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# Is Vincent Bugliosi Right that Neutron Activation Analysis Proves Oswald's Guilt?

by Gary L. Aguilar



## INTRODUCTION

In his book, *Reclaiming History*, author Vincent Bugliosi highlights the dubious, if not claim that bullet evidence in the Kennedy case scientifically establishes Oswald's guilt to degree of certainty. The proof, he says, consists of two related elements that show that two bullets from Oswald's rifle struck anyone in JFK's motorcade on November 22nd.

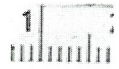


**Commission Exhibit 399, the so-called "magic bullet," allegedly found on a stretcher in Parkland Memorial Hospital on the afternoon of 22 Nov 1963. But new evidence has raised doubts that this Mannlicher Carcano bullet is the same bullet that was originally found and turned over to the U.S. Secret Service. See *The Magic Bullet: Even More Magical Than We Knew?***

First, both the nearly whole bullet that was recovered on a stretcher at the hospital where Governor John Connally were treated, as well as both of the other large bullet fragments recovered from JFK's limousine (consisting of the copper jacket and the lead core of a bullet) were shown to have been fired from Oswald's Mannlicher Carcano, to the exclusion of all other rifles in the world. Second, a sophisticated analytical test, neutron activation analysis (NAA), proves that all the smaller, recovered bullet fragments were separated from the specimens. Thus, only two bullets struck, both from Oswald's weapon.

As inescapable as the logic behind the theory may seem, and Bugliosi does an admirable job of making two recent reports in the technical/scientific literature have shot holes through it. The second debar months after Bugliosi claims to have stopped his inquiry and so he can't be faulted for not addressing it. I am aware of the first article, which, by itself, posed fatal problems which he glossed over. The manner in which this important evidence tells us much about his general approach to the subject of the Kennedy assassination. I understand that, some background is in order.

## BACKGROUND



**CE 56  
fragment  
of the PI**

That the larger pieces came from bullets shot through Oswald's rifle seems clear by the still-visible r... wake of the new studies what is now not clear is that NAA can prove that all the small fragments are the other of the two identifiable, large fragments.

First elaborated before the House Select Committee on Assassination's (HSCA) reinvestigation of Ken... NAA is a sophisticated technique that purports to identify bullets by measuring the miniscule levels... commonly present in bullet lead. Typically the quantities of antimony (Sb), silver (Ag) and copper (Cu)... trace components could be used just as well. The HSCA called upon Vincent Guinn, the University o... expert. He put JFK's bullet evidence to the test and, against all expectations, reported a match in antir... to inextricably tie Oswald to the crime.

But as Guinn explained it, NAA only proved useful in the Kennedy case because of a feature that was u... Carcano bullets used in Oswald's rifle.

In stark contrast with the lead used in non-MCC bullets, which, bullet-to-bullet, had near identical level... lead in Oswald's bullets had varying amounts. In the fragments recovered in the JFK case, Guinn fo... Oswald's ammo: varying quanta of Sb. But Guinn said that there was a key additional feature tha... conclusions. With Oswald's ammo the levels of trace elements found in fragments taken from a given bu... but were different from the levels found in other bullets. Thus, by NAA, fragments from one bullet wo... bullet of origin and could be distinguished from all others, even those picked out of a single box of twent

## BUGLIOSI'S TREATMENT OF NAA

Bugliosi offered a remarkably clear explanation of Guinn's thesis:

*"When subjected to NAA by Dr. Guinn, all five of the specimens produced a*



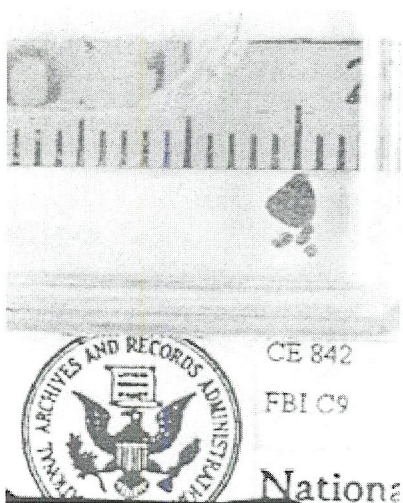
*profile highly characteristic of the Western Cartridge Company's Mannlicher-Carcano ammunition. Even more interesting, the results fell into two distinct groups. Of the five samples, two had a concentration of antimony of about 800 parts per million, and three had a concentration of antimony of around 600 parts per million. This could mean only one thing: all five specimens had come from just two bullets. 'There is no evidence for three bullets, four bullets, or anything more than two, but there is clear evidence there are two,' Guinn told the HSCA.*

*"Guinn concluded that the large fragment found in the limousine, the smaller fragments found on the rug of the limousine, and the fragments recovered from Kennedy's brain were all from one bullet.*

*"His most important conclusion by far, however, scientifically defeating the notion that the bullet found on [Governor John] Connally's stretcher had been planted, was that the elemental composition and concentration of trace elements of the three bullet fragments removed from Governor Connally's wrist matched those of a second bullet, the stretcher bullet. The stretcher bullet, then, had to be the one that struck Connally ... ."*

In further support of Guinn's conclusions, Bugliosi cited two related papers published by the longstand supporters, Ken Rahn, Ph.D. and Larry Sturdivan. The authors endorsed Guinn's statistical analy conclusion that, as Bugliosi put it, "unlike other manufactured bullets, which he (Guinn) found to elemental composition even when they came from the same batch or source, Mannlicher-Carcano ammu the Western Cartridge Company (CE 399 and the bullet fragments in the Kennedy case) (sic) f compositions (particularly in antimony content) from bullet to bullet within the same box (normally cons (sic) of ammunition. (1 HSCA 494-495)."

## RANDICH AND GRANT



**CE 842, small metal fragments taken from the wrist of Governor Connally.**

But almost immediately, there were doubts about the statistical analysis. Then, something unex scientists from Lawrence Livermore Laboratory who were avowedly agnostic on the conspiracy questi and Pat Grant, Ph.D., published a paper in the Journal of Forensic Science calling both Guinn's origi papers by Rahn and Sturdivan into serious question.

One of Randich and Grant's objections was that, although Guinn worked in good faith, he didn't unde

metallurgy, which was Randich's area of expertise. (Nor, they made clear, did Rahn or Sturdivan.) Mannlicher Carcano bullets were unique because the trace levels of component Sb varied. The levels of antimony do vary, they said. But so do Sb levels in many bullets that, like MCC shells, are jacketed. It is the non-jacketed bullets that have consistent levels of trace components. And the levels are controlled for a very good reason.

For while with jacketed bullets it is the jacket that provides the hardness and not the lead inside the bullets the hardness of a bullet is determined by how much antimony is mixed into the lead. To strictly speaking an important quality control issue, manufacturers strictly control the quantity of antimony used in their ammo. But with jacketed bullets, Sb levels vary because no effort is expended to control antimony as a function of a bullet's hardness.

As it happens, the non-MCC bullets Guinn used in his comparison tests were non-jacketed, and so have homogenous Sb levels. Imagining that his test samples were typical of the universe of all non-MCC bullets led to wrong conclusions. The varying Sb levels he found in JFK's fragments did not prove they had come from a single source. They could have come from many kinds of jacketed rounds.

Randich and Grant also disproved another, key Guinn contention: that there is little variation in Sb levels in non-jacketed bullets. Using exquisite micrographs showing MCC bullets cut in cross section, Randich and Grant demonstrated that non-jacketed bullets exhibit a "crystalline" type structure, with Sb tending to "microsegregate" around crystals of lead. The variation is enough that a sample taken from one portion of a bullet might easily have an Sb level one or two orders of magnitude higher or lower than one taken from another portion of the same bullet. Guinn found Sb matches within the fragments because he measured bits taken from only a very small portion of his test bullets, which said nothing about the rest of the bullet. If he had found had he sampled an entirely different area of the bullet. Thus, fragments with similar antimony levels could have come from one bullet, or more than one, and those with different antimony levels could have come from but a few different bullets.

Finally, Randich and Grant analyzed the statistical model Guinn presented to the HSCA. They determined that the small number of samples he had evaluated and the number of tests he performed were inadequate to draw the sweeping conclusions Guinn, Rahn and Sturdivan had drawn.

## A NEW STUDY

In May 2007, a second paper appeared reporting on a chemical, forensic and statistical analysis of bullets from the same batch as those supposedly used by Oswald. The authors, Cliff Spiegelman, professor of statistics and an expert in bullet lead analysis, William A. Tobin, the FBI's former Chief Forensic Metallurgist, William D. Johnson, with the Texas A&M Center for Chemical Characterization and Analysis, and Stuart Wexler, brought out the results of their study. As with Randich and Grant, they also concluded that, "evidence used to rule out a second assassin is flawed." They reported that, "many bullets within a box of Mannlicher-Carcano bullets have similar core compositions, but not true, as Guinn had said, that such matches are extraordinarily rare.

To his credit, Bugliosi acknowledged the Randich and Grant paper in his book. Unfortunately, however, he drew his conclusions on the flimsy basis of a personal letter (which he reproduced in an endnote) by the 40+ year old supporter, Larry Sturdivan. Repeating Guinn's mistaken interpretation, Sturdivan answered Randich and Grant's question: if one looks at the NAA data obtained by Vincent Guinn for the HSCA, it falls into two groups that are indistinguishable. Randich and Grant had effectively demonstrated that, metallurgically and statistically, it is simply not possible to have only two groups, a conclusion that has since been confirmed by the work of Spiegelman et al.

## CONCLUSION

Thus, the NAA pillar Bugliosi touts as undergirding Oswald's guilt no longer stands. This is an embarrassment Bugliosi could easily have avoided. In dealing with so important an area of evidence, Bugliosi had a duty to be thorough. Instead, for reasons that seem obvious, he deferred to the opinion of the pro-Warren Commission supporter, Larry Sturdivan. Had he approached this subject the way a scholar of any merit would have, he would have tested his assertions with either Randich or Grant, two men who have better credentials than Sturdivan does but who were not on the conspiracy question. But he never did. I called Randich and Grant and both said Bugliosi had never



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