

Letter to the Editor: “Tracking the ‘Magic’ Bullet in the JFK Assassination,”
 by L. Haag, *AFTE J*, Vol 46, No 2, Spring 2014, pp 104-113; “President Kennedy’s Fatal Gunshot Wound and the Seemingly Anomalous Behavior of the Fatal Bullet,”
 by L. Haag, *AFTE J*, Vol 46, No 3, Summer 2014, pp 218-223; and
 “President Kennedy’s Fatal Head Wound and his Rearward Head ‘Snap,’”
 by L. Haag, *AFTE J*, Vol 46, No 4, Fall 2014, pp 279-289

8 November 2015

Mr. Cole Goater
 Editor, *AFTE Journal*

Dear Mr. Goater,

We are respectfully writing, at long last, to address numerous scientific, JFK assassination-related issues raised by Messrs. Haag and Mr. Sturdivan in the *Journal*'s pages. We regret that several unforeseen personal and professional obstacles have delayed our responding. And we want to thank you again for the time and attention you have paid to this fascinating and important subject. That the Kennedy case is still significant is reflected by the fact the *Journal* has published five articles and four letters to the editor on the topic. Much, we believe, remains to be said scientifically that will be of interest to both the *AFTE* community and the larger community as well.

It strikes us that nearly all of the sweeping statements Messrs. Haag and Sturdivan have made are not supported by disinterested, recognized, published authorities writing in the peer-review literature, nor by official government documents. Instead they've presented what amounts to an argument from authority, offering almost exclusively their own thinly-sourced writings and those of a small circle of fellow anti-conspiracists. *AFTE* readers deserve a broader discussion than that, certainly broader than our single published letter. And surely, they also deserve direction and access to the best available evidence, if they are to form their own judgements.

This was particularly brought home to us by Mr. Lucien Haag's citing of author Wecht's endorsement of the Warren Commission's autopsy conclusions in 1966, while omitting the skepticism Wecht expressed in that very article. Furthermore, Mr. Haag completely ignored Wecht's later, more informed and scathing criticisms that appeared in numerous peer-review journals. What kind of science is that?

Additionally, we were stunned that Mr. Haag repeated, without source or citation, what is false hearsay about Wecht - namely, his saying that “One bullet cannot go through two people.” Few people in the world know better than Wecht that one bullet can go through two people, and that single bullets have gone through two people. This sort of selective reportage and unsourced personal smear will scarcely enhance the *AFTE Journal*'s reputation.

We were disappointed, though not surprised, when in his published letter Mr. Sturdivan spurned the Neutron Activation Analysis research of **Lawrence Livermore Lab** scientists, Drs. Randich and Grant, dismissing them as “purported metallurgists.” A quick google search reveals that Erik Randich, Ph.D. is a widely respected metallurgist. Unlike Mr. Sturdivan, Dr. Randich has been recognized as an NAA authority both in a court of law and in the peer-reviewed literature, as we show. We were also disappointed that, while Mr. Haag touted the conclusions of the **House Select Committee**'s forensic panel that concluded JFK was struck high in the back of his head, in the parietal bone, his colleague Mr. Sturdivan stoutly rejects that conclusion, opting instead for a bullet entry that is at least 10-cm lower. The ramifications of a 10-cm difference in a skull wound are hard to overstate and should not be ignored by the *Journal*. These are just a few of the issues *Journal* readers deserve to have clarified.

We realize our commentary is long and perhaps unsuitable as a “letter to the editor.” However, the factual and scientific record calls for a response such as ours, one that attempts to examine and rebalance the *Journal*'s one-sided JFK coverage. Our article offers *AFTE* readers footnoted access to the myriad research tools (most available on-line) that are necessary to judge our claims, as well as those of Messrs. Haag, Mr. Sturdivan, and the authorities they cite: Drs. Vincent P. Guinn, John Lattimer, and Kenneth Rahn.

We kindly request that you consider our submission and will be happy to work with you in further readying it for publication.

Sincerely yours,

Gary L. Aguilar, MD
Cyril H. Wecht, MD, JD

The Science Behind the Persistence of Skepticism in the JFK Case

Gary L. Aguilar, MD
Cyril H. Wecht, MD, JD

Introduction

The *AFTE Journal* has published five papers and three letters to the editor offering scientific support for the **Warren Commission's** conclusions Lee Harvey Oswald acted alone in the murder of President John F. Kennedy. It is our view that much what has been claimed is unsupportable scientifically. The only contrasting views the *Journal* has published were those we wrote in a single letter to the editor. Mr. Haag and Mr. Sturdivan's responses to our letter were error-ridden and, as with their other writings, provided scant source notes for fact checking. They were also marred by an unfortunate, personal and unprofessional tone that left core questions unaddressed and unacknowledged. We write now at length to address a number of those questions. Although we hold views that widely diverge from Messrs. Haag and Sturdivan, there are important areas with which we are in complete agreement. But where we disagree, we will provide copious citations so *Journal* readers can check our facts, usually by simply clicking the link we provide in the footnotes. And where we particularly disagree with Mr. Haag and Mr. Sturdivan is their continued, unexplained and unjustified, embrace of neutron activation analysis in the Kennedy case.

In his response to our letter, Mr. Haag writes, "[T]here are only two (2) bullets associated with the assassination of President Kennedy, the intact but slightly out-of-round WCC 6.5mm Carcano bullet from Gov. Connally's stretcher (CE399) and the nominal 2/3rds of a fragmented WCC 6.5mm Carcano bullet recovered from the presidential limousine (CE567 and CE569)."¹ To that, he added, "considerable variation in antimony content existed between bullets from the same lot (box of cartridges) and that these variations in antimony content were greater than that within individual bullets." These claims, endorsed by Mr. Sturdivan,² have been completely discredited, as we previously pointed out, in two independent,

peer-reviewed scientific studies by experienced, conspiracy-agnostic investigators with vastly better credentials than either Messrs. Haag or Sturdivan.³ But rather than taking on the science in those papers, as one would have hoped and expected, Mr. Haag and Mr. Sturdivan instead just repeat the debunked claims.

In short, two large bullet specimens were recovered that were firearms-matched to Oswald's rifle. Other, small fragments from JFK's brain and the Governor's wrist were also obtained and tested. Contra Haag/Sturdivan, intrabullet antimony concentrations may in fact vary widely, so widely that the small fragments cannot be matched by NAA to the larger, firearms-matched fragments. Nor can they even be identified as Mannlicher Carcano ammunition by NAA, as we will explore when we discuss Mr. Sturdivan's spirited defense, below.

Was Warren Commission Exhibit 399, AKA "The Magic Bullet" Found at Parkland Hospital

Besides the fact NAA cannot tie the large, identified fragments to any of the smaller bullet fragments by NAA, recent evidence raises doubts about another bit of evidence Mr. Haag considers bedrock and undisputed: that CE 399 was the bullet that was picked up on a Parkland Hospital stretcher on 11.22.63. The reasons for suspicion derive from files declassified by the **JFK Review Board**⁴ and from independent research by noted author Josiah Thompson, Ph.D. and one of the authors (Aguilar).

In his 1967 book **Six Seconds in Dallas**, Dr. Thompson discussed interviewing a key witness in 1966 who had handled CE 399 on the day of the assassination, Mr. O.P. Wright. A professional law enforcement officer who was working at Parkland Hospital on 11/22/63, Mr. Wright said that the stretcher bullet did not resemble a round-tipped Mannlicher Carcano shell, but instead had a pointed tip, like the .30 caliber bullet Wright had procured for Thompson.⁵ Mr. Wright wasn't the only doubting Thomas.

Declassified FBI files have revealed that none of the first four people in the chain of possession of the stretcher bullet were later able to identify CE 399 as the bullet they held on the day JFK died. Besides Mr. Wright and Parkland employee Mr. Darrell Tomlinson, neither Secret Service Agent Richard Johnsen nor the Chief of the Secret Service, James Rowley, recognized CE 399 when they were asked by a Bureau agent to identify it. Though beyond the scope of this discussion, there is much more to this story that casts doubt on what Messrs. Haag regard is undisputed – the bona fides of CE 399. *AFTE* readers are encouraged to follow the hot-link in the

footnote to an essay by Aguilar and Thompson that explores this fascinating issue with hot-links to relevant declassified government files, available on-line.⁶

Mr. Haag: Governor Connally's Coat Showed the Clear and Certain Impact of a Destabilized Bullet

Returning to Mr. Haag, in his reply regarding Mr. Connally's back wound, he finally admits that the wound was a 1.5-cm oval wound, not a 3-cm wound, which, as he had first reported, is the full length of a Mannlicher Carcano bullet. But he claims the ovality of that wound is still proof of a yawed bullet, arguing it was destabilized by having passed through JFK first. He then doubled down, adding, "the Governor's coat, according to firearms examiner Robert Frazier, showed the clear and certain impact of a *destabilized* bullet."⁷ (Haag's emphasis) As further evidence Mr. Haag contrasts that wound with "the round entry wound in the President's back."⁸ Several issues arise that suggest Mr. Haag's incomplete command of the evidence.

The obvious first is that, while Kennedy's back wound was indeed smaller than the Governor's, it was *not* round. "Situated in the upper right posterior thorax," reads the official autopsy report, "there is a 7 X 4 mm *oval* wound."⁹ Second, as we previously pointed out, the presumed entry wound in JFK's scalp measured 1.5-cm x 6mm, at least "as oval" as the gash in the Governor's back. If JFK's skull wound was oval because he was hit from "above and behind," why doesn't that also explain the Governor's back wound,¹⁰ especially given that the treating surgeon, Dr. Shaw, said: the Governor's "was a puncture-type wound, as if a bullet had struck the body at a slight declination [i.e., not at a right angle] (sic)"¹¹

Second, Mr. Haag invokes FBI examiner Robert Frazier's observations about the Governor's coat to buttress destabilization. *AFTE* readers should contrast Mr. Haag's interpretation of the agent's testimony with what he actually said (available by clicking the link we provide in the footnote, one Mr. Haag did not supply). Nowhere does Mr. Frazier claim he found evidence of a destabilized bullet. In fact, he said that he couldn't even be sure the defect in the dry-cleaned coat was caused by a bullet, or in which direction it was traveling if it was. Moreover, in speaking of the Governor's shirt, he offered three obvious, alternative explanations: the shape of the hole could have been due to the condition of the fabric, due to any folds in the fabric at the time of bullet passage, or that the bullet entered at an angle,¹² considerations that would apply equally to the coat.

Both the Governor and his wife Nellie testified that they heard the first shot and noted that JFK had been struck. (Mr.

Connally likely would not have heard the first shot if it had hit him.) It was as he turned, they both said, that the Governor was then hit by the second shot. His turning as he was hit, which the Zapruder film appears to confirm for a strike at the most commonly accepted frame, Z-223-4,¹³ gives yet another reason his wound might have been oval.^{14,15} In sum, the ovality of Governor's wound is precisely what would have been expected in the circumstances Mr. Haag embraces; destabilization need not be invoked.

Finally, the **House Select Committee's Forensic Panel** examined the coats worn by both Dallas victims. The hole in Connally's jacket measured 1.7 cm by 1.2 cm;¹⁶ JFK's measured 1.5 cm¹⁷ X 1 cm. By Mr. Haag's logic, JFK's coat also evinces 'the clear and certain impact of a *destabilized* bullet.'

Mr. Haag's Shooting Experiments and "Dr. Wecht's" Claim One Bullet Cannot Go Through Two Men

Mr. Haag then cites his own shooting experiments that he presented formally in 2013. He apparently showed that bullets were destabilized by passing through soft tissue and into air, as if it any proof of this commonsense phenomenon were needed. He then intoned darkly, "I can't speak for Dr. Aguilar, but Dr. Wecht was conspicuously absent from both of these presentations."¹⁸ Schedules permitting, both authors hereby offer to attend any future presentations Mr. Haag makes, but of course on condition that we are afforded, in the best scientific tradition, the opportunity to respond to him in public and to make presentations of our own.

Again without supplying a source or citation, Mr. Haag writes, "The statement often given by one of the authors (Wecht) in public forums that '*One bullet cannot go through two people*' is patently false and is given without any supportive tests results." The only thing that is "patently false and given without any supportive" evidence is Mr. Haag's claim that author Wecht has ever said anything so ridiculous. The authors request Mr. Haag offer proof. If he cannot, honor dictates he retract this calumny. Having completed tens of thousands of autopsies, author Wecht knows full well that bullets can go through two people. What he doesn't know, what he disputes, is that one bullet, Commission Exhibit #399, went through two men in Dealey Plaza on November 22, 1963.

Edgewood Arsenal Shooting Experiments

Mr. Haag complained that we attacked "the (skull-shooting experiments of) the **Edgewood Arsenal Biophysics Laboratory**."¹⁹ This, again, is false, as any *AFTE* reader who bothers to read what we actually wrote can determine.

We didn't attack those tests. Rather, we said that Mr. Haag,²⁰ Mr. Sturdivan and veterinarian Alfred Olivier, DVM (Mr. Sturdivan's former colleague at Edgewood) had misrepresented them.

As we pointed out, all three described the blasted skulls virtually identically to the description Dr. Olivier gave the **Warren Commission**: "This particular skull blew out the right side in a manner very similar to the wounds of the President ... We found that this bullet could do exactly – could make the type of wound that the President received."²¹ Mr. Haag refuses to acknowledge the obvious: the damage to the test skulls – loss of the right forehead, the right orbit and much of the right cheekbone - was completely unlike JFK's, whose skull suffered no such injuries. (Readers are invited to read our prior letter in which we published actual photographs of JFK's skull at autopsy alongside the test-skull images Dr. Olivier published in the **Warren Report**,²² one of which Mr. Sturdivan also published in his book, **The JFK Myths**.²³)

Mr. Haag: Dr. Wecht Endorsed The Official Conclusions

Absurdely, Mr. Haag quoted Dr. Wecht endorsing the official autopsy report in a *Journal of Forensic Sciences* article – from 1966! The selectivity of this citation is simply breathtaking. For as *AFTE* readers can see for themselves by clicking the link, Dr. Wecht's article was based *solely* on government reports. All of Dr. Wecht's 29 footnotes cite the **Warren Report** or its hearings.²⁴ It was written before Dr. Wecht had seen JFK's autopsy photographs and X-Rays for the first time and discovered how botched JFK's autopsy had been (a view shared by Mr. Haag's colleague, Mr. Sturdivan, whose book, "**JFK Myths**," has a 35-page chapter entitled, "Bungled Autopsy"²⁵). It was written before Dr. Wecht had published other scholarly articles that were based on more complete information and that were justly critical of the official conclusions.²⁶ Nevertheless, even in 1966 Dr. Wecht was skeptical of "Single Bullet Theory," and he noted significant deficiencies in the post mortem. He also astutely remarked, "the autopsy should not have been left entirely within the hands of military pathologists, whose professional actions may be completely controllable by the government."²⁷ Mr. Haag's citing Dr. Wecht's early, uninformed view while ignoring his later, informed perspective is affront to responsible scholarship.

JFK's Rearward Lunge After the Head Shot

Both Mr. Haag and Mr. Sturdivan argue that either a "jet effect" caused by a shot from behind, or a "neuromuscular reaction," caused the President's rearward head motion after Zapruder frame 313. Both scoff that a grassy knoll shot might explain

it. Because JFK's reaction to the fatal shot is perhaps the most important and contentious issue raised by Messrs' Haag and Mr. Sturdivan, the topic deserves a detailed discussion.

Jet Effect and JFK

As for what Mr. Haag has called the "Newtonian physics" explanation for Kennedy's rearward jolt - Luis Alvarez's so-called "jet effect" - Mr. Haag would have done well to ask his colleague about the Nobel Laureate's conclusion. "The question is," Mr. Larry Sturdivan has written, "Did the gunshot produce enough force in expelling the material from Kennedy's head to throw his body backward into the limousine? Based on the high-speed movies of the skull shot simulations at the Biophysics Laboratory, the answer is no."²⁸

Readers should pay more attention to Dr. Alvarez's published claims than his credentials. (Just as he had "proved" what the government preferred - that a jet effect from Oswald's shot had swung JFK backward, Dr. Alvarez also once said that he had "proved" what the U.S. and Israeli government falsely claimed was true: that there had been no South African/Israeli nuclear test in the Indian Ocean – the politically sensitive, so-called "Vela Incident." Dr. Alvarez's claim was subsequently shredded by private, government and military investigators.²⁹)

Re JFK, in the prestigious *American Journal of Physics* Dr. Alvarez wrote, "It is important to stress the fact that a taped melon was our a priori best mock-up of a head, and it showed retrograde recoil in the first test ... If we had used the 'Edison Test,' and shot at a large collection of objects, and finally found one which gave retrograde recoil, then our firing experiments could reasonably be criticized. But as the tests were actually conducted, I believe they show it is most probable that the shot in 313 came from behind the car."³⁰

First, surely *AFTE* members do not live in a universe in which a soft-shelled melon, even a tape-wrapped one, is the "best mock-up" of a bony human skull, particularly when said melon weighs about half what a human head weighs. Second, it was no less than **Warren** loyalist John Lattimer, MD who revealed that, apparently unable to get Mr. Haag's preferred "Newtonian explanation" using jacketed Mannlicher Carcano bullets, Dr. Alvarez instead shot soft-nosed, .30-06 rounds. But not just any old .30-06 rounds, with their ~2800 ft/second muzzle velocity; he "hot-loaded" his cartridges to 3000 ft/sec, and only then got his famous "jet effect."³¹ Worse, Dr. Alvarez withheld key information about his tests.

Dr. Josiah Thompson was recently given access to the photo file of the shooting tests by one of Dr. Alvarez's former graduate students, Paul Hoch, Ph.D.³² It turns out that the

Alvarez team shot at lots of targets – coconuts, pineapples, water-filled jugs, etc. The *only* objects that demonstrated recoil were his “a priori best mock-up of a head,” the disanalogous melons. *AFTE* readers are invited to scour Dr. Alvarez’s paper, which we’ve linked to, for his mentioning anywhere these other, inconvenient shooting results. We won’t insult the intelligence of *AFTE* readers by recounting what happened when Alvarez’s team shot targets that were more analogous to skulls - coconuts.

Finally, Mr. Haag proffers John Lattimer, MD’s skull-shooting tests as proof of the jet effect that his own colleague from Edgewood had disproved and dismissed.³³ Using a Mannlicher Carcano and firing downward at filled human skulls perched atop ladders, Dr. Lattimer’s skulls recoiled. In his book, “**Hear No Evil**,” Donald Thomas, Ph.D. explained why: “Lattimer’s diagrams reveal that the incoming angle of the bullet trajectory sloped downwards relative to the top of the ladder, with the justification that the assassin was shooting from an elevated position ... But the downward angle would have had the effect of driving the skulls against the top of the ladder with a predictable result – a rebound.” (A video clip of Dr. Lattimer’s shooting tests shows the ladder rocking forward as the skull is driven against the top of the ladder.³⁴) Clearly, the forward momentum Mr. Sturdivan had shown pushing his test skulls forward was what was being transmitted to the ladder, causing it to move forward while the skull rebounded. Unlike Dr. Lattimer’s skulls, the base of JFK’s skull and his chin were not resting on a hard, flat surface. (It is also worth mention that the “wounds” sustained by the blasted skulls were not, as Dr. Lattimer reported, “very similar to those of the President.”³⁵)

The results of Dr. Lattimer’s tests are in sharp contrast not only to those Mr. Sturdivan reported from the Biophysics Lab, but also to similar, skull-shooting tests conducted by University of Kansas’s pathology professor, Dr. John Nichols, MD, Ph.D., F.A.C.P. Rather than shooting down at skulls perched atop a flat surface, Dr. Nichols shot WCC ammo at both melons and cadaver material that were suspended by a wire. (**Warren** loyalist Paul Hoch, Ph.D. has said that this was the proper way to test for “jet effect” - personal communication.) Professor Nichols’ finding? “This study did not demonstrate the jet effect and would lead us to reject the jet effect as the basis for President Kennedy’s backward head movement.”³⁶

Inasmuch as Dr. Lattimer achieved such different results than Edgewood Arsenal and Dr. Nichols, Dr. Thomas observed, “this obvious difference in design would appear to be the explanation for the stark difference in the results.” Dr. Thomas also pointed out that, “Lattimer’s photographs of skulls do not show a jet plume. Instead they show a Kronlein Schuss

effect with a blowout of material through the top of the skull. Lattimer did not achieve jet effect.”³⁷

JFK’s Rearward Lunge and Neuromuscular Reaction

Inasmuch as Dr. Thomas, Dr. Nichols and Mr. Sturdivan are surely right that “jet effect” cannot explain Kennedy’s lunge, the only explanation Mr. Haag and Mr. Sturdivan have left that leaves Oswald standing in the dock is some variant of a neurological spasm, or as Mr. Sturdivan, who has no credentials in medicine, neurophysiology, etc., described it to the **House Select Committee**, a “neuromuscular reaction.”³⁸ Without supplying a citation, as per his custom, Mr. Sturdivan writes in his riposte that “Dr. Michael Carey calls (JFK’s motion) a ‘decerebrate reaction. Look it up.’”³⁹ We did look it up, if only to confirm what we already knew. We invite *AFTE* readers to do the same. We also looked up the fact that Mr. Sturdivan has elsewhere described JFK’s movement as a “decorticate reaction,”⁴⁰ as if the two reactions were the same thing. Setting aside the fact they are not, JFK’s motions are neither.

In decorticate posturing the patient’s back arches backwards, the legs extend and the arms flex inward. In decerebrate posturing the patient’s back arches and the legs extend (as they do in decorticate posturing), but the arms extend out parallel to the body.⁴¹ If one compares his posture at Zapruder frame 230,⁴² or in any frame after the back shot but before the head shot, JFK’s arms are flexed inward toward his neck, reacting to the first shot. In the frames following the head shot, JFK’s head moves backward but his back *does not* arch; JFK’s legs do not extend. Nor do his arms flex *or* extend, but fall limply toward his lap as his upper, probably paralyzed, body follows his blasted cranium rearward.⁴³ Furthermore, in the frames following frame 327, 7/10ths seconds after the head shot, JFK’s head starts moving forward, his back then follows forward, too, but at a slower rate than his cranium, which moves forward at as fast a rate, or faster, than his head lunges backward after Zapruder frame 313.⁴⁴ It thus “flexed” forward the same way it had “extended” backward: Kennedy’s back followed JFK’s head as it abruptly rocked forward. At no time did Kennedy’s back arch backward, nor did his legs extend, the basic requirements of decorticate and decerebrate posturing.

From the web, below are images contrasting decerebrate and decorticate posturing. JFK assumed neither posture in reaction to the head shot.⁴⁵

Decorticate posture results from damage to one or both corticospinal tracks. The upper arms are adducted and the forearms flexed, with the wrists and fingers flexed on the

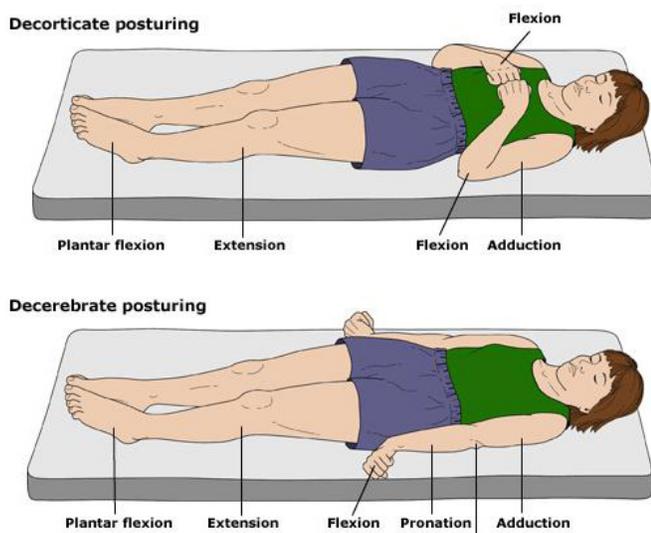


Figure 1. Decorticate vs. Decerebrate Postures

chest. The legs are stiffly extended and internally rotated with plantar flexion of the feet.

Decerebrate posture results from damage to the upper brain stem. The upper arms are adducted and the forearms are extended, with the wrists pronated and the fingers flexed. The legs are stiffly extended, with plantar flexion of the feet.

Can Momentum Transfer From a Grassy Knoll Shot Explain JFK's Rearward Jolt?

Given that the President's motions are neither decorticate nor decerebrate reactions, and given that a "jet effect" cannot explain them, what then of the possibility momentum transfer from a grassy knoll shot explains JFK's backward snap?

In considering this option,, we will use Mr. Sturdivan's own work, a man with whom we do not always disagree. We agree with the testimony he gave concerning the skull-shooting tests conducted by Army's **Biophysics Lab** that the **House Select Committee**. "All 10 of the skulls that we shot did essentially the same thing," Mr. Sturdivan swore, "They gained a little bit of momentum consistent with one or a little better foot-per-second velocity that would have been imparted by the bullet"46 (They saw no recoil from a "jet effect.") Since jacketed bullets deliver momentum to skulls, it's likely that skulls struck with soft-nosed, non-jacketed hunting rounds that flatten on impact would impart even more. We also agree with Mr. Sturdivan that "a similar explosion would have taken place if the bullet had gone through in the opposite direction" – from, say, a tangential shot from the right front.47 However we disagree with the faulty scientific premises Mr.

Sturdivan used to argue that a shot from the right front could *not* have deposited sufficient rearward momentum to move JFK backward.48

While referring to his momentum calculations derived from the skull shooting tests, he testified, "As we can see from the chart, this velocity of 1.2 feet per second is not the kind of velocity that would throw the President bodily around backwards, forwards, or in any direction no matter which direction the bullet came from. The deposit of momentum from the bullet is not sufficient to cause any dramatic movement in any direction."49 (In his book, Mr. Sturdivan reported a higher velocity: "the (test) skull ... moves forward at approximately 3 feet/sec, just as it must from the momentum deposited by the bullet."50) Mr. Sturdivan thus argued, as he testified, that a shot from behind would have caused "slight movement toward the front, which would very rapidly be damped by the connection of the neck with the body."51 We will address two issues here.

First, it was author Josiah Thompson, Ph.D. who was the first to claim that the Zapruder film revealed that JFK's head moved fleetingly forward between the clear frame 312 and the very blurred frame 313.52 However, additional studies done during the past several years have convinced Dr. Thompson and others that smear artifact in frame 313 gives the impression of forward motion that is uncertain and may be illusory. Second, Mr. Sturdivan's conclusion that momentum transfer could not explain JFK's skull motion was based on experiments using modestly powered Mannlicher Carcano rounds weighing 162 grains (0.023 lbs) that were fired from a distance of 90 yards.53 And he assumed the fatal bullet deposited half of its momentum when it struck Kennedy's 15 pound skull.54 These assumptions are unreasonable, and they stack the deck. (For starters, why assume a grassy knoll gunman would use a Mannlicher Carcano?)

In his book, "**Hear No Evil**," Don Thomas, Ph.D. has dissected Mr. Sturdivan's analysis in considerable detail. With permission, we quote Dr. Thomas in extenso.

Mr. Sturdivan's calculation, Dr. Thomas notes, was "derived indirectly from his tests shooting human skulls with a Mannlicher-Carcano. The bullet's velocity at a distance of 90 yards was 1600 feet per second according to Sturdivan (in fact, the Army's data indicated a value closer to 1800 fps) (sic). Sturdivan then divided this number in half on the supposition (unstated) (sic) that the bullet would deposit only half of its momentum. This supposition was apparently based on his observation that a velocity of something like 'one-foot-per-second' was imparted to test skulls when shot with the Carcano.55 Somehow, Mr. Sturdivan managed to miss the point that the rearward movement might have involved a shot

origination from the grassy knoll only 30 yards in front of the target, with consequently less loss of velocity from air resistance, than from a position 90 yards behind the President. It also seemed not to have occurred to Sturdivan that the President might have been shot from the grassy knoll with a different rifle than the modestly powered Mannlicher-Carcano ...⁵⁶

"For the purposes of this discussion let us suppose that the hypothetical killer on the grassy knoll was armed with a .30-.30 rifle ... (which) happens to have a muzzle velocity (2200ft/sec) very close to that of the Carcano, and fires a 170 grain bullet, slightly larger than the Carcano bullet. At 30 yards the projectile would have struck at a velocity of approximately 2100 fps ... the momentum on impact with the head would be 50 ft-lb/sec. If one postulates a hunting bullet (in accordance with the X-ray evidence) (sic) which is designed to mushroom and deposit its energy at the wound instead of a fully jacketed bullet, we will allow a deposit of 80% of the momentum, leaving a residual velocity for the exiting bullet. This results in a momentum applied to the target of 40 ft-lb/sec; considerably more than Sturdivan's stingy allowance of 18.4 ft-lb/sec. It is important to realize that at the time Kennedy was struck with the fatal shot at Z-312-3, he had most likely been paralyzed by the shot through the base of the neck (as Mr. Sturdivan admits⁵⁷). Consequently, his head was lolling forward, not supported by the muscles of the neck. This fact tends to minimize the damping effect (that so troubled Mr. Sturdivan) from the absorption of shock by the neck until after the head has snapped back. Assuming a head weight of 12 lbs, the velocity imparted to the head would be approximately 3.3 feet per second ...⁵⁸ (The same speed of the test skulls that Mr. Sturdivan reported in his book, though in JFK's case it might have even been faster as most estimates put the weight of a human head at 10-11 lbs.⁵⁹)

From the study of the Zapruder film by Josiah Thompson, the observed rearward velocity for the head was roughly 1.6 feet per second after frame 313.

Thomas concludes, "Even given the uncertainty about the exact weight of the President's head and the residual velocity of the bullet, the observed movement of the President's head is well within the range, if anything less, than expected from the momentum imparted by the impact of a rifle bullet."⁶⁰

If Mr. Sturdivan is right that jacketed, Western Cartridge Company (WCC) shells moved blasted skulls forward at 3 ft/sec, imagine how much faster skulls would move if hit with heavier, higher velocity, soft-nosed bullets; perhaps enough not only to move JFK's skull "back to the left," but also enough to even nudge his paralyzed upper body backward.

Mr. Haag argued that a "synchronized" or concurrent arrival of two bullets (one from the rear and one from the right front) is critical to nearly all conspiracy advocates' claim of a second shooter."⁶¹ Although Dr. Wecht has suggested this possibility in the past because of what was then accepted, as our understanding has matured, so has our interpretation of the events in Dealey Plaza. There need not have been two, near-simultaneous shots circa Zapruder 313. It's more likely that there was just one – fired from the right front, striking tangentially near the top right portion of the President's skull, with a portion of the bullet being deflected upward and to the left-rear of the limousine. The possibility that a second head shot struck from behind circa Z-327 is a tantalizing possibility, for it would explain why the President's head swiftly rolled forward after that frame, at a time Mr. Sturdivan believes his "decorticate" or "decerebrate" "neuromuscular reaction" should have had him arching backward.

Neutron Activation Analysis and JFK

In 1978 Vincent P. Guinn, Ph.D. presented the findings of his NAA study to the **House Select Committee**. He testified that it was highly probable that all recovered bullet fragments traced to but two bullets fired through Oswald's rifle.⁶² Messrs. Sturdivan and Haag tout Dr. Guinn's claims.

Doubts about Dr. Guinn's NAA were perhaps first raised in 1982 by historian Michael Kurtz, Ph.D. in his book, "**Crime of the Century**."⁶³ In a 1998 *Skeptic Magazine* article, **Stanford Linear Accelerator** physicist, Arthur Snyder, Ph.D., showed that Dr. Guinn's NAA statistics were fatally flawed.⁶⁴ In 2006 acclaimed metallurgist Erik Randich, Ph.D and accomplished NAA authority Pat Grant, Ph.D. crushed Guinn's case for two bullets, concluding that NAA could neither incontestably match the fragments to one another nor even show that the smaller fragments came from WCC ammunition. And in 2007, a team lead by noted statistician, Texas A&M Professor Cliff Spiegelman, Ph.D. and Mr. William Tobin, a forensic metallurgist at the FBI Laboratory for 24 years (12 as the de facto Chief Forensic Metallurgist⁶⁵), finally buried Dr. Guinn's claims about NAA and JFK, once and for all.

But Messrs. Haag and Sturdivan will have none of it. In the *AFTE* they offer little in the way of scientific counter evidence. Instead, they make an argument from authority – their own and Dr. Guinn's. By contrast, NAA skeptics argue from deep a knowledge of, and personal research in, NAA and statistical analysis. And they pin the misplaced faith of the few remaining NAA devotees - Dr. Guinn (now deceased), Mr. Sturdivan, Mr. Haag and Kenneth Rahn, Ph.D. – on the latter's botched understanding of basic bullet metallurgy, and their shoddy statistics.

How does Mr. Sturdivan counter in *AFTE*? "This is not botched metallurgy," he insists, "it is merely botched logic. That irrelevant metallurgy is matched by an equally illogical statistical analysis. In short, Guinn was right and they were wrong."⁶⁶ Strong words, proclaimed ex cathedra by a man with modest credentials in metallurgy and statistical analysis, and uttered without a shred of scientific support. How are *AFTE* readers to decide?

A useful first step might be to read the studies we mentioned in our last letter that eviscerate NAA (available on the web⁶⁷) and compare that work and the credentials of those authors with Messrs. Sturdivan's and Haag's.

Mr. Sturdivan's NAA portfolio consists solely of but one published article consisting primarily of a dubious statistical buttressing of Dr. Guinn's original work.⁶⁸ In his rebuttal, Mr. Sturdivan tellingly offers no answer to the peer-reviewed article we quoted from that was written by "Distinguished Professor of Statistics" (Texas A&M University), Cliff Spiegelman, Ph.D., former chief FBI metallurgist, Mr. William Tobin et al.⁶⁹ The NAA papers of "Rahn and Sturdivan (2004⁷⁰) and Sturdivan and Rahn (2004⁷¹)," Spiegelman et al have written, "are based upon historical data using what we feel are inadequate models for bullet distribution and sample sizes that are too small ... Dr. Guinn's testimony that the evidence supports two and only two bullets making up the five JFK fragments is fundamentally flawed." "In this paper," Dr. Spiegelman concluded, "we show that (the NAA) evidence used to rule out a second assassin is fundamentally flawed." (Professor Spiegelman's paper won the "Statistics in Chemistry Award" conferred by the **Institute of Mathematical Statistics**.⁷²)

For the less technically inclined, **Texas A&M Science** explained, "Distinguished professor" Spiegelman and his team "had examined 30 of the same brand of bullets from three boxes and found one of them out of 10 examined from a box of 20 matched the assassination fragments. So whereas Guinn essentially claimed a zero out of 100 chance of other matching bullets, the reality based just on a batch the researchers analyzed was closer to 10 out of 100, Spiegelman said ... 'So we're not saying that there's no value to the science presented in the Kennedy case, but simply that it was overstated and not as overwhelmingly certain as it was presented (by Guinn, Sturdivan and Rahn)'⁷³

So whose NAA conclusions should *AFTE* readers trust? Texas A&M University's "Distinguished Professor" Spiegelman holds a Ph.D. in statistics, teaches statistics and publishes in the peer-reviewed statistics literature, and he is **conspiracy agnostic**.⁷⁴ His **conspiracy agnostic** coauthor, former FBI lab examiner William Tobin, has decades of NAA/CABL work

under his belt and, unlike Mr. Sturdivan, does **not** consider metallurgy irrelevant. Spiegelman et al cite and footnote some of the copious, recent scientific literature on NAA in their paper.

By contrast Mr. Sturdivan, a committed **anti-conspiracist**,⁷⁵ holds a master's degree in statistics but neither publishes nor teaches the subject. Nor has he any proven expertise in NAA, CABL or metallurgy. The NAA paper Mr. Sturdivan wrote as lead author has a total of 5 footnotes, only three of which have anything to do with NAA: two cite Dr. Guinn's discredited work from the late 1970s, and one cites Sturdivan's own coauthor, fellow **anti-conspiracist** Dr. Kenneth Rahn,⁷⁶ who has *some* experience in atmospheric NAA, but has no primary expertise in bullet-NAA.⁷⁷ (The NAA paper Dr. Rahn wrote with Mr. Sturdivan as second author suffers a similar poverty of scientific support: the "newest" paper he footnoted was published 27 years before Dr. Rahn's and draws on none of the more recent, abundant NAA research.⁷⁸)

Had either Mr. Sturdivan or Dr. Rahn really believed the Spiegelman-Tobin team was wrong they would have followed scientific tradition and written a letter to the editor of *Annals of Applied Statistics* with their objections. They never did (personal communication with Professor Spiegelman). Instead, Dr. Rahn derided Spiegelman et al from the safety of his own website, thus avoiding the inconvenience of subjecting his analysis to a likely additional drubbing by Spiegelman, Tobin et al.⁷⁹ (Professor Spiegelman felt Dr. Rahn's on-line critique was unworthy of a reply.)

While he was silent about the Spiegelman team, against the two **Lawrence Livermore Lab** scientists who debunked Dr. Guinn's NAA in the *Journal of Forensic Sciences (JFS)* - Erik Randich, Ph.D. and Pat Grant, Ph.D. - Mr. Sturdivan threw down the gauntlet: "I do resent the attempts by two purported metallurgists," he wrote, "to trash the late Dr. Guinn's reputation." As with the Spiegelman paper, neither Mr. Sturdivan nor his NAA coauthor Dr. Rahn, ever wrote a letter to the editor of the *JFS* (personal communication with Dr. Randich). So we will not dignify with a response the sad aspersion Mr. Sturdivan casts, calling "purported metallurgists" two scientists whose impressive credentials in metallurgy and stellar accomplishments in NAA are easy to find and hard to miss for any reader, to say nothing of an *AFTE* reader.^{80,81} But what *does* deserve a response is Mr. Sturdivan's implication Drs. Randich and Grant wrote to "trash the late Dr. Guinn's reputation." Mr. Sturdivan here again demonstrates his characteristic poor grasp of evidence, this time regarding Drs. Randich and Grant.

Perhaps the best way of responding is to let Dr. Grant speak

for himself. But some background first. As he had done with the Spiegelman paper, Dr. Rahn took potshots at the Randich-Grant paper from the sanctuary of his own website.⁸² Dr. Randich felt Dr. Rahn's unpersuasive and unconventional on-line critique didn't merit a reply. However, Dr. Grant did reply, on-line, and in the process not only obliterated Mr. Sturdivan's expressed doubts about qualifications and motivation, but also Dr. Rahn's riposte.

Dr. Grant wrote:

"I worked with Vince at UCI (University of California, Irvine) during the late 60s-early 70s. He was a member of my graduate oversight committee, and his was one of three authorization signatures on my PhD thesis, but my research advisor was always Professor F.S. Rowland. However, I have always regarded Vince as an esteemed mentor in NAA and forensic science, and we did collaborate together on one technical article [*Science* 175: 1121 (1972)]. At UCI, I helped build the TRIGA nuclear reactor that Vince used for his work in the JFK investigation, as well as in other projects, and was an AEC-licensed senior operator for that reactor. George Miller and I set up the Ge(Li) spectrometer system that Vince used for his NAA work, and I performed the detector energy and efficiency calibrations necessary for accurate results. I understand first-hand how Vince did his JFK bullet analyses, the apparatus and reactor irradiation ports that he used, and the relative errors inherent in those various protocols. My PhD thesis with Sherry Rowland was on a novel combination of NAA with hot-atom chemistry to obtain molecular, not just elemental, information. Yet, Dr. Rahn would label me a latter-day NAA revisionist? Exactly who is the poseur here?"⁸³

Indeed, who *are* the poseurs here? Mr. Sturdivan says that knowledge of metallurgy is "irrelevant" to understanding NAA in the JFK case, and that the contrary statistical conclusions of his disputants are wrong and he is right. *AFTE* readers should decide for themselves whether to trust the NAA conclusions of Mr. Sturdivan, Mr. Haag and Dr. Rahn – all as fervently anti-conspiracy as they are inexpert - or the conclusions of *conspiracy-agnostic* authorities who have no ax to grind and who not only have vastly better backgrounds in NAA and statistical analysis, and, in the case of Dr. Grant, a true expert who has a personal fondness for Dr. Guinn as well an intimate technical familiarity and experience with NAA and the NAA work Dr. Guinn did on the Kennedy case.

The Pattern of Blood Splatter and the Beveling in JFK's Skull Prove the Fatal Shot Came from the Rear

In a letter to the *AFTE* editor, Mr. Hueske argued that the skull explosion visible in Zapruder frame 313 is proof of

a shot from the rear because "the bulk of the blood spatter from the head shot is directed toward the front of President Kennedy's head."⁸⁴ As mentioned, Mr. Sturdivan cast doubt on this conclusion when he rightly pointed out that, "A similar explosion would have taken place if the bullet had gone through in the opposite direction."⁸⁵ The reasons are perhaps best explained by Dr. Thomas. A human skull is a closed vessel and the "liquid contents" (brain and blood) cannot be compressed. "A forceful wave of hydraulic pressure is applied to the walls of the (skull) ... causing it to burst open" as the "tissues are directed radially outward from the bullet's path."⁸⁶ The spew outward from the bursting is radial to the bullet's path and is separate from the inshoot and outshoot splatter. Dr. Thomas identifies this as the Kronlein-Schuss phenomenon, one that is as plainly visible in the Zapruder film as it is in Dr. Lattimer's skull shooting experiments.⁸⁷

Although he undermines Mr. Hueske's claim the explosion proves bullet direction, Mr. Sturdivan argues nevertheless that the bullet came from behind because the "cratering effect in the inside of the skull at the entrance and on the outside of the skull at exit" proves a shot from behind.⁸⁸ Meaning, the inward beveling of the boney wound in the rear, and the outward beveling toward the front, mean the bullet entered the rear of JFK's skull and exited the front. Would that things were so simple.

It turns out that beveling is not always a reliable indicator of bullet direction. Numerous exceptions have been documented in the scientific literature.⁸⁹ Moreover, although beyond the scope of this discussion, in JFK's case there were particular features that lessened the certainty of any conclusions that can be drawn. Among them was the fact that the internal beveling in JFK's occiput was not detected in an otherwise intact plate of bone, which would have made things less ambiguous. It was only perceived upon a reconstruction of the skull at autopsy. Or, as autopsist J. Thornton Boswell, MD, testified, "... there was a hole here (in Kennedy's occiput), only half of which was present in the bone that was intact, and this small piece then fit right on there and the beveling on those was on the interior surface."⁹⁰ In other words, the "beveling," if there really was any, was only apparent when two separated pieces of bone were juxtaposed, that is, *if* they were juxtaposed correctly, around what appeared to be a bullet hole. Of course there's much more to this story. Interested readers are encouraged to follow the link to a multipart essay by one of the authors (Aguilar) that delves into this fascinating issue with hotlinks to official testimony from JFK's autopsy team, newly declassified files and other documents.⁹¹

Mr. Larry Sturdivan's Evidence for a Shot From The Grassy Knoll

Besides the "momentum transfer" evidence Mr. Sturdivan gave that offers an alternative explanation for JFK's backward jolt from a shot from the grassy knoll, he unintentionally offered additional, striking evidence. It is to be found by comparing JFK's X-rays vs. the X-Ray of a test skull that he published from the Biophysics Lab's "duplication" tests.

X-Ray Evidence for a Shot From The Grassy Knoll

As we mentioned in our prior letter, the lateral X-Ray reveals a few small fragments scattered about JFK's skull as well as a trail of tiny bullet fragments visible along the very top of JFK's skull. Under oath Mr. Sturdivan testified that this was evidence the shot from behind hit the President in 'the upper portion of the skull' --"It was definitely in the upper part,"⁹² just as the **Select Committee's** forensic consultants had also concluded.

In his book, Mr. Sturdivan supplies a photograph of a lateral X-ray taken of a gelatin-filled test skull that the Biophysics Lab had shot with a Mannlicher Carcano in a duplication experiment. (Fig. 2) Our clinical impression of this X-Ray suggests the bullet entered the back of the skull low, through the occipital bone, or at the junction of occipital and parietal bones. The trail of small, distinct bullet fragments is clearly visible and lines up reasonably horizontally in the lower portion of the skull, from the middle to the front. (Unlike JFK's skull X-ray, no tiny fragments appear in Mr. Sturdivan's test skull.) Though he testified to a high entry in the late 70s, Mr. Sturdivan has changed his mind. In his 2005 book, "**JFK Myths**," he now says that the fatal bullet entered JFK's head even lower than the one that hit this test skull.⁹³ If indeed the fatal bullet had hit JFK so low, it's highly likely the bullet trail would have been even lower than the one in the test skulland, like the test skull, there would have been no trail of miniscule fragments more than 100mm away, along the top of the President's skull.

The President's official X-Rays show a few smallish fragments scattered, with no clear pattern, low in his skull. But there is also a trail of tiny fragments that runs roughly horizontally on the lateral X-ray. It's not low, where "duplication experiments" suggest it should have been if the bullet had been fired from above and behind and entered low. Instead, it's high, near the very top of his skull - ~5 cm above the even the higher entrance location accepted by the experts of the **Clark Panel**, the **Rockefeller Commission**, the **House Select Committee's Forensic Panel** and, once upon a time, even Mr. Sturdivan. (Fig. 3)

Mr. Sturdivan's **Assassinations Committee** testimony about the location of the bullet fragments is useful and has the ring

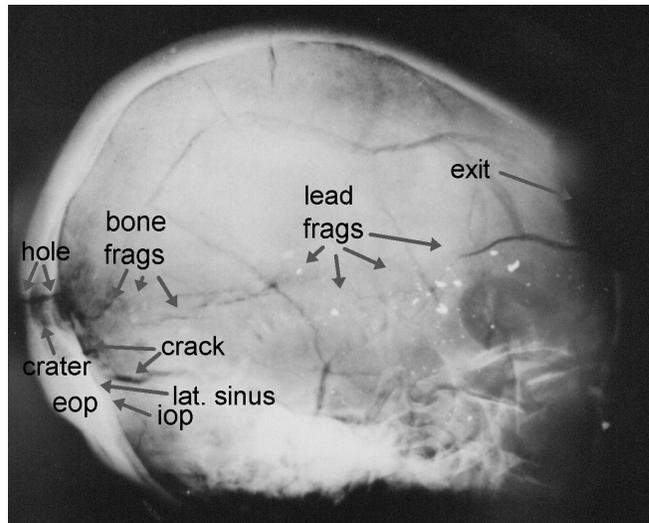


Figure 2. Lateral X-Ray of a test skull shot with a Mannlicher Carcano by the Biophysics Lab. The bullet entered occipital bone above the location Mr. Sturdivan believes JFK was struck. But the fragment trail is relatively low in the skull and the fragments are much larger than all but a few of the fragments in JFK's skull X-ray (Fig. 3).

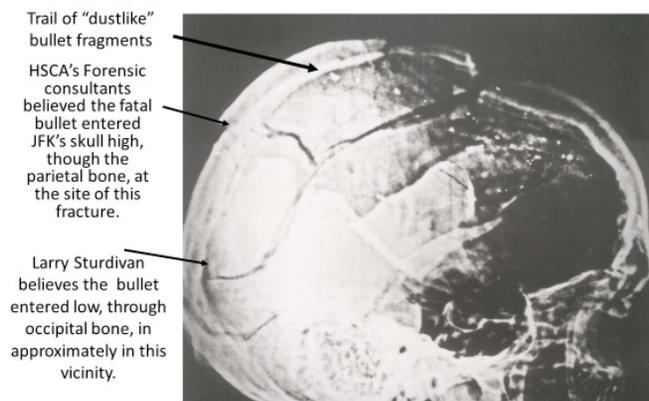


Figure 3. Enhanced lateral X-Ray taken of JFK during the autopsy. Note the trail of fragments runs very close to the top of JFK's skull and that the vast majority of the fragments are much smaller than the fragments in the Biophysics' test skull. The differences are even more strikingly in the original X-Rays at the National Archives, which both authors have examined. Myriad, tiny dustlike particles are visible and were aptly described by an independent forensic radiologist as a "a snow trail of metallic fragments."

of truth. He said that when the bullet exploded JFK's skull, the President's "soft (brain) tissue, which was badly damaged, would have moved somewhat (upward) in the direction that relieved pressure and, therefore, would be displaced *somewhat upward* from the original track. So, I would place the original track as being *somewhat lower* than that trail of fragments indicated through there; *certainly not much lower*."⁹⁴ (emphasis added)

Thus in 1978 Mr. Sturdivan and the forensic consultants of the **House Select Committee** agreed that the fatal bullet entered JFK's skull high, through the parietal bone, at the point indicated on the radiograph (Fig. 3), about 5-cm below the visible fragment trail. Messrs. Haag both endorse that high posterior parietal entrance locus, proffering as evidence the credentials of the *Forensic Panel*, as well as the **Select Committee's** Ida Dox drawing that depicts a high entrance wound.⁹⁵ It's no small irony that they thus reject their colleague, Mr. Sturdivan's, new and revised opinion: that the bullet entered low, through occipital bone,⁹⁶ perhaps 12-cm or more below the visible trail of fragments.

Of course Mr. Sturdivan is right to assume the trail would rise as brain matter pushed upward through JFK's burst cranium. He's also right it wouldn't rise very much, because the lateral X-Rays don't show brain matter protruding through, or resting above, the top of JFK's bony skull. So the fragment trail alone almost completely eliminates the official theory JFK was struck from above and behind with a single bullet that entered his skull low, through the occipital bone, as now believed by Mr. Sturdivan (and as reported by JFK's examining pathologists). But that's not all.

The visible fragments in the test skull are relatively large, much larger than all but a few of the fragments in JFK's X-ray. JFK's pathologist James H. Humes, MD testified that JFK's X-rays revealed "between 30 or 40 tiny dustlike particle fragments of radio opaque material."⁹⁷ Having seen the originals ourselves, we concur. An independent forensic radiologist with considerable experience examined JFK's X-rays and agreed, writing: "There is a 'snow trail' of metallic fragments in the lateral skull X-Rays which probably corresponds to a bullet track through the head, but the direction of the bullet (whether back-to-front or front-to-back) (sic) cannot be determined by anything about the snow trail itself."⁹⁸

These informed assessments are in contrast to the implication of Messrs. Haag, who wrote that the fatal bullet left "only a few small lead fragments in its wake."⁹⁹ It was the X-Ray of **Biophysics'** test skull that showed "only a few small fragments." JFK's radiograph showed a few small fragments, *as well as* a trail of myriad, tiny fragments, the latter more

typical of non-jacketed, hunting rounds. And those miniscule fragments are probably very close to the bullet's path for the very reasons Mr. Sturdivan gave under oath to the **Committee**: tiny fragments tend not to move much because they have a very high surface area compared to their mass, and so they "have a very high drag in tissue."¹⁰⁰

What one can carry away from the **Biophysics** tests is evidence JFK may have been twice struck in the head. For struck skulls move in the direction of bullet path due to momentum transfer, even when hit by jacketed, WCC rounds, to say nothing of soft-nosed, hunting rounds, and JFK's skull rocked back to the left. Second, WCC rounds fired low into the rear of a human skull leave a few small fragments low in the X-ray that measure no larger than, say, 7-mm. But they do *not* leave an additional "snow trail" of tiny fragments anywhere, particularly not 10-cm, or more, away from the entrance, near the top of the skull, as with JFK. It is non-jacketed hunting rounds that tend to leave myriad tiny fragments, not jacketed ones.

In sum, the government's own experimental data and the Zapruder film suggest that something besides, or in addition to, WCC ammo finished Kennedy off. It suggests he may initially have been struck tangentially toward the top front of his skull at Zapruder frames 312-313 with a hunting round fired from the right front. Such a shot explains why JFK's skull abruptly moved back to the left and why there is a trail of miniscule fragments near the top of his cranium. This scenario is further buttressed by at least 10 credible witnesses in Dealey Plaza who either saw smoke coming from the area of the "grassy knoll" or smelled gun smoke at ground level.¹⁰¹ A hypothetical second head shot, fired from behind and hitting JFK low in the back of his skull at approximately Zapruder 327-328, would explain not only why JFK's head moved rapidly forward following those frames but also the presence of the much larger fragments we see in the mid/lower regions of Kennedys X-Rays.

Finally, as both pro- and anti-conspiracy authors have noted, including Luis Alvarez,¹⁰² some of the Zapruder frames are blurred at points that correspond to Mr. Zapruder jerking his camera in startle-reaction to the sound of gunfire. Thus, for the commonly accepted shot that many believe was fired from the rear and struck the limo at Zapruder frame 223-224, there is a corresponding blurred, "jiggled," image when Zapruder would have heard that shot a fraction of a second later, at frame 227.^{103, 104} Similarly, there is considerable blurring of frames 331 and 332, which correspond to a putative shot from behind that struck JFK's head in frames 327-328.

Tellingly, the image that shows JFK's head exploding, frame 313, is blurred. Alvarez claimed this had "been caused directly

by shock-wave pressure on the camera body"¹⁰⁵ from the Book Depository. As should be obvious to *AFTE* readers, and as Don Thomas has explained, neither the "shock-wave" nor the sound of gunfire would have reached Zapruder by frame 313 if fired from Oswald's alleged position, 270 feet from Zapruder. There is only one explanation that works, and it works perfectly: the shot that struck JFK's head in frame 313 was likely fired from where Zapruder first said he heard that shot come from - behind him, from the grassy knoll, a mere 52 feet behind the cameraman.¹⁰⁶

In conclusion, the *AFTE Journal* has done a great service to its readers and the general public in showcasing the many fascinating and contentious scientific issues surrounding the assassination of President Kennedy. We write in hopes of adding to the discussion by offering an alternative interpretation of the events in Dallas and by providing copious documentation, which we hope will serve as a useful research resource for anyone who might want to examine the facts for themselves. Our endeavor to provide a reasonable interpretation of the evidence is an invitation to Messrs. Haag, Mr. Sturdivan and *AFTE* readers to check our claims and challenge us. For in a case as medically and forensically complex and conflicted as the murder of John F. Kennedy, clarity is frustratingly difficult to achieve, and can only be sought by a painstaking weighing and sifting of the data.

Endnotes

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 - 3 Aguilar G, Wecht C. Letter to the editor. *AFTE Journal*, Vol. 47, No. 3, Summer 2015
 - 4 **Final Report of the Assassination Records Review Board.** On-line at: <http://www.fas.org/sgp/advisory/arrb98/index.html>
 - 5 Thompson, Josiah. **Six Seconds in Dallas.** New York: *Bernard Geis Associates for Random House*, 1967, p. 175. The image was reproduced in "Fig. 4" on-line in an essay available here: <http://www.history-matters.com/essays/frameup/EvenMoreMagical/EvenMoreMagical.htm>
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 - 7 Haag, L. Author's response to Doctors Aguilar and Wecht. *AFTE Journal* -- Volume 47 Number 3 -- Summer 2015, p. 142.
 - 8 Haag, L. Author's response to Doctors Aguilar and Wecht. *AFTE Journal* -- Volume 47 Number 3 -- Summer 2015, p. 140.
 - 9 **Warren Report**, p. 540: http://www.history-matters.com/archive/jfk/wc/wr/html/WCReport_0282b.htm
 - 10 Especially since Mr. Haag himself admitted that the bullet that hit the Governor had been "traveling downward.". See: Haag, L. **Author's response to Doctors Aguilar and Wecht.** *AFTE Journal* -- Volume 47 Number 3 -- Summer 2015, p. 140.
 - 11 7HSCA142: http://www.history-matters.com/archive/jfk/hasca/reportvols/vol7/html/HSCA_Vol7_0076b.htm
 - 12 **Warren Commission** testimony of Robert Frazier. 5H63-65: http://www.history-matters.com/archive/jfk/wc/wcvols/wh5/pdf/WH5_Frazier.pdf
 - 13 Zapruder frame 224: on-line at: <http://www.assassinationresearch.com/zfilm/z224.jpg>
 - 14 **Warren Commission**, Vol. 4:132-133. On-line at: http://history-matters.com/archive/jfk/wc/wcvols/wh4/html/WC_Vol4_0070b.htm and http://history-matters.com/archive/jfk/wc/wcvols/wh4/html/WC_Vol4_0071a.htm
- See also: Governor Connally's broadcast interview from Parkland Hospital on 11.27.63: https://www.youtube.com/watch?v=cP04_IGjkO0
- 15 **Warren Commission** testimony of Nellie Connally, 4H147. On-line at: http://history-matters.com/archive/jfk/wc/wcvols/wh4/html/WC_Vol4_0078a.htm
 - 16 HSCA V.7:138. On line at: <http://www.maryferrell.org/mffweb/archive/viewer/showDoc.do?absPageId=39148>
 - 17 **HSCA** V.7:83. On-line at: <http://www.maryferrell.org/mffweb/archive/viewer/showDoc.do?docId=82&relPageId=93>
 - 18 Haag, L. Author's response to Doctors Aguilar and

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29 * **The Vela Incident - Nuclear Test or Meteoroid?** *National Security Archive*. On-line at: <http://nsarchive.gwu.edu/NSAEBB/NSAEBB190/index.htm>

* A good summary of government evidence proving a nuclear blast in the Vela Incident is available in: **Report on the 1979 Vela Incident** -on-line at: <http://nuclearweaponarchive.org/>

Safrica/Vela.html [(Investigative journalist Seymour) Hersh reports interviewing several members of the Nuclear Intelligence Panel (NIP), which had conducted their own investigation of the event. Those interviewed included its leader Donald M. Kerr, Jr. and eminent nuclear weapons program veteran Harold M. Agnew. The NIP members concluded unanimously that it was a definite nuclear test. Another member - Louis H. Roddis, Jr. - concluded that "the South African-Israeli test had taken place on a barge, or on one of the islands in the South Indian Ocean archipelago" [Hersh 1991; pg. 280-281. On-line at: <http://www.vho.org/aaargh/fran/livres10/SamsonOption.pdf>]. He also cited internal CIA estimates made in 1979 and 1980 which concluded that it had been a test.

"The U.S. Naval Research Laboratory conducted a comprehensive analysis, including the hydroacoustic data, and issued a 300-page report concluding that there had been a nuclear event near Prince Edward Island or Antarctica [Albright 1994b]."

30 Alvarez L, **A Physicist Examines the Kennedy Assassination Film**, *American Journal of Physics* Vol. 44, No. 9, September, 1976 <http://jfk.hood.edu/Collection/Weisberg%20Subject%20Index%20Files/A%20Disk/Alvarez%20Luis%20Dr/Item%2002.pdf>

31 Lattimer, J. **Kennedy and Lincoln**. New York: *Harcourt, Brace, Jovanovich*, 1980, p. 250.

32 Josiah Thompson, Ph.D. gave a public lecture in October, 2013 and projected images from Alvarez's shooting tests. **Wecht Center Symposium on the 50th Anniversary of the Assassination of President Kennedy** See: <http://jfkcountercoup.blogspot.com/2013/10/wecht-center-symposium-on-jfk.html>

33 Haag L. Author's Response. *AFTE Journal*, V.47(3) 141, summer 2015 and Haag, L. President Kennedy's Fatal Head Wound and his Rearward 'Snap.' *AFTE Journal*, V.46(4), Fall 2014, p. 281.

34 Dr. John Lattimer fired at human skulls from above and behind with a rifle and ammunition identical to those Oswald used. Dr. Lattimer claims to have reproduced Alvarez's results with human skulls, and with a rifle and ammunition identical to those Oswald used. A video clip of Dr. Lattimer's shooting tests is available on-line at: <http://mcadams.pose.mu.edu/dealey.htm> or a video clip of one of Lattimer's shooting experiments. Note that the ladder rocks forward after bullet impact, reflecting the forward momentum transfer.

35 Lattimer, J. **Kennedy and Lincoln**. New York: *Harcourt Brace Jovanovich*, 1980, p. 254. Photo is Fig. 102.

This image is available on-line at: <http://www.history-matters.com/essays/jfkmed/How5Investigations/images/Lattimer.jpg> Contrast the damage to Lattimer's skull – loss of anterior parietal and much of the upper frontal bone on BOTH sides of skull, with the damage to JFK's, described in the autopsy report as a "large irregular defect of the scalp and skull on the right involving chiefly the parietal bone but extending somewhat into the temporal and occipital regions." On-line at: <https://www.archives.gov/research/jfk/warren-commission-report/appendix-09.pdf>

36 John Nichols, MD shooting experiments, accessed at Baylor University. On-line at: <http://www.baylor.edu/content/services/document.php/185131.pdf>

37 Thomas, Donald B. **Hear No Evil**. Ipswich, MA: *Mary Ferrell Foundation Press*, 2010, p. 363.

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41 <http://www.emergencymedicalparamedic.com/what-is-the-difference-between-decorticate-and-decerebrate-posturing/>

42 On-line at: <http://www.assassinationresearch.com/zfilm/z230.jpg>

43 Individual Zapruder frames available on-line at: <http://www.assassinationresearch.com/zfilm/>. A good video of Zapruder's film is available, here: <https://www.youtube.com/watch?v=iU83R7rpXQY>

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1366&bih=651&dpr=1#imgre=urJQpecJ-dblYM%3A

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47 "A similar explosion would have taken place if the bullet had gone through in the opposite direction. The only way to distinguish the direction of travel of the bullet is to examine the cratering effect in the inside of the skull at the entrance and on the outside of the skull at exit." Sturdivan, LM, **The JFK Myths**. St. Paul, MN: *Paragon House*, 2005, p. 171.

48 Sturdivan L. **Response from Larry Sturdivan: "Tracking the 'Magic' Bullet in the JFK Assassination."** *AFTE Journal*, Vol. 47, No. 3, p. 143, Summer 2015, p. 143.

49 **House Select Committee on Assassinations** testimony of Larry Sturdivan, 8 September, 1978. 1H414. On-line at: http://history-matters.com/archive/jfk/hasca/reportvols/vol1/html/HSCA_Vol1_0209b.htm

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51 **House Select Committee on Assassinations** testimony of Larry Sturdivan, 8 September, 1978. 1H413-414 http://history-matters.com/archive/jfk/hasca/reportvols/vol1/html/HSCA_Vol1_0209b.htm

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