Posher

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SKEPTIC

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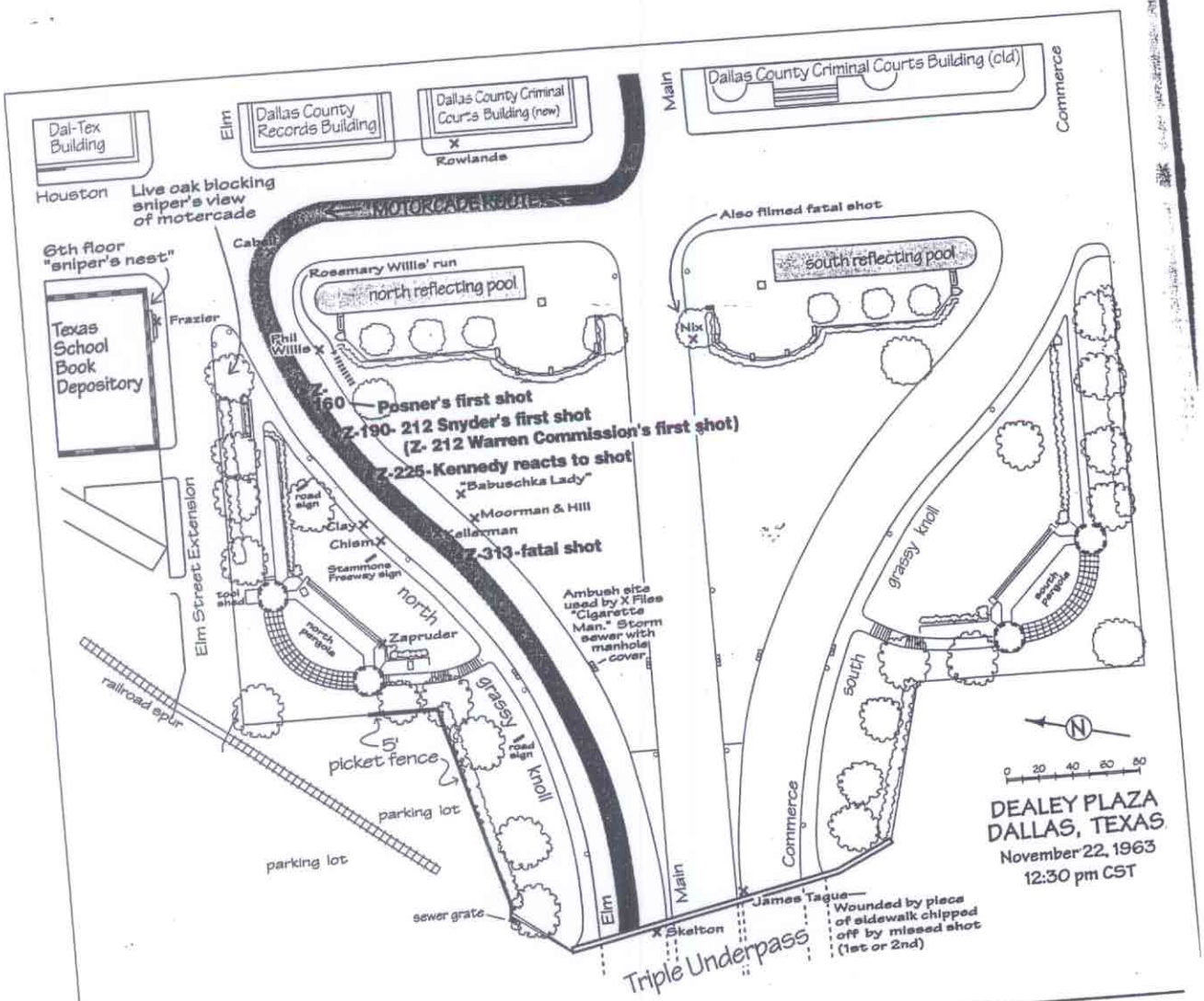

THIS MAP CONTAINS ITEMS MENTIONED IN BOTH THE GERLICH ARTICLE PRECEDING IT AND THE SNYDER ARTICLE THAT FOLLOWS.

SELECTIVE CITING OF WITNESSES BY POSNER— FROM THE SNYDER ARTICLE

Witnesses cited by Posner as evidence of an early first shot:

- Royce Skelton (on the bridge over the Triple Underpass)
- Barbara and Arnold Rowland (in front of the new Dallas Co. Criminal Courts Building)
- Buell Wesley Frazier (on the steps in front of the Texas School Book Depository)

Witnesses pointing to a later first shot not cited by Posner:

- Secret Service Agent Roy Kellerman--right after we passed the Stemmons sign (riding shotgun in the President's limousine)
- Mrs. Billie Clay—a few seconds after the car passed (10 ft. in front of the Stemmons sign)
- Mayor Earle Cabell—just as we turned the corner (riding 5 cars back in the motorcade)
- Chism—just in front of me (right in front of the sign)
- Governor Connally—150-200 ft. after the turn (in jump seat in front of President and Mrs. Kennedy)

SKE

CASE STILL OPEN

Skepticism and the Assassination of JFK

By Arthur and Margaret Snyder

On November 22, 1963, President John F. Kennedy was assassinated in Dallas, Texas. The FBI investigation of the assassination was bungled. The autopsy was bungled. The Warren Commission appointed by President Johnson to investigate the murder was misdirected by the FBI, which reported to the Commission only evidence supporting Director Hoover's preconceived theory of the case. Warren Commission staff systematically selected witnesses that supported the comfortable lone assassin theory. As a result, the 1964 *Warren Report* was bungled.

The Warren Commission concluded that Lee Harvey Oswald, acting alone, killed the President. Gerald Posner, in his 1993 book *Case Closed*, vigorously defends the Commission's conclusion and attempts to discredit Commission critics. Although he admits the Warren Commission's investigation was flawed (see his chapter 17), he contends that it came to the correct conclusion.

Some skeptics take Posner seriously. Nick Gerlich (1997) characterizes *Case Closed* as the "definitive Oswald-did-it book," and Skeptic editor Michael Shermer (1997) in his article "The Belief Module" writes, "...the evidence, as presented by Gerald Posner in his 1993 book *Case Closed*, supports the theory that Oswald did the job all by himself." The mainstream media were also impressed. The cover of *The U.S. News and World Report* special issue with excerpts from *Case Closed* reads: "After 30 years of conspiracy theories, a brilliant new book finally proves who killed Kennedy" (1993).

Case Closed is convincing. The evidence as presented fits the theory, contrary evidence is debunked, and critics are made to look like fools or charlatans. However, a critical reading shows that the evidence has been cut-to-fit. The case is far from closed.

The primary thrust of this article will be to examine the evidence as presented in *Case Closed* and to demonstrate that it is incomplete, distorted, and theory-driven. We will not propound a theory of the case, but it will become evident that the lone assassin scenario suffers from serious inconsistencies. However, before beginning this daunting task, we pause to examine the attitude skeptics should take toward conspiracy theories.

Skepticism vs. Conspiracy Theories?

Recent articles in Skeptic and *Skeptical Inquirer* (e.g., Lier, 1996; Henry, 1995; Gerlich, 1997; Shermer, 1997) appear to lump the possibility of a conspiracy in the Kennedy assassination with UFOs, dowsing, clairvoyance, and other extraordinary claims. Conspiracy "buffs" are portrayed as "nuts" or "true believers." Yet there is nothing extraordinary about conspiracies, many examples of which make it clear they can and do happen:

- John Wilkes Booth led a conspiracy that killed Abraham Lincoln, and attempted to kill Secretary of State Seward and Vice President Andrew Johnson. There is considerable evidence that Booth was an agent of the Confederate government, although he was acting without authorization in choosing to kill President Lincoln rather than kidnap him (Gaddy, 1997).
- The Dreyfus affair was a conspiracy by high ranking French army officers to frame Alfred Dreyfus for treason actually committed by Count Esterhazy (Snyder, 1973). While not an assassination, it shows how a widespread and enduring conspiracy can function without centrally directed planning.
- In 1950 Puerto Rican nationalists attempted to kill Harry Truman and succeeded in bombing the Capitol (Smith, 1998).
- Eight attempts were made on the life of Charles de Gaulle. The conspiracy by L'Organisation Armee Secret (OAS) involved elements of the French military services that opposed Algerian independence (Sifakis, 1991).
- The CIA was involved in the overthrow and the resulting murder of Chilean President Salvador Allende (Hersh, 1983, 264-296). They aided the French dissidents attempting to kill De Gaulle. The CIA conspired with the Mafia in numerous failed attempts to kill Castro (Church, 1976; Conover, 1997). A CIA hit on Dominican President Trujillo succeeded, but Congolese President Lumumba was killed by political enemies before CIA-sponsored assassins could get to him (Vankin, 1995, 11-15). See William Blum's 1986 book *The CIA: A Forgotten History* for details of these and other CIA plots.

Both conspiracies and "lone nuts" are common in the history of political assassinations. Leon Czolgosz killed McKinley. Charles Guiteau killed Garfield. They acted alone with at most imagined support. The only way to tell conspiracies from the actions of such "lone nuts" is to look at the evidence in each case.

Perhaps skeptics regard it as irrational to mistrust our Government's official conclusions. The Warren Commission "looked" at the evidence and concluded that Lee Harvey Oswald acting alone killed President Kennedy. Could it be they were not telling the truth? Or that they might not have been told the truth?

Government lying is not extraordinary. Ours has lied on numerous well-documented occasions, including the U2 incident, the Bay of Pigs invasion, the Gulf of Tonkin incident, the secret invasions of Cambodia and Laos, Watergate, and Iran-Contra. The FBI in "the most exhaustive investigation since the assassination of JFK" concluded that the Nixon White House was innocent of Watergate wrongdoing (Emery, 1994, 217).

Government deception is common. It has happened throughout history, and it occurred in the JFK assassination investigation. Within hours of Oswald's arrest, FBI Director J. Edgar Hoover decided that Oswald alone committed the crime (HSCA Report, 128 and 244). The FBI rank-and-file proved eager to demonstrate that their prescient boss was right. FBI Agent James Hosty, who had received a note allegedly from Oswald 10 days before the assassination, destroyed it following orders from the Dallas Special Agent in Charge Gordon Shanklin. Hosty characterize it as an "angry note telling me to knock it off and stop harassing his [Oswald's] wife" (Hosty, 1996, 27). Nannie Lee Fenner, the receptionist who accepted the note and later identified Oswald as the man who brought it in, claimed it said "Let this be a warning I will blow up the FBI or the Dallas police if you do not stop bothering my wife" (HSCA, Vol. 11, 278). Whatever its content, its existence was withheld from the Warren Commission, and Hosty's name, address, and phone number were omitted from the list prepared for the Commission from Oswald's address book (Hurt, 1985).

Another example can be seen in two FBI memos dated November 30, 1963, reporting on the FBI laboratory's analysis of the paper bag that allegedly hid Oswald's rifle as he brought it into the book depository: one given to the Commission and cited in their report links it to paper Oswald had access to at the depository; the other, which surfaced 16 years later, in nearly identical wording, denies there was a link (Hurt, 1985, 251). FBI agents pressured Nelson Delgado (a Marine comrade of Oswald's) and many others to change their stories to support Hoover's theory (Warren, Vol. VIII, 228).

The following exchange from declassified minutes of a Commission meeting (North, 1991, 515) illustrates that the Commission was not oblivious to the problem:

> McCloy: . . . the time has come—is almost overdue—for us to have a better perspective of the FBI investigation than we now have. . . . We are so dependent on them for our facts. . .
>
> Rankin: Part of our difficulty in regard to it is that they have no problem. They have decided that no one else is involved. . .
>
> Russell: They have tried the case and reached a verdict on every aspect.
>
> Boggs: You have put your finger on it.

The *Warren Report* made no mention of these difficulties. Instead it proclaimed: "Because of the diligence, cooperation, and facilities of Federal investigative agencies, it was unnecessary for the Commission to employ investigators other than the members of the Commission's legal staff."

Should conspiracy be rejected simply because a lone assassin provides a simpler explanation? We refer to this argument as *Ritual Occam's Razor Abuse:* Occam's razor is elevated to an absolute preference for simplicity, a rule of "reasoning"—"of two theories choose the simplest"—(Henry, 1994), instead of the rule of thumb "Entities should not be multiplied more than necessary" (Occam, 1300). If there is evidence for them, multiplying entities may be necessary.

If history is to be a science (Shermer, 1996), a conspiracy theory needs to be judged on the same basis as any other theory. Is it testable? Does it explain anything in a concrete, meaningful way? On this basis some theories can be rejected out of hand; for example, the numerological fantasies of Rev. Farrakhan (Brackman, 1996). More rational theories need to be investigated. They should be judged on the evidence.

Case Closed is considered to be the definitive work on the JFK assassination by both skeptics and the mainstream media. But the distortions and blunders in *Case Closed* are numerous and have been documented by a number of authors. See, for example, Harold Weisberg's 1994 book *Case Open*, as well as articles by Gary Aguilar, Martin Shackelford, Peter Dale Scott, Milicent Cranor, Jerry Rose, James Folliard, M. M. Dworetsky, Barb Junkkarinen, Wallace Milam and David Starks published in various journals (see the bibliography, but most can be found on the Web from http://home.cynet.net/jfk/issue1.htm). For this article we have relied on the above works as well as the advice, observations and ideas of Gary Aguilar, Milicent Cranor, Paul Hoch, Joe Riley, Martin Shackelford and Stuart Wexler. To demonstrate that *Case Closed* fails to close the case we will dissect a few critical examples of Posner's approach to the evidence.

The Head Snap

The head snap refers to the backward motion of President Kennedy's head seen in the Zapruder film. As Posner puts it: "But if the President was struck in the head by a bullet fired from the rear, then why does he jerk so violently backward on the Zapruder film which recorded the assassination? To most people, the rapid backward movement at the moment of the shot means the President was struck from the front." Posner begins by trying to dismiss the significance of the head snap with a quote from respected forensic pathologist Dr. Michael Baden: "People have no conception of how real life works with bullet wounds. It's not like Hollywood, where someone gets shot and falls over backwards." Dr. Baden is right about people, but heads are more than an order of magnitude lighter than a person. The velocity imparted to a head by a stopping bullet is given by conservation of momentum:

$$V_{head} = V_{bullet} (M_{bullet} / M_{head})$$

where V is velocity and M is mass. For a 10 gm bullet moving at 550 meter/sec hitting a 5 Kg head this is ~1 meter/sec; or

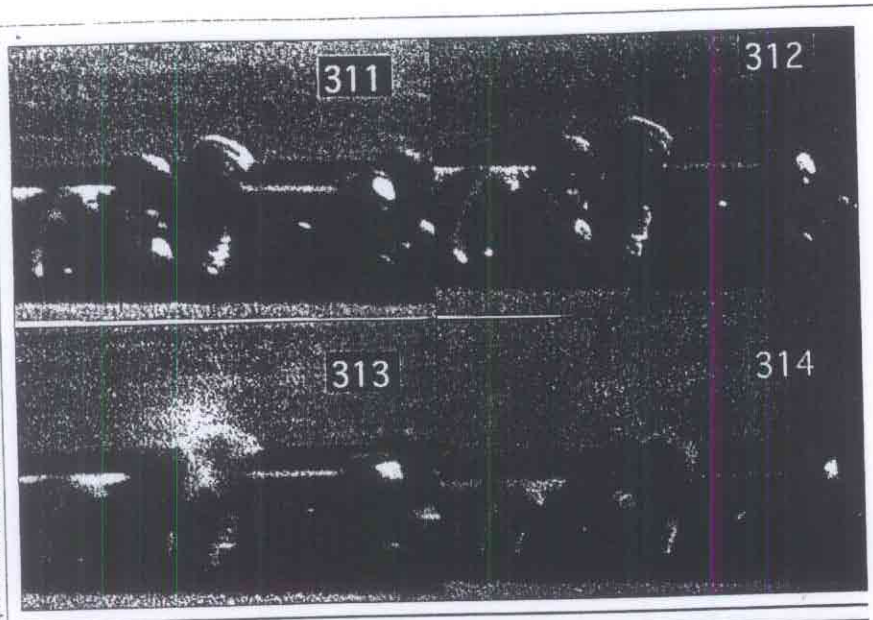

FIGURE 1a
Frames Z311-Z314, closeup
The fatal shot sequence. There appears to be a forward movement of Kennedy's head between frames Z312 and Z313 as measured by the patch of chrome behind his head which appears to increase in length in from frame Z312 to Z313.

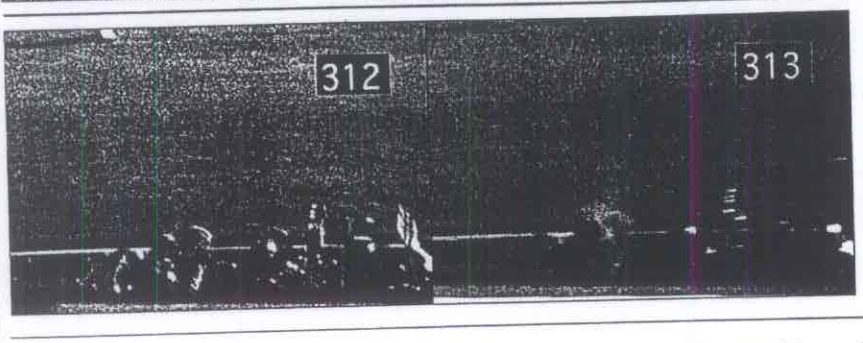

FIGURE 1b
Frames Z312-Z313 (below)
A wider view of the same fatal shot sequence. While the the increase in size of the patch of chrome in frame Z313 creates the *appearance* of a forward movement of Kennedy's head between Z312 and Z313, the increase is an artifact of blurring. Compare the highlights on other places on the car and you will see that they too have "grown" due to blurring by the same amount as the bright patch that has been used to measure the position of Kennedy's head. The actual forward movement must be measured by comparring Z312 to Z314, rather than the blurry Z313.

to put it another way ~2.4 inches per Zapruder frame.

Having used Dr. Baden to dismiss the possibility that a bullet strike could cause head motion, Posner twists around and in the next paragraph notes that Itek Corporation, using a "computer enhancement" (Itek, 1975), discovered that JFK "first jerked forward 2.3 inches before starting his rapid movement backward." Itek did not "discover" this forward motion. Caltech physicist Richard Feynman noticed it in 1966 when David Lifton showed him the Zapruder frames published in *Life* (Lifton, 1980, 48). Warren critic Josiah Thompson published measurements made on black and white copies in his 1967 book *Six Seconds in Dallas* (Thompson, 1967, 90).

The measurements of Itek and Thompson are almost inconsistent with a shot from a Mannlicher-Carcano. The motion is so large that nearly all the momentum of the bullet is needed to account for it. However, quantitatively Thompson and Itek were mistaken. The apparent motion between Zapruder frames Z312 and Z313 (see FIGURE 1a, frames 311-314) is an artifact of the blurring of frame Z313 (Snyder, 1997). This is not to say that JFK's head did not move forward between frames Z312 and Z313, but that the Z313 blur obscures the motion so that it cannot be measured using these frames. The actual forward motion (~0.3 meter/sec) can be estimated by comparing Z312 to Z314. It is about 1/3 the value obtained using the Itek or Thompson measurements—consistent with a Carcano bullet imparting ~1/3 its momentum and ~1/2 its energy.

What is the purpose of Posner's dance around the forward motion? He trots out Dr. Baden to deny that the direction of motion tells us anything, then uses the observed forward motion to verify a shot from the rear. None of this explains why the head went backwards ~100 msec later.

An explanation for the backward motion was proposed by Nobel laureate Luis Alvarez, in his 1976 article in the *American Journal of Physics*. Posner's description of Alvarez's work is ludicrous:

> "Dubbed the 'jet effect,' Alvarez established it both through physical experiments that recreated the head shot and extensive laboratory calculations. He found that when the brain and blood tissue exploded out of JFK's head, they carried more momentum than was brought in by the bullet. That caused the head to be thrust backward—in an opposite direction—as a rocket does when its jet fuel is ejected.

The "recreation" of the head shot consisted of shooting 2-3 pound melons wrapped in strapping tape with the wrong gun (30.06) and the wrong ammunition (hunting instead of jacketed military ammunition). The "extensive laboratory calculations" consisted of a "back of the envelope" calculation Alvarez did in his hotel room at the 1969 meeting of the American Physical Society in St. Louis (Alvarez, 1976, 819). The calculation demonstrates that the jet-effect is kinematically allowed. It does not establish that ejected material "carried more momentum than was brought in by the bullet," but only that this is possible.

The possibility of the jet-effect arises from the relationship between kinetic energy and momentum:

$$P=\sqrt{2ME}$$

Where P is momentum, M is mass and E is kinetic energy. If a large enough mass is ejected it can carry more momentum than the incoming bullet deposits using only a fraction of the bullet's energy. For example if 0.2 Kg of material were expelled carrying 10% of the bullet's energy it would carry 7.8 Kg-m/sec of momentum—enough to overcome the maximum possible momentum a Carcano bullet can deposit (6 Kg-m/sec). Kinematics allows jet-effect to occur but only the detailed interaction of the bullet with the target determines if it actually occurs under a given set of circumstances.

Alvarez's melon shooting experiment demonstrated that there are circumstances under which the jet-effect occurs. Dr. J.K. Lattimer (1980) did experiments using the correct rifle and ammunition. Lattimer claimed his targets—whether skulls or melons—"always" went backwards. Edgewood Arsenal did experiments on skulls (Edgewood, 1964; HSCA, Vol. 1, 404). All skulls shot by Edgewood moved away from the shooter.

Posner makes the situation with regard to the jet-effect seem neat, straightforward, and scientifically well established when it actually is messy and confused.

Since the publication of *Case Closed* there have been new experiments by Dr. Doug DeSalles and Dick Hobbs (DeSalles and Hobbs, 1994) and by us (Snyder, 1996). DeSalles and Hobbs shot tape-wrapped melons using a Carcano rifle and jacketed ammunition. In 11 shots they saw no jet-effect. In 1996 we undertook to resolve the apparent discrepancy. We shot a variety of melons with two different guns (30.06 and Carcano) and both jacketed and soft-nosed hunting ammunition. The results were surprisingly simple: *Hunting bullets produced a jet-effect. Jacketed bullets did not produce a jet-effect.*

This confirms Alvarez's results using hunting ammunition. Lattimer's results on melons appear to be inconsistent with our experiments and those of DeSalles and Hobbs.

From these results one might conclude that the jet-effect cannot explain the head snap. However, a melon is not a head. In our next experiment we will attempt to ascertain if the presence of a hard skull-like material around the target melon can cause a jacketed bullet to fragment and act like a hunting bullet.

At this point in time the jet-effect issue is not resolved. In his explanation of the head snap Posner employs, in addition to the jet-effect, a so-called "neuromuscular spasm." His full explanation might be described as jet-assisted neuromuscular spasm. Posner writes, "First, when the bullet destroyed the President's cortex, it caused a neuromuscular spasm, which sent a massive discharge of neurologic impulses from the injured brain down the spine to every muscle in the body."

The authority for this statement is the House Special Committee on Assassinations forensic pathology panel. The HSCA is not as definite as Posner: "The panel further recognizes the possibility of the body stiffening, with an upward and backward lunge, which might have resulted from a massive downward rush of neurologic stimuli to all efferent nerves" (HSCA, 1974, 174-175).

The HSCA also suggested that "decerebrate rigidity" or DR as described by Sherrington (1898) "could contribute to the President's backward motion." No practicing neurologist or neuro-scientist testified that DR or a "massive downward rush of neurologic stimuli" could explain the head snap. DR is due to the absence of nerve signals that keep opposed muscles in equilibrium rather than "a massive discharge of neurologic impulses." Since JFK is positioned facing to the left at the moment of the fatal shot, any "upward and backward lunge" whatever its cause would have pushed JFK to the right, not the left.

The HSCA also noticed that "such decerebrate rigidity as Sherrington described usually does not commence for several minutes after separation of the upper brain centers from the brain stem and spinal cord," but included DR in their stew of possibilities anyway (HSCA, Vol. 7, 174). Again Posner has it wrong. Again he portrays a confusing and difficult subject as if it was simple and well understood.

The other obvious explanation for the backward motion of JFK's head—a shot from the front—is problematic too. A shot from the grassy knoll should have left an exit wound in the left rear. There was none. A frangible bullet that stopped without exiting either should have deposited more fragments than are visible in the extant X-rays or it would have had to have been made of an exotic material such as glycerin ice (McCarthy, 1992). However, fragments could have been expelled during the assassination or removed before the X-rays were taken. A shot that skipped along the right edge of JFK's head has to come from a very forward position, but might have deflected to JFK's right, accounting for the leftward movement starting in Z315. This would, however, conflict with the majority of witnesses, who placed a shot on the grassy knoll (Thompson, 1967, 244). While none of the proposed scenarios are satisfactory, a frontal shot cannot be ruled out either. At this point, it is no more implausible than neuromuscular spasm. The jet-effect may soon be ruled out. *Case Closed* presents oversimplified explanations of the head snap that are just plain wrong.

The First Shot

The timing of the first shot and whether it hit or missed has long been a matter of controversy. The Warren Commission placed it ~6 seconds before the fatal head shot. Posner moves it two seconds earlier thereby giving Oswald more time to fire three shots. Even in the 8 seconds Posner provides, firing three shots, re-acquiring the target and aiming twice through the limited field-of-view (18°) of the misaligned 4x scope would not have been easy. The scope was so badly aligned that shims had to be put in to make testing possible (Warren, Vol. 3, 443). Thus, it is not a question of the scope just being knocked out of whack by post-assassination handling. It is more reasonable to suppose Oswald used the iron sights, but even this would not have been easy for someone with Oswald's modest attainments as a marksman. Only highly skilled marksmen in test situations have been able to accomplish this feat in the Warren Commission's six seconds.

Posner selects ear-witnesses who suggest a shot near frame Z160. He paraphrases them, one after another, describing how the first shot occurred "just" after the limousine turned the corner onto Elm. Other witnesses place the shot later. Posner does not mention them.

Among his just-after-the-turn witnesses, Posner contrives to make their testimony seem more definite than it was. Two of his selected witnesses were not very close. Royce Skelton was way down by the triple underpass at the far end of Dealey Plaza (see the map on page 50). Barbara Rowland was with her husband near the corner of Houston and Main. Mr. Rowland testified before the Warren Commission as follows: "The then the [sic] motorcade turned on Elm and was obscured from our vision by the crowd, and we were discussing Mrs. Kennedy's clothes at that time. My wife likes clothes." Mrs. Rowland said "...as they turned the corner I heard a shot...." She was not in a good location to see how far down Elm the car had progressed.

Posner's other selected witnesses are in reasonable locations to determine the time of the shot. For example, Wesley Frazier was on the steps of the School Book Depository building. He recalled, "Well, I say, just right after he went by he hadn't hardly got by, I heard a sound and if you have ever been around motorcycles you know how they backfire, and so I thought one of them motorcycles backfired because right before his car came down, now there were several of these motorcycle policemen, and they took off down toward the underpass down there...." This supports Posner's thesis of an early shot even though Frazier thought the sound came from down the street instead of the 6th floor window directly overhead.

Here are a few witnesses Posner fails to call:

Secret Service Agent Roy Kellerman, who was riding shotgun in the front seat of JFK's limousine: "As we turned off Houston onto Elm and made the short little dip to the left going down grade, as I said, we were away from the buildings, and were—there was a sign on one side of the road which I don't recall what it was or what it said, but we no more than passed that and you are out in the open, and there is a report like a firecracker, pop."

Mrs. Billie P. Clay, who was standing about 10 feet up the street from the Stemmons Freeway sign, which obscures JFK in the Zapruder film from frames Z200 to Z224: "Just a few seconds after the car in which President John F. Kennedy was riding passed the location where I was standing, I heard a shot."

John Chism, who was was standing immediately in front of the Stemmons freeway sign: "And just as he got just about in front of me, he turned and waved at the crowd on this side of the street, the right side; at this point I heard what sounded like one shot."

Dallas Mayor Earle Cabell was five cars back from the presidential limousine. As his car turned the corner, the presidential car was approaching the Stemmons sign: "We were just rounding the corner of Market [sic] and Elm, making the left turn, when the first shot rang out."

Thompson, in *Six Seconds in Dallas*, cites the testimony of 12 witnesses (a few of which we have reproduced above) that point to the first shot occurring as the car approaches the Stemmons sign (Thompson, 1967, 32). Posner mentions only one of the 12—Texas Governor John Connally. Connally's testimony is distorted by leaving out his estimate of the distance they had traveled down Elm (150 to 200 feet) when he heard the first shot.

Witnesses do sometimes contradict each other. Posner selects witnesses and trims their testimony to support his version of events.

The keystone of Posner's time shift is the behavior of Rosemary Willis in Z160-Z190. He describes Rosemary's run as follows:

> New Zapruder enhancements, however, confirm the ear-witness testimony that an early shot missed the President and the Governor. Beginning in frame 160, a young girl in a red skirt and white top who was running along the left side of the President's car, began turning to her right. By frame 187 less than 1.5 seconds later, the enhancement clearly shows she had stopped, twisted completely away from the motorcade, and was staring back at the School Book Depository.

You do not need "new Zapruder enhancements" to see Rosemary running, stopping and turning. Posner uses the so-called "new Zapruder enhancements" of Dr. Michael West. Martin Shackelford (1998) notes that West's "enhancements" are only simple enlargements with circles for emphasis made for Dr. West by news photographer Johann Rush. They are not "computer enhancements" as stated on page 317 of *Case Closed*. David Lui, at the time a 15-year-old high school student, spotted Rosemary in a bootleg copy of the Zapruder film in 1979. You do not need "enhancements" to see that she did not begin to slow and turn in at Z160. She continued running and glancing at the President's limousine until about Z180. By Z187 she was looking back in the direction of the School Book Depository. Her father, Phil Willis, was also standing back there. Nobody else in the

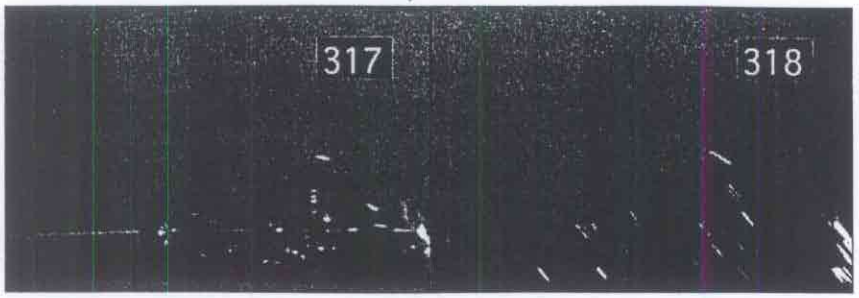

FIGURE 2—
Frames Z317-Z318
A Comparison of these two frames shows the rapid angular acceleration of the camera as Zapruder reacts to the Z313 shot.

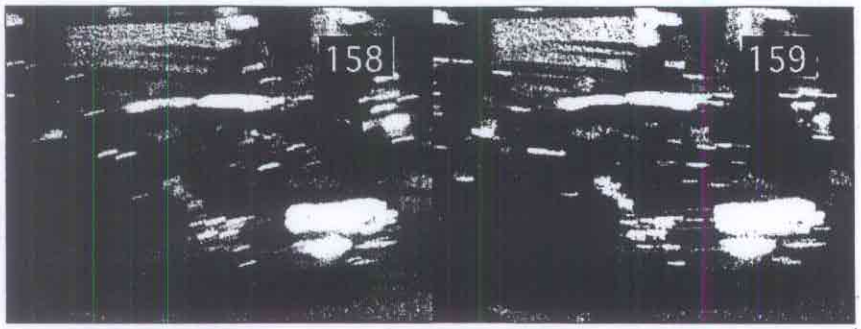

FIGURE 3—
Frames Z158-Z159
Are these jiggles an indication of an "early shot"?

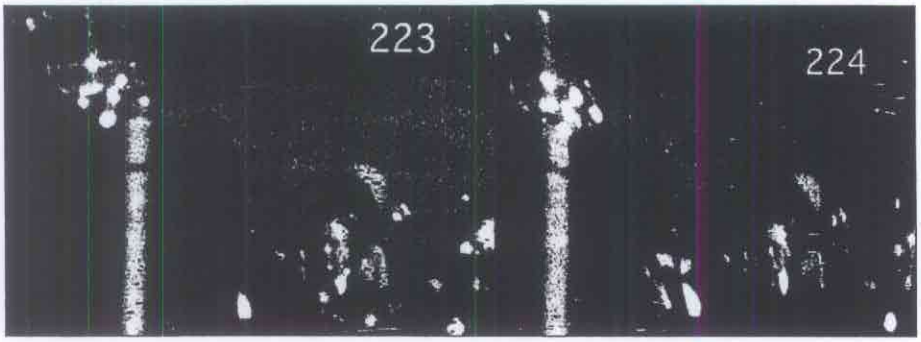

FIGURE 4—
Frames Z223-Z224
The lapel flip—an indication that Connally has just been wounded, or just the wind?

crowd turns to look back at Willis or the Book Depository.

Posner notes that when Rosemary was asked "why she had stopped running with the President's car, she said 'I stopped when I heard the shot.'" The question was asked by David Lui for his article "The Little Girl Must have Heard" which was syndicated by the *Los Angeles Times* (Weisberg, 1994, 25-30). It would not have made a very interesting story if all the little girl had heard was her father yelling at her to stop. Posner grants that, "Some believe the girl's reaction was because her father, Phil Willis, standing only 10 feet away told her to stop and come back to him." In a footnote he acknowledges that Willis himself is one of the "some" who believe he called out for her to stop. He trots out the "enhanced Zapruder film" to debunk Willis, claiming that Willis was taking pictures when Rosemary turned. In fact, as is easily seen in any half reasonable copy of the film, Willis does not have the camera "in front of his face" for the entire Z160-Z190 interval. At about Z187 he is raising it to his eye again, but if Rosemary was responding to his command rather than a shot, he would have had to yell out well before Z187.

The picture Willis was about to take is very interesting. Willis testified to the Warren Commission in 1964 that "the shot caused me to squeeze the camera shutter, and I got a picture as the President was hit with the first shot." Analysis undertaken for the HSCA (HSCA, 1979, Vol. 15, 695-697) later determined that this picture was taken at Zapruder frame 202. This contradicts Rosemary's statement to David Lui 16 years later. It places the first shot during the period when the view of the President from the sixth floor "sniper's nest" was obscured (though not completely) by a Texas live oak.

Posner uses "jiggle analysis" proposed by Luis Alvarez in the same paper where he develops the idea of the jet-effect (Alvarez, 1976) to provide "additional evidence of the moment of the first shot." Jiggle analysis seeks to identify times when shots could have occurred by looking for frames where the Zapruder film is blurred either because he was startled by a shot or because the shock wave produced by a bullet directly affected the camera. Posner recognizes "a jiggle...could be caused by many other factors."

Blurs are common. There are a large number in frames

Z1-Z132 (before the President's limousine appears) that nobody attributes to shots. Posner says: "The largest spastic movement by Zapruder came at frames Z313-Z314, the moment of the head shot." Z313 is blurry but far from the blurriest frame in the film. To attribute the blurring of Z313 to a spastic response by Zapruder is absurd. He could not have responded so fast. Alvarez attributed the blurring of Z313 to the shock wave produced by the bullet which would have hit Zapruder's camera at almost the same time the bullet hit JFK. Alvarez interpreted the very blurry frames Z318-319 (FIGURE 2) as Zapruder flinching in response to the shot and used them to calibrate Zapruder's response time at about 5 frames. Z158 and Z159 are also very blurry. Like Z318, Z158 shows a large increase in the blurring compared to the previous frame indicating a rapid acceleration of the camera. Z158-159 (FIGURE 3) are consistent with an early shot at about Z153, but they are not positive evidence of such a shot. It might just have been a random jiggle. There are also jiggles consistent with the time implied by Phil Willis' picture and testimony.

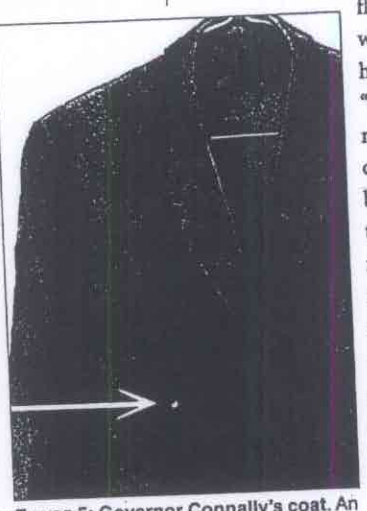

FIGURE 5: Governor Connally's coat. An arrow points to the location of the back-lit bullet hole.

Posner selects his witnesses and distorts what they said. Two were too far away to be able to make a reliable estimate. He ignores witnesses that do not support his thesis. At best, jiggle analysis is consistent with an early shot. Other than Rosemary Willis there is no response from the crowd or security personnel. Critically examined, Posner's case for an early shot is unconvincing.

THE SINGLE BULLET THEORY

The single bullet theory (SBT) refers to the hypothesis that a single bullet caused JFK's back and neck wounds and all of Governor Connally's five wounds. Without the SBT Oswald could not have fired all the shots.

Posner does not follow the Warren Commission's version of the SBT, which is untenable and was not accepted by three of the commissioners. Instead he appropriates the version developed by Robert Piziali and the team of experts he led for the prosecution at the American Bar Association mock trial of Oswald at their 1992 convention in San Francisco. Dr. Piziali and his team were supplied to the ABA by Failure Analysis Associates (FAA), a company that specializes in the application of technical expertise to legal problems. Posner fails to mention that FAA also supplied experts (led by CEO Roger McCarthy) for the defense side (McCarthy, 1995). Nor does he let his readers know that the jury, which heard both sides, could not agree on a verdict.

Posner uses the motion of Governor Connally's lapel between frame Z223 and Z224 (FIGURE 4), noted by Jeff Lotz of Failure Analysis in his computer enhancement, to establish the time of the SBT shot. A computer enhancement is not needed to see the lapel flip. It could just have been caused by the wind, which had nearly blown off Jackie Kennedy's hat a few minutes earlier, but Posner writes: "...this jacket movement may be one of the most important timing confirmations in the case, as it establishes the moment when the bullet hit him. The movement of the jacket took place at the exact area where the Governor's suit and shirt have a bullet hole, as the missile passed through his right shoulder blade and out under his right nipple." FIGURE 5 shows a drawing of Connally's suit back-lighted to show the bullet hole (Groden, 1997). The hole is nowhere near the lapel.

Posner attempts to strengthen his case for a Z224 shot using what is one of the strongest pieces of evidence that Governor Connally's wrist was not hit then: "A film enhancement, done by Dr. Michael West, shows the Governor's light-colored Stetson hat, which he was holding in his right hand, near his chest start to rise. It flipped quickly up during frames Z227 and Z228 and then at Z229 it started coming rapidly down, and by the next frame it was at its original position."

Dr. West, a forensic dentist not a neurologist, is said to have called this "positive proof" of "a neurological reaction to physical trauma." Connally was not hit in the nervous system. Dr. West is one of Posner's favorite authorities, but he is not highly respected in the forensic science community. Mark Hansen (1996, 50), in an article that appeared in the *ABA Journal* notes: "The American Academy of Forensic Sciences ethics committee recommended that West be expelled for allegedly failing to meet professional standards of research, misrepresenting data to support a general acceptance of his techniques, and offering opinions that exceed a reasonable degree of scientific certainty." West was suspended in 1994 by the American Board of Forensic Odontology because he "had misrepresented evidence and testified outside his field of expertise." Dr. Charles Gregory, who operated on the wrist, testified (Warren, Vol. 4, 124), "[the] dorsal branch of the radial nerve, a sensory nerve in this immediate vicinity was partially transected together with one tendon leading to the thumb,which was totally transected." The rest of Connally visible in the film is unperturbed.

That Connally could have held onto his hat as his wrist was shattered and a tendon controlling the thumb was severed is not credible. The impact alone would have been enough to make him drop the hat. Under Posner's scenario, a 10g bullet lost 500 feet per second passing through the Governor's wrist (Posner, 478). This impact would have sent his wrist and hand flying at a velocity of ~5

"alternative" healing, should rely on Posner is not that surprising, but one might hope for a higher standard of critical thinking from skeptics.

What can we conclude about the JFK assassination? There is no "smoking gun" that proves conspiracy. On the other hand to accept the lone assassin theory requires us to swallow myriad inconsistencies, implausible explanations of key evidence and numerous odd coincidences. One does not have to scour the evidence like a defense attorney hunting for something to confuse a jury to find these problems. They crop up everywhere, not just in the examples we have discussed, but in every aspect of the case.

Thirty-five years after the assassination the case is still open. Skeptics should keep an open mind. Skeptics should be more skeptical. □

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(6002B at 732 PPM and 6003A at 730 PPM) are reasonable matches.

As Guinn himself testified: "It is much easier to exclude; if you find two samples that differ markedly, it is easy to say definitively they did not have a common origin." Guinn's data are consistent with only WCC ammunition being used. All the fragments he tested had the low antimony content characteristic of Western Cartridge Carcano bullets. Most bullets have antimony contents at the level of 1% or more and would have been easy to detect if they were among Guinn's samples. However, Guinn's attempt to definitively link CE399 and the "fragments" from Connally goes beyond what the data will support.

The Posner/FAA version of the SBT is unconvincing. Presented with fancy graphics and hi-tech computer modeling, the analysis suffers from the garbage-in-garbage-out phenomenon. Guinn's results were overstated. NAA is merely consistent with CE399 being the bullet that hit Connally's wrist. That a tumbling bullet could have caused all the damage attributed to it and emerged as unscathed as CE399 is not plausible.

CASE STILL OPEN

The three examples above illustrate how the evidence as presented in *Case Closed* is distorted and misrepresented to support the lone assassin theory. Posner leads his readers to believe that advances in science and technology have allowed him to close the case, but science and technology serve only a rhetorical function in *Case Closed*. Computer models and fancy graphics are opinion not evidence; they only output what has been input. When Posner uses words like "enhanced" or "exact," he is misdirecting your attention, so that you will not look for yourselves and see that the evidence he is referring to does not support the claim he is making.

These are not just isolated errors. *Case Closed* is biased in its presentation of all the evidence. It is a brief for the prosecution, not a serious work of historical research. It is an apologetic—convincing to those who already believe. It fails as historical science. Although *Case Closed* has been thoroughly discredited by serious assassination researchers, many skeptics have swallowed it without a twinge of criticism and the mainstream media turn to Posner as the authority on the assassination whenever the subject arises. With the Assassination Records Review Board (ARRB) coming to its statutory end, Posner appeared on the *Today Show* to comment (NBC, September 30, 1998) and *Newsweek* chose him to write a column on the legacy of the ARRB (Posner, 1998, 49). Ironically the media called on Posner to comment on the final report of the ARRB, which by releasing long-closed files, had conclusively demonstrated that the case was not closed. That the media which, as John Stossell pointed out on *The Power of Belief* (ABC, October 6, 1998), routinely features channelers, psychic detectives and

dorsal side. Dr. Gregory, who operated on the wrist, observed that considerable material from the Governor's jacket sleeve was carried into the wound indicating, "It [the bullet] is in some way angular, it has edges or sharp edges or something of this sort. It is not rounded or pointed in the fashion of an ordinary missile." He conceded to Specter that a missile traveling backwards could possibly account for the material carried into the wound. The bullet having passed through the wrist, shattering bone, severing nerve and tendon, came to rest in Connally's thigh. All this is supposed to have been accomplished by CE399—the minimally damaged bullet found on a stretcher at Parkland hospital. Again Dr. Baden is trotted out: "This is a damaged bullet and is not pristine. It is deformed; it would be very difficult to take a hammer and flatten it to the degree this is flattened. This is a partially deformed bullet with a heavy jacket."

It is not difficult to flatten a bullet with a hammer. A few gingerly blows from a hammer in our garage flattened a Carcano bullet far more than CE399. The bullets are made of soft lead surrounded by a thin copper jacket. They are designed to survive and not fragment when they hit head-on—not when tumbling.

The experiments with reduced velocity bullets that Posner cites to show that a bullet can shatter wrist or rib without being severely damaged involved non-tumbling, head-on collisions of the kind the jacket was designed to withstand. A blow to the side will subject the bullet to higher shear forces than a head-on hit. A head-on hit produces compression forces, which are easier to withstand.

According to the SBT the bullet had to hit the wrist going backwards in order to explain the material carried into the wound. The Carcano bullet is not a full metal jacketed bullet. The jacketing does not seal fully in the back. The FAA experiments shooting Carcano bullets at reduced velocities head-on through a cadaver's wrist do not test the relevant hypothesis. Dr. Lattimer is quoted saying "it [the bullet] never hit a hard surface, like bone, on its nose," but it is supposed to have shattered a rib at near full velocity in a weaker sideways orientation and punched through a living wrist bone with its unsealed rear jacketing.

Another pillar of the SBT is the neutron activation analysis (NAA) undertaken by Dr. Vincent Guinn for the HSCA (HSCA, Vol. 1, 490). Posner summarizes Guinn's results as follows: "Guinn's finding ended the speculation that CE 399 had been planted on the stretcher, since there was now indisputable evidence that it had traveled through Connally's body, leaving behind fragments." To support this statement he quotes from Dr. Guinn's HSCA testimony as follows:

> "The stretcher bullet [CE399] matches the fragments in the wrist," Guinn said, "and that indicates indeed that that particular bullet did fracture the wrist." When asked if there was a chance that another Carcano bullet could have the same composition as Connally's fragments, he said, "Extremely unlikely, or very improbable, however you prefer."

The first quotation does not accurately reflect Dr. Guinn's testimony. The full quotation reads: "The results merely say that the stretcher bullet matches the fragments in the wrist, and that indicates indeed that that particular bullet did fracture the wrist. It unfortunately can't tell you anything else because there were no other bits and pieces along the other wounds." Dr. Guinn only claims a match between CE399 and the wrist. He does not establish that CE399 caused all of Connally's wounds, much less JFK's back and throat wounds. However, even what Dr. Guinn did say goes beyond what his data will support.

NAA is a method for determining the proportion of trace elements in a sample. The amount of antimony in lead is the most relevant to us here. The procedure is to expose a sample to a flux of neutrons from a nuclear reactor and to count the characteristic decays of the radioactive isotopes induced. The result is a measure of the fraction of various trace elements in the sample. For the Western Cartridge Company (WCC) ammunition used in the assassination, the antimony fraction ranges from near 0 to about 1200 parts per million (PPM). Dr. Guinn measured the fraction of antimony and other trace elements in 14 WCC bullets from four different manufacturing lots (6000, 6001, 6002, and 6003). He also repeated the measurements four times each on four of the bullets and measured the bullets and testable fragments submitted to him including CE399 and one of the fragments from Connally's wrist.

Guinn found more variation from bullet to bullet than in multiple samples from a single bullet. This fact is the basis of his claim that it is "extremely unlikely, or very improbable" that CE 399 and the Connally fragments came from different bullets. However, while the intra-bullet variation is smaller than the inter-bullet variation, it is by no means small. TABLE 1 shows Guinn's antimony content results for the four bullets on which he made repeated measurements.

TABLE 1:
Intra-bullet antimony content (PPM)

Bullet/Sample	6001C	6002A	6003A	6001B
1	1139	358	667	621
2	1062	983	395	646
3	1235	869	363	646
4	1156	882	441	791
Mean	1148	732	466	667
RMS	71	281	137	78

CE399 measured 833 PPM of antimony. The measured wrist fragment had 797 PPM—a "match." However, TABLE 1 shows that it is impossible to falsify the contention that fragments match. Even if the Connally fragment had come out 358PPM, it would have been consistent with a single bullet as variable as 6002A. The probability of a bullet failing to "match" itself is ~40%. Nor is it "extremely improbable" that the wrist fragment match a bullet other than CE399. In TABLE 1 two bullets—6002A and 6001B—yielded values consistent with the Connally fragment. Among the 10 other bullets Guinn measured two more

There is also some question as to why the location of the entry wound at the rear base of the President's neck is several inches higher than is indicated by the bullet holes in his suit jacket and shirt. Photographs taken during the motorcade show the President's jacket was often bunched up and riding up his back as a result of his waving to the crowd. His back brace also pushed his clothing up. Therefore, measuring placement of the holes in the clothing is not an accurate means of determining precisely where the bullet entered the body.

One might call this the cheap suit theory (CST).

The jacket and shirt would have had to ride up ~4 inches to match the upper blemish. Since the holes in the shirt and jacket are nearly on top of one another, they would have had to ride straight up almost identical distances. At frame Z225 the President was not waving to the crowd, but was holding his arms in front of his chest. His suit does not look bunched up. The picture taken earlier in the motorcade and offered by Lattimer (1980, 205), as evidence of the suit "riding up" does not show it bunched up anything like 4 inches. The back brace was a simple corset worn under his clothing around his waist (Warren, 1964, Vol. 2, 125). It would not have pushed his clothing up. A close look at the Willis photo discussed above shows the shirt was not riding up ~1.2 sec earlier (Thompson, 1967, 223).

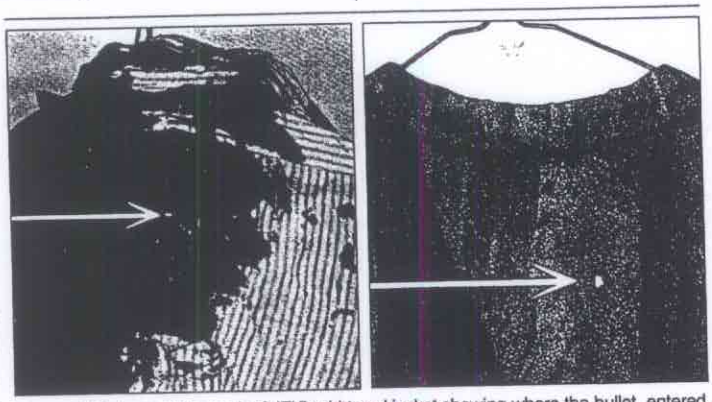

FIGURE 9: Pictures of the back of JFK's shirt and jacket showing where the bullet entered.

Posner is correct that the clothing holes are "not an accurate means of determining precisely where the bullet entered..." but it does not require much accuracy or precision to see that the clothing holes are inconsistent with an entry point ~4 inches higher. The size of entry wounds is too variable and the back photos are too cluttered to establish that there is no other candidate for an entrance wound. The situation in contrast to Posner's presentation of it is confused.

While accepting the autopsy position for the back wound, the FAA prosecution team and Posner reject the autopsy finding that the bullet entered JFK's skull "above and to the right of the external occipital protuberance (EOP)" (Warren, 1964, Autopsy Report, 543). All three pathologists marked the location of the entry wound on a skull within 1 cm of the EOP (HSCA, Vol. 7, 1976, 115). A bullet from the 6th floor of the depository that entered near the EOP would have exited through the face. JFK's face was not damaged. The HSCA moved the entrance wound ~4 inches higher out of the occipital bone and into the parietal. This choice of location gives a trajectory consistent with a shot from the 6th floor.

Posner claimed in 1993 testimony before the Legislation and National Security Subcommittee of the House Committee on Government Operations that two of the pathologists—Drs. Humes and Boswell—admitted to him that they had changed their minds about the low entry point of the skull wound (LNSS, 1994). In recorded interviews with Dr. Gary Aguilar, both Humes and Boswell denied changing their minds on the wound location. Moreover, Dr. Boswell said he had never spoken with Posner (Aguilar, 1996, 1994). In 1995 testimony before the Assassination Records Review Board (ARRB), Humes and Boswell insisted that JFK's wound was low and in occipital bone. The ARRB asked Posner twice for the tapes of his Humes and Boswell interviews, but as of October 1998 when the ARRB closed down they had not received them (ARRB, 1998, Chapter 7).

Posner and the FAA prosecution team chose "the information on the wounds" that gave the answers they wanted. They begged the question.

Dr. Baden estimated that the throat wound is anatomically ~10° higher than the back wound (HSCA, Vol. 1, 231, exhibit F-47). The FAA analysis Posner cites (which "achieved precision on the placement [of JFK and Connally] because it used a sonic digitizer") claims the President's posture at Z225 was consistent with a shot from the 6th floor. A 6th floor shot would have had to slope downward at an angle of ~18°, so JFK would have to have been bent forward by ~28° to account for the upward trajectory. Elm Street slopes downward by ~3°, so JFK needed to be leaning forward at an angle of ~25° relative to the limousine. Neither a "sonic digitizer" nor a "Zapruder enhancement" is needed to see that JFK was not leaning forward ~25° in Z225.

After passing through JFK, the bullet is supposed to have hit Connally's right shoulder. Posner describes the resulting wound as follows: "[The] entry wound in [the] right shoulder was 1 1/4 inch long—the exact length of the bullet—indicating the bullet was tumbling." The wound was not 1 1/4 inch but 1.5 cm (Shackelford, 1994; Warren, 1964, Vol. 4, 104). The wound was consistent with either a tumbling bullet or a tangential entry. Both Drs. Shaw and Gregory were of the opinion that the bullet that entered Connally's back had not previously struck anybody else. Under questioning by Warren Commission counsel Arlen Specter, they admitted the possibility of a bullet that had only passed through soft tissue causing the injury.

The bullet then knocked out four inches of Connally's 5th right rib, exited below his right nipple and entered his wrist through the

effects described are hard to see on the black and white stills available with this article. Also, Rosemary's run, Mrs. Kennedy "pushing" on JFK's arm, and the fate of Connally's hat are difficult to follow in stills and, in any case, far more frames would be needed than can be reproduced here. The new videotape and DVD from MPI Home Video provide excellent color versions, but the old CD-ROM from Macmillan Digital is good enough.

To explain the delay in Governor Connally's response compared to JFK's, Posner uses Dr. Charles Gregory. Gregory is the only expert he has to explain this remarkably long delay. Let us line-by-line deconstruct Posner's treatment of this issue (Posner, 1993, 331). Posner begins: "At frames Z235-Z236, Connally's mouth opened wide, and by frame Z238 his cheeks puffed out and he turned sharply down and to the right." This is an accurate description of what happens to Connally in these frames.

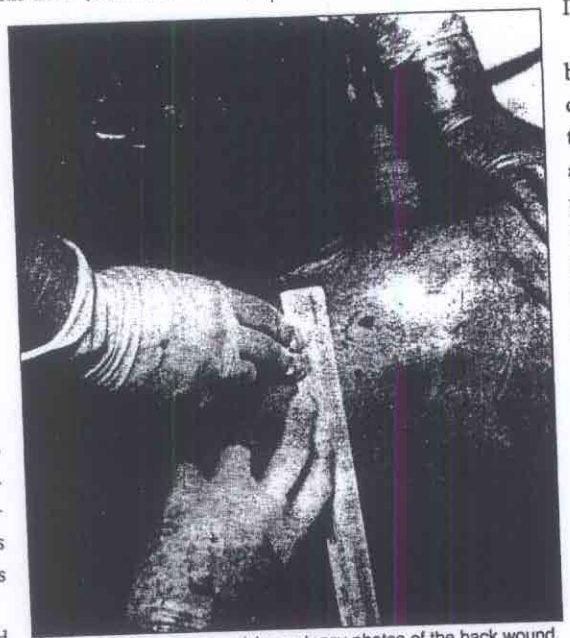

FIGURE 8: One of two surviving autopsy photos of the back wound.

Posner: "According to Dr. Charles Gregory, one of the surgeons who attended Connally at Parkland, when the bullet passed through the Governor, it compressed his chest wall, and the epiglottis involuntarily opened, forcing air out of his mouth." Dr. Gregory was the orthopedic surgeon who operated on Connally's wrist. Chest wounds or their effects were not his area of expertise.

Posner: "Dr. Gregory estimated that such an expulsion of air could come up to half a second after the bullet struck." Dr. Gregory estimated "on the order of 1/4 to 1/2 second" (Thompson, 1967). Posner's statement is consistent with this, but he phrases it to emphasize the 1/2 second he needs for his scenario. Posner: "Dr. Gregory had not seen the Zapruder film when he testified, instead basing his opinion on his medical expertise." The reference for Dr. Gregory is to page 89 of Josiah Thompson's *Six Seconds in Dallas*. (The page number is wrong. The correct page is 71.) Thompson is not referring to *testimony* by Dr. Gregory before the Warren Commission or anywhere else, but to Thompson's November 1966 interview with Gregory in a Dallas hotel room. We have spoken to Thompson (1998) about the interview. He points out that it was not a even formal interview much less testimony. No recording was made. No oaths were taken. Thompson and some *Life* magazine staffers met with Dr. Gregory in one of their hotel rooms. They showed him stills from the Zapruder film. It is not true that he had not previously seen the Zapruder film. In his Warren Commission testimony he refers to the film and indicated that in frames Z234-Z236 Connally was in position to have incurred the wounds he suffered.

Posner continues: "His [Gregory's] estimate, when applied to the Zapruder film, would indicate that Connally was shot near frame 226." By a verbal slight of hand typical of Posner's approach to inconvenient facts, Gregory's informal upper limit has been transmuted into an estimate. Z226 is actually outside Gregory's range. We can hardly claim that Josiah Thompson's memory of Gregory's informal opinion excludes frame Z226, but it does not "indicate that Connally was shot near frame 226" either. When he testified before the Warren Commission, Dr. Gregory said: "I am not persuaded that this [SBT] is very probable" (Warren, 1964, Vol. IV, 127).

The heart of the SBT is the bullet's trajectory. Failure Analysis constructed a trajectory "utilizing the information on the wounds" and their determination of the position of the two victims and the car at frame Z225. The positions of JFK's wounds are not as unambiguously established as Posner intimates.

For the back wound they relied on the results of the autopsy which Dr. Baden (1989, 5) has described as follows: "Where bungled autopsies are concerned, President Kennedy's is the exemplar...From the beginning it was surrounded with confusion and secrecy and papered over with an enormous concern for appearances." The New York State Medical Examiner at the time of the autopsy, Dr. Milton Helpern, commented as follows (Houts, 1967, 55): "The tragic, tragic thing is that a relatively simple case was horribly snarled up from the very beginning; and then the errors were compounded at almost every other step along the way."

FIGURE 8 shows one of the two surviving photographs of JFK's back taken during the autopsy. The autopsy surgeons identify the uppermost blemish as a bullet wound. They measured it to be 14 cm below the mastoid process, an odd and unreliable reference point. They probed it with a finger and with a wire. They failed to dissect the path of the bullet as they should have (Wilber, 1978). Probing the wound does not definitively establish the bullet's track.

FIGURE 9 shows that the holes in JFK's clothing are not consistent with the autopsy position for the back entry wound. The hole in JFK's suit coat was 5 3/8 inches below the top of the collar and 1 3/4 inches to right of the midline. The hole in his shirt was 5 3/4 inches below the collar and 1 7/8 inches to the right. Posner treats this problem in a footnote on page 305:

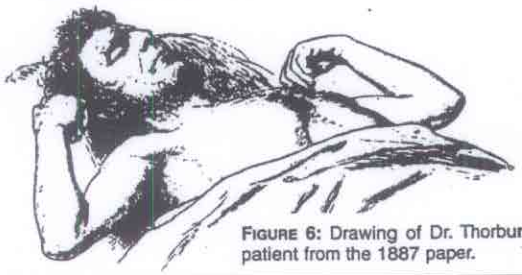

FIGURE 6: Drawing of Dr. Thorburn's patient from the 1887 paper.

feet per second—downward and to the right, rotating around his elbow. It would not have caused his hat to flip up. The hat would have been ripped from his hand.

In a footnote Posner again calls on Dr. Baden to say, "If he doesn't drop the hat, it doesn't mean a thing" and that it is a "moot point" since "...the Zapruder film never shows him dropping the hat." Note how artfully Posner words the latter quote (his paraphrase of Baden). True, the film "never shows him dropping the hat," but he was out of sight behind the Stemmons sign before frame Z223 and his hand and hat disappeared from view as Zapruder fails to track the limousine's downward motion between frames Z280 and Z310.

Even with a severed tendon the Governor might have been able to hold his hat or even pick it up, but he could not have held onto it under the impact of the bullet. If his wrist had been hit while it was in sight we would be able to see its motion (~3 inches per frame). The film never shows him dropping his hat or his wrist flying off. The wrist must have been hit off camera.

Posner, despite his faith in jiggle analysis in his brief for an early first shot, does not mention it in his SBT discussion. Perhaps this is because there is no jiggle to confirm his shot at Z224. Z227 and Z229 are somewhat blurred but nothing like the major reaction to the head shot in frame Z318.

It seems apparent to us that JFK was already reacting to a hit in Z225. This would have been impossible if he had just been hit at Z224, but since he is hidden by the Stemmons sign before Z225, it is not possible to be sure he is reacting. His posture seems odd and his arms and shoulders are starting to take on the splayed out position with his fist rising to his neck that is fully formed a few frames later. By Z226 he is clearly reacting.

Posner deals with JFK's rapid reaction by elevating the "Thorburn position"—promoted by urologist J.K. Lattimer as the reason JFK raised his fist in front of his face—to the status of a "neurological reflex" (Lattimer, 1980). Posner writes, "A spinal injury at the level of C-6 [sixth cervical vertebrae] is significant because it can cause an instantaneous reaction called 'Thorburn's position.'" Posner does not reference Thorburn directly but relies on Lattimer. Milicent Cranor has read Thorburn's original 1887 paper (Cranor, 1998; Thorburn,1887). Dr. Thorburn did not see his patient until four days after the accident that injured his spine at C6. The patient's arms had already taken the awkward position shown in FIGURE 6, since called the Thorburn position. It is a specific indicator of damage at C6. Compare the position of JFK's arms in Z247 (FIGURE 7) with the position of Dr. Thorburn's patient. JFK's arms were not in Thorburn position.

Posner attempts—again—to use West's "enhanced" Zapruder film to support his muddled scenario:

> Moreover, once C-6 is damaged, the arms would have remained locked in the raised position indefinitely.... In the nearly five seconds that elapsed between the neck and the head wound, Mrs. Kennedy leaned over toward him to see what had happened. At one point, she grabbed his raised left arm with her right hand and tried to push it down. It stayed up. Then she reached with both hands and tried again to push it down, but the film clearly records his resistance. His arm did not lower.

That Mrs. Kennedy touched JFK's left arm during this period of time is clear on the Zapruder film. For example see Z247 in FIGURE 7. In motion it looks like she might be pushing. No "enhancement" is needed. A few frames later she reached over with her left arm and touched his left arm from below (Z256-not shown). If anything it looks like she might be pulling it. While his left arm remains up, his right arm comes down. Mrs. Kennedy is not pushing on his right arm. It is not "locked in the raised position indefinitely" (Z256 again). If Mrs. Kennedy is pushing or pulling on his left arm she succeeds in lowering it. By Z-275 both of JFK's arms are no longer "locked" in so called "Thorburn position."

While "computer enhancements" are not needed to see what's going on in the Zapruder film, color and motion help. Some of the

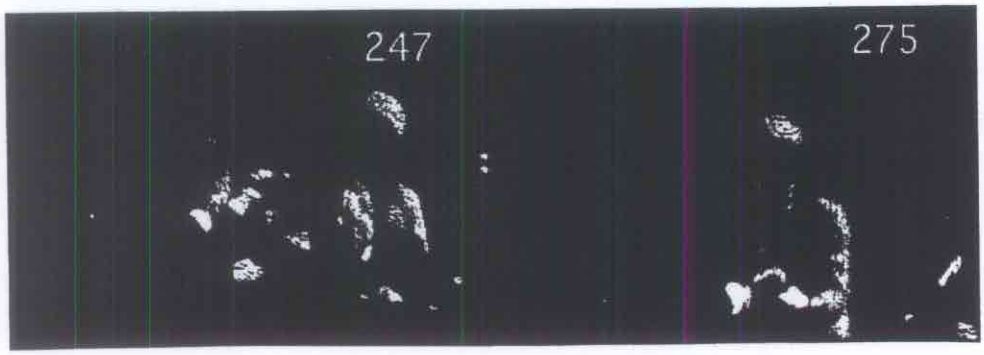

FIGURE 7—
Frame Z247— JFK reacts to the first shot and Mrs. Kennedy reaches across to touch his left arm.
Frame Z-275— Both arms are no longer "locked" in the so-called "Thorburn position."