point that it fractured the radius bone in [Connally's] wrist, exited and produced a puncture wound in his upper left leg, became dislodged, snared momentarily in his clothing and ultimately fell out onto his stretcher?" Pretending that he has actually established these conditions when he has not, Haag answers unsurprisingly, "passage through his upper torso..." He then makes the same claim he made in 2013 for *Cold Case: JFK*, which is that Connally had a 3cm, elongated entry wound in his back that is "entirely consistent with a destabilized bullet..." As I expected, he then argues that, since tests performed for the Commission established that the Carcano bullet was "very stable", "...the yawed strike and entry into Governor Connally's back can only be the consequence of a destabilized bullet that must have previously passed through President Kennedy..." Needless to say, there are big problems with Haag's supposition.

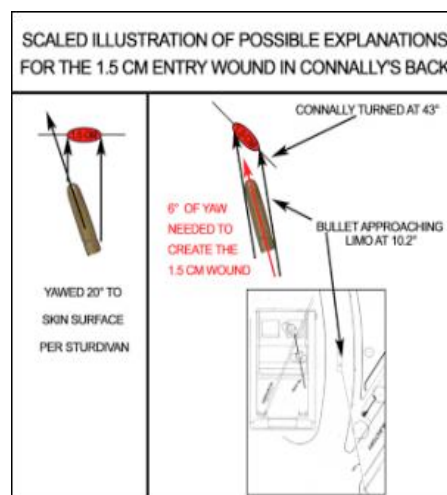
To begin with, it begs the question. As previously explained, since there were no bullets or identifiable fragments removed from Governor Connally, there is no way to conclusively establish

that his wounds were, in fact, caused by a Carcano bullet. So one cannot use its relative stability as proof of anything. It is well understood that rifle bullets are wobbling and yawing when they leave the muzzle and can take some distance to fully stabilize; sometimes in excess of 100 yards. Round nosed bullets like the Carcano round are known to be more stable because they have a more central center of gravity. But how would it effect Haag's argument if Connally was actually struck by a pointed tip bullet of the type O.P. Wright said was found at Parkland Hospital?

More importantly, at the very heart of Haag's argument that the bullet had to have struck Kennedy first is his claim that Connally's entry wound was 3cm long. It wasn't. As Connally's thoracic surgeon, Dr. Shaw, explained in his Warren Commission testimony, the entry wound under the Governor's right armpit was actually 1.5cm long – half the size Haag claims it was. (6H85) 3cm was the length of the wound after it was surgically enlarged. (Ibid 88) Should there be any doubt, Shaw's testimony is validated by the holes in Connally's jacket and shirt which measured 1.7 cm and 1.3 cm respectively. (7HSCA138-41) Clearly Haag, like John Lattimer and Gerald Posner before him, exaggerated the size of Connally's entry wound so that it would better suit his hypothesis.



Even at 1.5cm, the entry wound must still be considered slightly elongated. Yet this was the exact same length as the entrance wound in the back of President Kennedy's head (ARRB MD3) and no one has ever suggested that the bullet that hit the skull had previously struck someone else. Connally's thoracic surgeon Dr. Shaw – who had treated “well over a thousand” gunshot wounds in his three years in the U.S. Army medical corps during World War II (6H85) – explained in his testimony that, although the oblique nature of the wound might have been the result of a tumbling bullet, “...you have to also take into consideration...whether the bullet enters at a right angle or at a tangent. If it enters at a tangent there will be some length to the wound of entrance.” (Ibid 95) Former President of the American Academy of Forensic Science, Dr. Cyril Wecht, concurred, stating in his testimony to the HSCA: “...I think the fact that the scar on Gov. John Connally's back is in a horizontal plane is more consistent with the shot having been fired from the right side, the right rear, entering with some degree of a tangential nature.” (1HSCA346)



When we consider that the Zapruder film shows Connally was turned somewhat to his right at the time he was hit, a tangential strike appears to be the most likely explanation for the elongation of the entrance wound. [see the above illustration by John Hunt] And with that realization, any reason for believing the bullet *had* to have previously passed through President Kennedy flies right out the window.

To summarize: Haag claims that CE399, the “Magic Bullet”, fell off Governor Connally's stretcher, but the evidence indicates a strong possibility that an entirely different bullet was found on an unidentified stretcher at Parkland and was later substituted for CE399. He claims that extrapolating backwards from Connally's left thigh wound leads to the comminuted fracture of the right wrist and that, in turn, leads back to the chest. Yet the precise position of the wrist in relation to the thigh and chest at the time the Governor was struck is not known. Haag cites the Neutron Activation Analysis of Vincent Guinn as establishing that CE399 left fragments in Connally's wrist despite the fact that Guinn's work has been revealed to be “junk science” by two independent teams of experts. And he falsely states that the entry wound in the Governor's back was 3cm long and must have resulted from a tumbling bullet that had already struck Kennedy when, in fact, the wound measured only 1.5cm and was as likely explained by a tangential strike.

At every stage of his “step by step analysis”, Haag's propositions are either not supported or are wholly contradicted by the available evidence. It goes without saying, therefore, that he completely fails to provide any reason to believe that the bullet which struck Governor Connally *must* have already passed through President Kennedy. To be fair, as far as this writer is aware, there is nothing about Connally's wounds that specifically precludes the possibility. But many would argue that the same is not true of the wounds that Haag studiously avoids discussing. Namely, the non-fatal wounds of President Kennedy.

JFK's autopsy report describes the wound in his upper back as one “presumably of entry” and the throat wound as one “presumably of exit.” (ARRB MD3) Why such cautious language? Because not only was no pathway between the two wounds established at autopsy, the throat wound wasn't even noticed by Kennedy's pathologists! Leader of the autopsy team, Commander James J. Humes – a Naval hospital pathologist who was not an expert in gunshot wounds – explained in his Warren Commission testimony that, at the time the post mortem was conducted, he had been unaware of the wound in the throat because it had been obscured by a tracheotomy performed at Parkland Hospital. It wasn't until the following morning that Humes learned from Parkland's Dr. Malcolm Perry that the tracheotomy incision had been made on top of a bullet hole. (2H362) At that point Humes, who no longer had access to the body or any of the autopsy photos and X-rays, must have realized that by missing one of the President's missile wounds he and his colleagues had seriously screwed up. So he burned the first draft of his autopsy report (Ibid 373) and re-wrote it to state that the bullet which entered the back had “presumably” exited the throat.

Yet, according to a number of witnesses, at the close of the autopsy the surgeons had been certain that the back wound was shallow with no point of exit and that the bullet had worked its way out when external cardiac massage had been performed at Parkland Hospital. For example, FBI Agent Francis O'Neil stated in his testimony to the Assassination Records Review Board that “there was not the slightest doubt” that the bullet had “worked it's way out through external cardiac massage...There was not the slightest scintilla of doubt whatsoever that this is what had occurred...And viewing them with the surgical probe and their fingers, there was absolutely no point of exit...this was the exact thought when the entire autopsy was completed. The body has been dressed – washed, dressed, powdered, and is all set to go to the White House, and, in fact, left for the White House. And then several days later or something or other, we had heard that the doctor said further examination – I don't know examination of what – further examination showed that it worked its way back through a strap muscle, and came out the throat into...Connally. Not That evening. Not when the body was there. The body was gone.” (O'Neil testimony, p. 30-31)

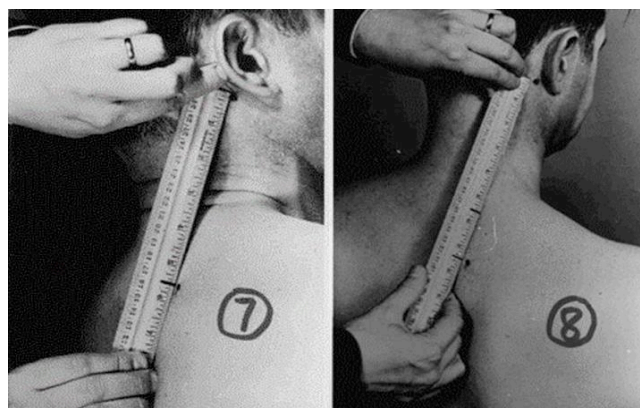
Autopsy technician James Curtis Jenkins believed that the back wound was “very shallow...it didn’t enter the peritoneal (chest) cavity.” He remembered that the doctors extensively probed the wound with a metal probe, “approximately eight inches long”, and that it was only able to go in at a “...fairly drastic downward angle so as not to enter the cavity.” (ARRB MD65) Jenkins's colleague Paul O'Connor said much the same thing. In an interview for the HSCA, O'Connor said that “it did not seem” to him “that the doctors ever considered the possibility that the bullet had exited through the front of the neck.” (ARRB MD64)

It is quite apparent that Humes's revised autopsy conclusion was based on inference and not on observation. And that inference, as logical as it may be, has further problems. Because according to the descriptions of the Parkland staff who observed it, the wound in the throat looked far more like an entrance wound than an exit. For example, Dr. Malcolm Perry told Humes that the hole was little more than 3-5mm in diameter. (17H29) He further explained in his Commission testimony that "It's edges were neither ragged nor were they punched out, but rather clean cut." (3H372) Dr. Charles Carrico recalled that the wound measured “4-7mm...It was, as I recall, rather round and there were no jagged edges or stellate lacerations." (6H3) And Dr. Ronald Jones described it simply as a “very small, smooth wound.” (Ibid, 54) As most readers are probably aware, a small, round, approximately 5mm wound is not what we would usually expect from an exiting high-powered projectile. In fact, at Edgewood, it was discovered that typical exit wounds created by the Carcano from a distance of 60 yards measured up to three times that much. (5H77, 17H846)

Of course, contrary to what many conspiracy theorists would like to believe, the above doesn't prove that the wound was an entrance. Forensic experts do not discern entrance from exit based solely on size and shape. But what it does do is highlight the ambiguities that exist thanks to President Kennedy's sloppy and incomplete post mortem. The fact is that the throat wound remains unexplained and its connection to the wound in the back remains open to doubt.

Even more problematic is the location of the back wound in relation to the hole in the throat. A bullet fired from the sixth floor window of the Texas School Book Depository would have been traveling at a downward angle of approximately 20 degrees. That being the case, it would clearly have needed to enter the back at a point that was considerably higher than the alleged exit wound in the throat. But the evidence indicates it did not.

Unfortunately, it is not possible to locate the entry wound with absolute precision because the autopsy doctors failed to record its position according to fixed anatomical landmarks. Their report states that the "7 x4mm oval wound" was "14cm below the tip of the right mastoid process” which is the small, boney bump behind the ear. But as these photos show, depending on the position of the head, 14cm below the mastoid process can be close to the base of the neck or considerably further down the back.



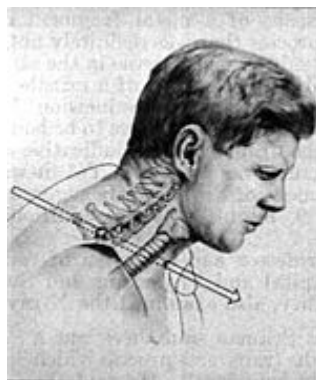
The nine-member forensic pathology panel of the HSCA criticized the autopsy doctors for this very reason, stating that the mastoid process is a moveable point and “should not have been used.”

(7HSCA17) Ultimately, after careful study of the autopsy materials, the panel concluded that the bullet entered at the approximate level of the first thoracic vertebra.

But the panel's proposed location for the in-shoot is not entirely free from doubt. The day after the assassination, Kennedy's personal physician, Dr. George Burkley – who was present at the autopsy – prepared and signed the official death certificate which states that the wound of "the posterior back" was situated "at about the level of the third thoracic vertebra". This lower position is seemingly corroborated by the holes in Kennedy's shirt and coat which are approximately 5 ½ inches below the collar. (Ibid 83) For obvious reasons, many conspiracy advocates uncritically embrace Burkley's description. But any objective reader should be able to see from his wording, "about the level of", that Burkley was clearly estimating. And as far as the holes in the clothing go, it should be obvious that the jacket and shirt could well have been riding up Kennedy's back somewhat at the time he was struck. In fact, as John Hunt showed in his online essay *The Case for the Bunched Jacket*, that is very likely the case. Perhaps the best that can be said based on the evidence we have is that the wound was somewhere between the first and third thoracic vertebrae.

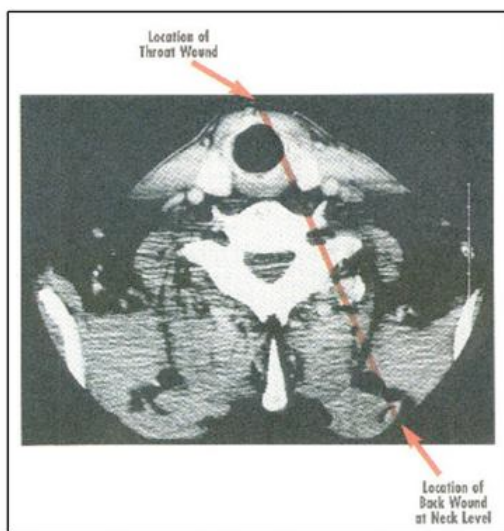


Whether the wound was as high as T1 or as low as T3, it poses a big problem for the Single Bullet Theory, because even T1 is anatomically lower than the hole in the throat. Nonetheless, the HSCA suggested the SBT was still possible providing Kennedy was leaning significantly forward when he was hit.



The trouble is, there is no known film or photo that shows Kennedy in anything like the above position. The Zapruder film shows the President in the moments before and immediately after he was shot and at all times he appears to be sitting upright. It has to be assumed, therefore, that during the extremely brief 0.9 second interval that he was hidden from view by the Stemmons Freeway sign, Kennedy adopted the necessary pose, was shot, and then sat back up again. Few would find this to be a believable proposition. As Dr. Cyril Wecht remarked, "I would suggest that is a movement that the most skilled athlete, knowing what he is going to do, could not perform in that period of time." (1HSCA339)

Finally we come to what is, for a number of critics, the most powerful reason for rejecting the SBT: the lateral angle through Kennedy's torso. All proponents of the theory agree that the bullet which struck the President must have passed through without hitting bone, otherwise there would have been very obvious damage to the spine – which does not appear on the X-rays – and significant mutilation of the bullet. But as pathology professor John Nichols MD, Ph.D., pointed out in 1973, a straight-line from the back wound to the alleged exit in the throat had to pass directly through the hard bone of the spine. (*The Practitioner*, p. 631-632, November, 1973) Nichols's work received striking confirmation in 1998 via a cross-sectional CAT scan of a patient with the same upper body dimensions as President Kennedy provided by radiation oncologist Dr. David Mantik.



It certainly appears as if the above rules out a straight-line trajectory through Kennedy. Dr. Nichols measured the lateral angle as $9^{\circ} 21'$ and noted, "Elementary anatomy indicated that the minimum lateral angle for the bullet to miss the transverse process and emerge in the midline is 28° ; this is obviously an impossibility from Oswald's alleged firing position. If the bullet had continued without deflection, Connally would have been shot in the left chest rather than the right chest and the bullet would have emerged below the diaphragm." (Ibid 632-633)

The above examination of President Kennedy's non-fatal wounds reveals that the Single Bullet Theory is built not upon proven facts but on a series of unproven assumptions. It is assumed that the back wound was at about the level of the first thoracic vertebra when it may, in fact, have been lower. It is assumed that Kennedy was leaning significantly forward at the moment he was struck despite the fact that the Zapruder film shows him sitting upright at all times. It is assumed that the throat wound was an exit for the bullet which entered the back when no such thing was established at autopsy, the only physical examination ever conducted contradicted the idea, and the throat wound did not have the typical appearance of a high-powered rifle exit. And it is assumed that the bullet could pass through Kennedy's torso without striking bone when the evidence indicates it would have had to have struck the spinal vertebrae.

It is little wonder, then, that Lucien Haag limited his defense of the 'Magic' Bullet Theory to a (misleading) discussion of Governor Connally's wounds. After all, no matter how impressive his credentials and extensive his experience, there are some problems that no man can make disappear.