

'Single Bullet' Theory Valid, Specter Insists

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District Attorney Arlen Specter yesterday described in detail the scientific tests which the Warren Commission conducted in support of its "single-bullet theory" in the assassination of President Kennedy.

The theory—endorsed as "persuasive" by the commission—supposes that Mr. Kennedy and Texas Governor John B. Connally, who was seated directly in front of Mr. Kennedy in the Presidential limousine, were hit by a single bullet.

Specter, who was chief investigator for the commission, is generally conceded to be the chief architect of this theory. It holds that one of the three shots fired in the assassination ploughed through Mr. Kennedy's neck from back to front, then smashed through Connally's chest and right wrist.

Specter's conviction—and the commission's—is that one of the three bullets missed the limousine altogether. There is no dispute about the third bullet; it tore off the back of Mr. Kennedy's head.

Connally, himself, insists that he heard the shot which wounded Mr. Kennedy in the neck and that the President already was clutching at his throat before the next bullet from Lee Harvey Oswald's 6.5mm. Mannlicher-Carcano hit Connally in the back.

The tests, and their results, add up to what Specter calls "a sophisticated and intricate picture" of the shooting, one not readily apparent to the casual observer influenced by partial evidence isolated from context.

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This picture negates certain "erroneous conclusions," Specter says.

The Other Theory

The wildest such conclusion, said Specter, is that disproof of the single-bullet theory automatically implies the existence of a second assassin.

Even if his theory fell, said Specter—"and I'm convinced that the evidence is substantial enough to prevent that"—there was still time for Oswald to have complied with the "quite unlikely theory" of three shots, three hits—one in Mr. Kennedy's neck, one in Connally's back, the third in Mr. Kennedy's head.

Specter's explanation of the test involves terms puzzling to the layman—"muzzle velocity, exit velocity, yawing and tumbling. . . ."

And it involves, too, "angle of declination," the slope of the highway over which the Presidential motorcade was traveling, surveyor's instruments, telescopes and the time it takes for different individuals to react to a bullet.

Beginning and End

The tests began with Oswald's rifle and ended, as it has today, in public confusion, triggered by Connally's strenuous denial that he and Mr. Kennedy were wounded by the same shot.

Sightings through telescopes from the sixth floor of the Texas School Book Depository, whence Mr. Kennedy's killer fired, convinced Specter and his investigators that the killer's first hit was the back of Mr. Kennedy's neck.

The question of what happened to this bullet after it exited from Mr. Kennedy's throat, nicking the knot of his four-inch hand tie, its residual velocity—and hence its capability of inflicting still further damage in the limousine—preoccupied the commission with weeks of tests, involving, among other things:

—The resistance of gelatin, goatflesh and horseflesh to gunfire.

—Firing bullets from the Carcano into anesthetized goats.

—A minute inspection of the limousine.

—Again firing bullets—this time into cadaver hands in an effort to duplicate the smashing of the bones in Connally's right wrist.

Bullet Velocity

The first—and easily ascertainable—fact was the velocity at which the bullet left the rifle,

2,160 feet a second.

The distance over which this bullet was fired was computed at about 180 feet.

The bullet entered Mr. Kennedy's neck at a velocity of 1,904 feet a second—again easily fixed by test firings since there was no intervening substance except air to slow it.

No Bone in Way

To compute the velocity lost in Mr. Kennedy's neck, Edgewood scientists constructed two blocks of animal tissue—one of horseflesh, one of goatflesh—and a third of gelatin to simulate Mr. Kennedy's neck tissue and its resistance to a bullet.

There was no inclusion of bone in these blocks since Navy Commander James J. Humes, the pathologist who directed the autopsy on Mr. Kennedy, had told the commission:

"This missile, to the best of our ability to ascertain, struck no bone protuberances, no bony prominences, no bones, as it traversed the President's body. . . ."

Test bullets were fired into these three blocks at a distance of 180 feet.

A Bullet Loose

The exit velocities ranged from 1,772 feet a second to 1,798 feet a second.

"In other words," said Specter, "we had a bullet loose in the car which was still traveling at a velocity capable of doing great damage—even after ripping through the President's neck."

The question, of course, was: "Where did the bullet go? Did it hit somebody else in the limousine, the upholstery, the limousine itself?" asked Specter.

The assassin's slanted angle of fire precluded the thought: the bullet spun out of the limousine.

"Remember," said Specter. "There was no intervening bone to divert it or send it shooting off in another direction—out of the limousine. It had to be lodged in something or somebody."

Not Committed

At this juncture, said Specter, neither he nor any of his investigators were committed to the "theory the bullet hit Connally" or any other theory. "It was just a missing bullet," he said.

The commission and its FBI investigators dealt first with the question whether the bullet had lodged in the limousine itself.

The car was subjected to exhaustive tests and examinations. The findings:

—A dent in the interior side

of the metal coaming around the windshield.

—A faint cracking in the interior of the glass which he glass outward with a spray of tiny lines, indicating the missile or fragment which hit the windshield at a velocity considerably less than the 1,779-foot-a-second exit from Mr. Kennedy's neck.

FBI Explains

As for the dent, its origin has never been explained.

But Special FBI Agent Robert A. Frazier, testifying on both dent and crack, said:

"Neither of these points of damage to the car could have been caused by the bullet which exited from the President's neck at a velocity of 1,772 to 1,779 feet a second. . . ."

"If the trajectory had permitted the bullet to strike the windshield, the bullet would have penetrated it and traveled a substantial distance down the road unless it struck some other object en route. . . ."

"Had the bullet struck the metal framing, which was dented, it would have torn a hole in the chrome and penetrated the framing, both inside and outside the car. At that exit velocity, the bullet would have penetrated either metal or upholstery surface in the interior of the automobile."

Turn to Governor

Although Connally, sitting directly in front of the President, presented a quite obvious secondary target for this bullet, it wasn't until all other alternatives had been exhausted that Specter and the commission investigators turned to the governor.

While no bone in the President's neck had intervened to disturb the trajectory of the bullet, the best firings into the two blocks of animal flesh and the third of gelatin had convinced investigators that the bullet was "yawing"—wobbling—as it exited.

The Pistone Bullet

And the entrance wound in Connally's back, said Specter, drawing on the testimony of the surgeon who treated Connally of Parkland Memorial Hospital, was "of a size indicative of a yawing bullet."

It was at this juncture in the sequence of Specter's explanation that the bullet, which rolled from a stretcher at Parkland Memorial Hospital, was examined and identified as the bullet which penetrated Connally's chest, his right wrist, then spent itself after in-

flicting a superficial wound in Connally's thigh.

The finding of the bullet presented another problem.

Before it could be introduced as the "single bullet," with whatever bearing its condition might have on the investigation, it had to be proven to the commission's satisfaction it was indeed THE BULLET.

Rib Is Grazed

The bullet was slightly flattened, the metal jacket squeezed at the nose, with an accompanying extrusion of the lead core from the hind end of the jacket.

The commission had one other fact in hand to suggest the next series of tests. The bullet which entered Connally's back, had grazed a rib.

Edgewood Arsenal ballistics and wound experts anesthetized 11 goats and fired test shots—again from the Carcano—at an angle similar to the one from which the slug plunged into Connally's back and from the

same distance.

It was a difficult feat to bring off, but the commission's marksmen succeeded on at least one goat.

And the nose of this test bullet was squeezed with the accompanying extrusion, just as the bullet found on the stretcher had been.

Another Explanation

But it had been squeezed tighter, said Specter, which was easily explained by the fact that the test bullet was a "pristine" bullet with none of the intervening tissue in Mr. Kennedy's neck to slow its velocity.

"The extra flattening didn't bother us," said Specter. "It rather tended to support the 'single-bullet theory.'"

"In other words, if Mr. Kennedy's neck hadn't intervened between the assassin and Connally's rib, the extra flattening would have been apparent in the bullet found on the stretcher."

Goat Too Thin

The tests with the goats also gave investigators some rough idea of the loss of velocity in the passage of the bullet through Connally's body.

Allowing for the fact that the goat was a thinner target than Connally, said Specter, "we added some girth to the goat, and the loss finally figured at around 400 feet a second."

Mathematically, this would have reduced overall velocity from 2,160 at the muzzle to 1,379 as the bullet left Connally's

chest.

The bullet now, its velocity reduced, its trajectory disturbed, was beginning to "tumble," perhaps end over end, leaving a "large wound" as it exited from Connally's chest, "a wound entirely consistent with tumbling."

said Specter.

The bullet was to find two more targets, Connally's hand just above the wrist and his left thigh.

Again the Carcano was brought into play, this time against cadaver hands obtained from the Baltimore Morgue.

Higher Damage Level

Taking the damage to Connally's hand as an index, "pristine" firings into the cadaver hands produced a higher "level of damage."

This, he said, suggested that the intervention of other targets, first the President's neck, then Connally's chest, would reduce the damage inflicted by the "single bullet." The angle of fire from the sixth floor of the Depository to Connally's thigh was checked and rechecked—and corrected, as it had been before, for the 3.9 degree slope of the highway which the Presidential motorcade was traveling towards an underpass.

The Second Bullet

Specter also commented on Connally's insistence that he was wounded by another bullet.

—And that Abraham Zapruder's movie film doesn't show any reaction on Connally's part until he was hit seconds after the first shot hit the President.

Said Specter: "We don't know very much about reaction time. Human experience shows that different men react very differently to bullet wounds. In some instances, considerable time elapses before a man knows he has been shot in an important area of the body."

"Battlefield experience shows that men who have been shot go on a considerable time. It is

very easy in these circumstances to allow for a few seconds reaction time by either President Kennedy or Governor Connally."

Connally Didn't Know

In effect, Specter said, Connally didn't know he had been hit when the bullet, traversing Mr. Kennedy's neck, plunged into his back.

One of the prime arguments cited by critics of the Commission findings is that after Mr. Kennedy was hit in the neck, and had both hands clutching at his throat, the Zapruder film shows Connally:

—Apparently gazing ahead unconcerned, ignorant of the tragedy in the making behind him.

—And, more importantly, holding his hat in his right hand—the hand fractured by the bullet—to the right of his body, and well out of the line of fire between the exit wound in his chest and the wound in his left thigh.

Hand Clenched Like Claw

The presumption is that Connally never could have moved his hand into the line of fire in time to receive a wound in his wrist from this first bullet, which, as indicated by Mr. Kennedy's already well-developed reaction, already had sped elsewhere.

The corollary here, of course, is that he did move it back in time to receive a wound from the second bullet which missed the President and hit him in the back.

Actually, Specter said, Connally's hand is clenched on the hat in almost "clawlike fashion," indicating that Connally's hand had been in the line of fire, then

abruptly "withdrawn from his lap" and "instinctively switched to the right" in recoiling from the wound in the hand.

Illusion of More Time

Again, Specter said Connally already had been hit, and despite his upright posture, simply had not begun to show discernible reaction.

Again drawing on testimony given the commission by surgeons who attended Connally, Specter said, the governor didn't realize that his hand had been "almost shot to pieces" even after he got to Parkland Memorial.

One of the difficulties in viewing the Zapruder film frame-by-frame, Specter said, is that it gives viewers the illusion of "more time is elapsing than was actually the case."

"We're dealing with split seconds," said Specter. "Nobody—but nobody—can conceptualize an interval of 1/4 of a second (the frame-by-frame speed of Zapruder's film). You can't even enunciate a syllable in 1/4 of a second."

Can't Judge by Fragments

"The commission and its staff, in consulting with wound and ballistic experts, considered every conceivable test which would shed light on what happened."

"All this was done to find out all possible about the complex interactions and multiple variations which were possible."

"So it's hardly adequate for some people—even the governor—to take fragmented pieces of evidence without considering the laborious tests and analyses which were brought to bear on known raw facts."