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2/28/93

Dear Wallace,

Thanks for your interesting 2/12 Guinn memo. It should provoke much interest.

I am glad you knew that outside HSCA Guinn admitted the specimens he tested did not match the official evidence. I planted that question and Lifton's determination to follow his own agenda prevented that reporter from carrying it forward. Lifton interrupted still again and turned him off when cutting him out.

I wish I could recall where I have two papers on the use of copper in identifications. I used them in CA ~~7905~~ CA 75-226. One was for the Canadian government and one was by Guinn for the DJ. He said copper was superior of identification.

Yet he did not use the copper for HSCA and as I recall did not use some specimens because he said there was too much copper, it would overwhelm. I think that was a ~~XXXX~~ front-seat fragment.

May have been the Journal of Forensic Sciences but I'm not now sure at all.

I do not recall seeing the news story reporting that Guinn had tested the paraffin tests in 1964 and I wonder if he really did because I have no record indicating it. Your treatment of this is OK. Not a criticism. I'm just wondering.

Gallagher saw to it he was not involved in the FBI's Oak Ridge NAAs.

I've ignored the few typos. You'll catch them.

That Guinn did for those test remove a specimen of lead core from the pristine bullet, the one found in the rifle, destroys the FBI's excuse for not having done that.

When we deposed Gallagher on that in CA 75-0322, that is what he testified to.

Lesar may also remember that.

Thanks for the paper, good luck with its presentation, and

best wishes,



DATE: Friday, February 12, 1993
TO: Josiah Thompson, David Wrone, Harold Weisberg
FROM: Wallace Milam
RE: Dr. Guinn and Neutron Activation Analysis

1. Enclosed find a copy of my revision of "The Troubling Testimony of Dr. Vincent Guinn."
2. I have looked into Guinn's HSCA testimony, but also at his previous NAA research and conclusions. I am in the process of reviewing the 1964 NAA raw data, which review may cause me to change or add to this monograph.
3. This is a rough draft and there may be typographical errors, etc., in the manuscript.
4. I am presenting a program on this at the Chicago Convention in early April.
5. It is clear that Guinn's NAA testimony had a great impact on Blakey and his desire for "scientific" evidence. Guinn's testimony was probably the most important factor in HSCA's decision to endorse the single bullet theory.
6. My research has convinced me that:
 - a. The FBI was correct in its "inconclusive" verdict in 1964.
 - b. Mannlicher ammunition from WCC will always be "inconclusive" because the manufacturing processes used have no provision for the addition of measured amounts of antimony, and the bullet-lead used in the manufacturing process was an amalgam of leads which had been previously used.
 - c. Guinn's own laboratory tests contradicted his testimony before HSCA.
 - d. Guinn knew of the contradiction between what he was saying under oath and what he had found in his lab and reported in peer-review journals.
7. Needless to say, your comments are welcomed.

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**THE TESTIMONY OF DR. VINCENT GUINN:
SOME TROUBLING QUESTIONS**

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INTRODUCTION

In its investigation of the assassination of President Kennedy, the House Select Committee on Assassinations placed strong reliance on what it characterized as "scientific evidence." The controversial single bullet theory was endorsed by HSCA, and a scientific tool, neutron activation analysis, was used to develop evidence in support of the theory. Dr. Vincent Guinn was given bullet fragments from the National Archives for testing in a nuclear reactor at the University of California at Irvine. In testimony before the committee on September 8, 1978, Dr. Guinn asserted that his research indicated that only two bullets struck President Kennedy and Governor Connally, and that there was a "high probability" that bullet fragments found in Connally's wrist were from CE 399, a bullet found on a stretcher at Parkland Hospital. Guinn's findings differed from a 1964 FBI neutron activation analysis, which had yielded results called "inconclusive."

Since the committee's report, HSCA Chief Counsel Robert Blakey, Warren Commission counsel David Belin, and other apologists for the single bullet theory have cited Dr. Guinn's findings as indisputable scientific proof that the stretcher bullet had previously hit Governor Connally's wrist. Guinn's work has been employed in an attempt to place the single bullet theory on a high pedestal of scientific fact, beyond doubt and above question.

But what of Dr. Guinn's work? How valid are his findings? It appears that no one has bothered to carefully study both his testimony and his test data. A prevailing attitude seems to have been: a man of science has spoken--what can we do? We can read, for starters. Guinn's testimony is filled with inconsistencies and contradictions, and his laboratory data is shocking both in its quantity and its quality.

In his HSCA appearance, Dr. Guinn willingly admitted that the metallic fragments delivered to his California laboratory for study had the same identification numbers which had been assigned to them in 1964, but the weights of the fragments were different. Guinn further stated that there was no scientific reason for these differences in size. After his testimony, he was quite willing to speculate that the fragments he examined might not be the relevant ones at all. He clearly erred in assuming that he had done laboratory testing of all batches of Mannlicher ammunition manufactured by Western Cartridge Company. He presented findings from his own laboratory tests which contradicted the very hypothesis which is the basis of his work: that fragments from the same Mannlicher bullet exhibit a high degree of homogeneity. Guinn's own tests demonstrate that they, in fact, do not. Worse, his earlier reporting of test results shows that Guinn was aware of this crucial lack of homogeneity--yet he proceeded to give testimony contradicting his laboratory findings. Professor Blakey even misrepresented Guinn's previous association with the Kennedy case, shielding the fact that Guinn had done work on paraffin casts of Lee Harvey Oswald's hands and cheek in 1964.

I believe Dr. Guinn's work represents, at best, an invalid scientific hypothesis based on inadequate research. At worst, it is a scientific charade meant to lend an aura of legitimacy to the single bullet theory. In this paper, I have focused on those areas of testimony and laboratory testing which brought Dr. Guinn to his questionable conclusions.

Wallace Milam, February, 1993

THE TESTIMONY OF DR. VINCENT GUINN:
SOME TROUBLING QUESTIONS

BACKGROUND

1. In September, 1977, at the request of the House Select Committee on Assassinations (HSCA), the National Archives delivered to Dr. Vincent Guinn, nuclear chemist at the University of California Irvine, certain bullets and bullet fragments said to be related to the assassination of President Kennedy.
2. Guinn performed neutron activation analysis on the metal at his laboratory during a three-day period in September.
3. On September 8, 1978, Dr. Guinn testified before the HSCA in open hearings concerning the results of his analysis. Among other things, Dr. Guinn stated:
 - a. that Mannlicher-Carcano ammunition manufactured by the Western Cartridge Company in 1954 tended to be distinctive, especially in the antimony content of the bullets;
 - b. that it was probable the five relevant fragments related to the wounds of President Kennedy and Governor Connally came from only 2 bullets;
 - c. that it was "highly probable" that the three metal fragments allegedly removed from Governor Connally's wrist came from the bullet allegedly found on a stretcher at Parkland Hospital.
4. Dr. Guinn's testimony was used by the HSCA to buttress the single-bullet theory. Committee counsel Jim Wolf put the proposition to Guinn:
 - a. WOLF. You can...today state for the first time scientifically that CE-399 [stretcher bullet] did cause the injuries to Governor Connally's wrist?
GUINN. Yes, sir, those two match so closely that I would say that such was the case.
(HSCA, Vol I, p. 504)
 - b. Sources close to the committee reported that Guinn's test results weighed heavily in HSCA's decision to endorse the single bullet theory in its conclusions. Chief Counsel Robert Blakey was said to have been greatly impressed by Guinn's findings. Since 1979, Blakey, David Belin and others have spoken of the single bullet theory as a fact--and have stated that it is the "scientific proof" from Guinn's neutron activation analysis which elevated the theory to its new status.
 - c. The importance of the Guinn testimony can thus be demonstrated quite easily:
 - (i) **The single bullet theory is necessary to explain how Oswald or any other one person could have assassinated the President.**
 - (ii) **Guinn's neutron activation analysis provides the strongest "scientific" proof of the validity of the single bullet theory.**

THE CHOICE OF DR. GUINN

1. When he presented Dr. Guinn as an expert witness, Chief Counsel Blakey stated: "Dr. Guinn had no relation to the Warren Commission." (HSCA, Vol 1, p. 490)
2. This statement (and Dr. Guinn's later elaboration) is, at worst, patently untrue, and, at best, disingenuous and misleading. Dr. Guinn did neutron activation work on paraffin casts of Lee Harvey Oswald's hand and cheek while working for General Dynamics in 1964! Guinn is quoted extensively about the work in the New York World Telegram & Sun, August 28, 1964. Among other comments, Dr. Guinn said; "I cannot say what we found out about Oswald because it is secret until the publication of the Warren Report."
3. As Mark Lane wrote (Rush to Judgment, p. 153), "Although Dr. Guinn worked closely with the FBI on behalf of the Commission, was entrusted with the precious paraffin casts by the Commission, and submitted his findings to the Commission, there is no reference to his name in the Report."
4. When Dr. Guinn testified, Congressman Fithian asked him about reports of a prior connection to the Warren Commission:
FITHIAN. Dr. Guinn, this is not meant to be an embarrassing question, but I think I must ask it. Mr. Chairman, a recent article in the New Times magazine stated that you had worked for the Warren Commission and, therefore, your conclusions for this committee would be implicitly biased.
Did you ever work for the Warren Commission or work for the FBI in connection with the analysis of these evidence samples?
GUINN. Neither one. I think Mr. Wolf called my attention to the existence of this article, which I haven't seen, and I don't know where they got their misinformation, but I never did anything for the Warren Commission, and although I know people in the FBI, I have never done any work for them.
5. Unless the New York World Telegram & Sun misquoted Dr. Guinn twenty eight years ago, the nuclear chemist's answer is evasive. Although he may not have been paid by either the Warren Commission or the FBI, he clearly worked on evidentiary material submitted by the latter to be used in a report by the former. For a man who worked with the paraffin casts of Lee Harvey Oswald to say "I never did anything for the Warren Commission" is patently dishonest.
6. The question of who chose Dr. Guinn to do the neutron activation analysis remains unanswered. Blakey stated simply, "...the committee engaged as a consultant Dr. Vincent P. Guinn, professor of chemistry at the University of California at Irvine." (HSCA, I, p. 490). For his part, Dr. Guinn stated "we made arrangements in advance" and then the samples were delivered to his laboratory. (HSCA, I, p. 495)

THE FRAGMENTS GUINN TESTED

1. Dr. Guinn was given fragments with the same CE and/or Q numbers which the FBI had used in its 1964 NAA tests, but none of these "same" fragments weighed the same!
2. HSCA implied that this was due to alteration of the fragments during the previous tests:
 - a. "There are differences in the count and weight of the materials examined by the FBI and Dr. Guinn. This is attributable to the character of lthe FBI tests and to the fact that the FBI disposed of the samples examined after the tests." (HSCA Report, p. 599, note 33)
 - b. No footnotes or other citation offers proof of this explanation.
 - c. The implication here is that the FBI's tests were of a kind which destroyed some of the samples being tested. However, Dr. Guinn's testimony clearly disputes this explanation:

FITHIAN. You have said this whole process that you go through does not destroy the material, is that correct?

GUINN. That is correct.

FITHIAN. Now, then, did you test exactly the same particles that the FBI tested in 1964?

GUINN. Well, it turns out, I did not, for reasons I don't know, because as they did the analysis, they DID NOT destroy the samples either. [emphases added]

FITHIAN. So?

GUINN. The particular little pieces that they analyzed, I could just as well have analyzed over again, but the pieces that were brought from the Archives--which reportedly, according to Mr. Gear--were the only bullet-lead fragments from this case still present in the Archives--did not include any of the specific little pieces that the FBI had analyzed. Presumably those are in existence somewhere, I am sure nobody threw them out, but where they are I have no idea.

FITHIAN. And the 1964 equipment wouldn't have consumed them either?

GUINN. No.

(HSCA, I, pp. 561-562. emphases added)

3. Thus, we have these improbable circumstances:
 - a. The FBI tested certain metal fragments with certain identification labels (CE's or Q's) in 1964.
 - b. The FBI's tests were not of a kind which would have used up any of the fragments.
 - c. The National Archives passed on to Dr. Guinn an entirely different set of fragments--with the same CE and/or Q numbers, alleging them to be related to the Kennedy case.

- d. The Archives told Dr. Guinn that these were the only bullet-lead fragments remaining there from the case.
 - e. HSCA's explanation for this remarkable state of affairs is contradicted by Dr. Guinn and unsupported by any documentation whatsoever.
4. After his testimony before the committee was completed, Dr. Guinn talked with several people in the hallway outside the committee room. His remarks were recorded on tape, and they are noteworthy. Among other things, Dr. Guinn said:
- a. It was not until the fragments from the Archives arrived at his California lab that he discovered he was testing fragments different from those previously tested by the FBI.
 - b. None of the weights matched those of the 1964 test fragments.
 - c. It would have been easy to deliberately falsify the evidence to be tested:
"Possibly they would take a bullet, take out a few little pieces and put it in the container, and say, 'This what came out of Connally's wrist.' And, naturally, if you compare it with 399, it will look alike....I have no control over these things."

PRINCIPLES AND PROCEDURES OF NEUTRON ACTIVATION ANALYSIS

- Both in his testimony before HSCA and in a paper which he submitted to the committee (JFK-F331), Dr. Guinn outlined the basics of neutron activation analysis (NAA) and the procedures he used in studying the fragments from the National Archives:
1. First, Guinn grouped the materials: the unfired Mannlicher-Carcano round allegedly from the rifle found on the sixth floor of the Texas School Book Depository and the "mashed bullet" allegedly fired at General Walker became Group II. Those fragments "reportedly found in or near the limousine and its occupants" were designated Group I. Eight items were included in this group:
 - a. a piece of curb from Dealey Plaza (Q609)
 - b. a fragment reportedly found in the front seat of the limousine (Q3, CE-569)
 - c. particles scraped from the windshield of the limousine (Q15, CE-841)
 - d. a whole bullet allegedly found on a stretcher at Parkland Hospital (Q1, CE-399)
 - e. a large bullet fragment from front seat of the limousine (Q2, CE-567)
 - f. two fragments removed from President Kennedy's brain during autopsy (Q4-5, CE-843)
 - g. three small fragments reportedly removed from Governor Connally's wrist during surgery (Q9, CE-842)
 - h. fragments from the rear floor of the limousine (Q14, CE-840)
 2. Guinn soon decided that three of his samples were not suitable for NAA. The vial supposedly containing the windshield scrapings was empty, the curbing sample consisted only of a smear, and one of the front seat fragments (CE-569), consisted only of the copper jacketing, with no lead present. None of these three samples consisted of the requisite 50 milligrams of lead necessary for NAA.

3. The remaining samples were washed with acetone and deionized water and placed in polyethylene vials, which were then inserted into a nuclear reactor.
4. Inside the reactor, the samples were bombarded with neutrons, some of which were captured by the nuclei of the various kinds of atoms present in the samples, making these atoms radioactive.
5. These radioactive atoms then began to decay at a specific rate or half-life.
6. In decaying, their nuclei gave off radiation--beta particles and gamma rays.
7. It was the gamma rays which Guinn used in making his analysis. A sensitive germanium lithium-drift semiconductor gamma ray detector was used. Gamma rays emitted from each kind of nuclei present have energies specific for that atom and thus showed up at the same point or "channel" on the analyzer. A "spike" at a discrete point on the "channel" the atomic source or element, while the height of the "spike" indicated the quantity of the element present in the sample.
8. A mathematical formula allowed the quantity of each radioactive element to be expressed in parts per million (ppm) found in the sample.
9. The theory behind neutron activation analysis is that irradiation and decay produce qualitative and quantitative data on all elements present in a given specimen. In the case of bullets and bullet fragments, NAA claims to be able to identify the various elements present in the bullet lead and the amounts of each element present
10. Various "trace elements" in addition to lead are found in "bullet lead," the core portion of bullets. These elements may be present as a result of contamination or may be added in order to change the nature of the bullet.
11. Dr. Guinn's instruments detected and measured the amounts of 8 elements present in bullet lead--antimony, silver, copper, magnesium, chlorine, sodium, manganese, and aluminum.
12. Dr. Guinn stated on several occasions (both in his paper and in his testimony) that antimony was the most important trace element in comparing bullet samples through NAA, with silver of just less significance. Copper was also usually present, but often as jacket contamination which had found its way into the core sample. The other five elements were found to be present from time to time as a result of contamination of the sample.
13. Thus, the first of two overriding hypotheses on which the principle of neutron activation analysis of bullet lead depends is that it possible to accurately measure the amounts of antimony, silver, and copper in a given sample of bullet material.

14. The second hypothesis is that bullets of different calibers, from different manufacturers, from different manufacturing lots, and from different individual bullets within a given lot or box have distinctive and unique amounts of antimony, silver and copper.
15. The first hypothesis, if correct, would allow the creation of a body of data. The second hypothesis, if correct, would allow scientific interpretation of the meaning of the data. Together, they would, in theory, allow the grouping or the separation of bullet fragments as to origin. At a crime scene, recovered bullet fragments could be accurately attributed to or separated from one another. Fragment A could be said to have come from the same bullet as Fragment B, or all the fragments present could be said to have come from the same box of ammunition. The combining of these two hypotheses gave NAA its potential value as a forensic tool.

NEUTRON ACTIVATION ANALYSIS OF OTHER AMMUNITION

1. In actual practice, NAA proved far less than a perfect forensic tool. Gamma rays could be counted accurately using the increasingly-sophisticated equipment. However, the pattern of trace elements present in various bullet leads proved not to be distinctive for individual brands, lots or bullets.
2. In 1968, Dr. Guinn and H. R. Lukens presented a paper, "Comparison of Bullet Lead Specimens by Nondestructive Neutron Activation Analysis," before the American Academy of Forensic Sciences in Chicago. The paper offers insights into the state of NAA at the time.
3. Guinn and Lukens reported "Progress has been made toward the establishment of probabilities that, within the bounds of analytical precision, (1) bullets of common origin will have the same composition, and (2) bullets of different origins will have different composition." (Guinn and Lukens, Journal of Forensic Sciences, Vol 16, No. 3, p. 30)
4. Antimony had been pinpointed as the most significant trace element in bullet lead, and the authors reported the antimony content of 36 different types of bullets from a variety of manufacturers, ranging from 0.22 caliber to 0.45 caliber. As many as 20 bullets from a given box of rifle ammunition were analyzed for antimony content, and several 0.38 caliber bullets of various makes had been fragmented into from 10-12 pieces per bullet, with antimony measurements made of each of the fragments from different portions of the same bullet. (See Appendix B)
5. In their research, Guinn and Lukens identified a persistent problem for NAA: many types of bullets had overlapping antimony values. A Peters 0.22 and a Remington 0.22 contained virtually the same amount of antimony as a trace element. In some cases, the other trace elements, such as copper and silver, could be used to help distinguish between bullets whose antimony content were overlapping, but in many other cases, this was not possible. Guinn and Lukens wrote in the conclusion to their article:

"Thus while it can be said with confidence that bullets with different antimony concentrations have different origins, the present data indicate that there is a 28% chance that whole bullets with the same antimony level may have a different origin...." (Journal of Forensic Sciences, Vol 16, No. 3, p. 306)

6. In 1970, Dr. Guinn published on NAA again, this time with Lukens, H. L. Schlesinger and R. P. Hackleman in "Forensic Neutron Activation Analysis of Bullet-Lead Specimen," for the Atomic Energy Commission.
7. By now, 230 samples of bullet leads from 75 different lots of bullets had been examined. Three elements now been identified as having the greatest diagnostic significance--antimony, copper, and arsenic, in order of their analytical value.
8. But the problem of overlapping was still there. Antimony concentrations for many types of bullet lead fell within a range of 0.7-0.8% of the sample, and the copper and arsenic concentrations tended (a) overlap in the same manner as antimony and (b) to have large standard deviations.
9. In the end, Guinn and his colleagues conceded that "less than half of the 75 lots of bullets were uniquely characterized by the concentrations of Sb (antimony), Cu (copper) and As (arsenic)....As a result of the foregoing it can be said that a significant difference in concentration of any one of the three elements between two bullet specimens indicates that they came from different lots, but that matching concentrations of all three elements does not indicate that two bullets came from the same lot." The chemists concluded by recommending that manufacturers might add a "unique combination trace element tag" to each lot of bullets, in order to assist with NAA.

NEUTRON ACTIVATION ANALYSIS OF MANNLICHER-CARCANO AMMUNITION

1. In 1972, Dr. Guinn first turned his attention to Mannlicher-Carcano ammunition manufactured by the Western Cartridge Company, the type supposedly used in the assassination of President Kennedy.
2. Dr. John Nichols of Kansas University contacted Guinn and offered him bullets from each of 4 production lots made by WCC in 1954. Subsequently, Nichols sent Guinn a total of 14 WCC bullets, 2 from one production lot and 4 each from three other production lots. [There are no indications in either Guinn's testimony before HSCA or his technical writings that he ever examined any WCC Mannlicher ammunition other than these 14 bullets from Nichols.]
3. During 1973, 1974 and 1975, Guinn did NAA on the materials sent him. At the time he performed his tests for HSCA, Guinn had not published any findings concerning his work. [Guinn submitted a paper at the time of his testimony in September,

1978, dated "September, 1978," and he and Nichols published "Neutron Activation Analysis of Bullet-Lead Specimens: The President Kennedy Assassination" in Number 28 of Transactions of the American Nuclear Society, also dated 1978.]

4. Guinn told the committee that he had found WCC Mannlicher bullets to be unique in certain respects:

- a. WCC Mannlicher bullets had very low antimony contents.

Guinn explained that antimony is sometimes deliberately added to bullet-lead in order to "harden" it. "Hardened" bullets often contain from 0.4% to as much as 5% antimony. A 0.4% addition of antimony in the hardening process would yield parts-per-million concentrations of antimony in the range of 4000. Guinn reported that "virgin lead" could be used to produce a bullet with very low antimony content--within ranges he placed at only 10-20 ppm. (HSCA, Vol. I, p. 544). Guinn stated that although WCC Mannlicher rounds were not produced of virgin lead, they were very low in antimony content: "They are definitely unhardened bullets." (HSCA, I, p. 494)

- b. WCC Mannlicher bullets showed "tremendous" antimony and other trace element variations from one lot to the other and also between bullets taken from the same box. Unlike the earlier problem encountered--overlapping trace element values for various makes of bullets, Mannlicher-Carcano bullets returned values "all over the place" :

GUINN. The other unusual feature of the WCC Mannlicher Carcano is that there seems to be no uniformity within a production lot. That is, even when we would take a box of cartridges all from a given production lot, take 1 cartridge out and then another and then another and then another, all out of the same box--boxes of 20, these were--and analyze them, they all in general look different, and widely different, particularly in their antimony content.... This is not true of most bullet leads that we have ever looked at before, which are very uniform. In general, if you take most boxes of ammunition--and we published on this; it is in the literature--take a bunch of them out, you can't tell one from the other. They all look like little carbon copies even to activation analysis, but not so with the Mannlicher-Carcano." (HSCA, I, pp. 494-495)

Guinn offered an explanation for this phenomenon in his report to HSCA. While some bullet-leads are deliberately hardened with antimony and other, virgin leads are kept free of any antimony except small amounts of accidental contaminants, other bullet-leads, including those from WCC, are made from lead which has been recycled from other bullets. This

"used lead" may be a complex mixture of bullet-leads which were hardened and of bullet leads which were virgin (and of even previously recycled leads). As a result, the antimony content could vary --in Guinn's word-- "tremendously"--in any portion of the recycled bullet lead, from lot to lot and from bullet to bullet within a lot.

- c. Within individual WCC Mannlicher bullets, there was homogeneity of bullet-lead trace elements.

In contrast to the "tremendous" variations found bullet to bullet, "...you simply do not find a wide variation in composition within individual WCC Mannlicher-Carcano bullets..." (HSCA, I, p. 505), In the paper he submitted, Guinn wrote "Results of UCI [University of California Irvine] background studies of WC bullet lead indicates a wide range of Sb values, from bullet to bullet, but reasonable homogeneity within an individual bullet." (HSCA, I, p. 546)

This becomes the key point of the entire issue of NAA. It is this claim which allowed Guinn to make the matches of bullets and fragments in the Kennedy case. It was this claimed characteristic of WCC Mannlicher ammunition which brought Guinn to Washington to testify and which gave his testimony its meaning. [Much more on the issue of homogeneity within Mannlicher bullets in a later section.]

GUINN'S TESTIMONY AND THE KENNEDY MATERIALS

1. On September 8, 1978, Dr. Guinn told HSCA his tests showed that only 2 bullets struck Governor Connally and President Kennedy. "There is not evidence for three bullets, for four bullets or anything more than two, but there is clear evidence that there were two. (HSCA, I, p. 504)
2. Guinn found that the two fragments removed from Kennedy's brain and fragments from the interior of the limousine were parts of the same bullet. He based this conclusion on the claimed homogeneity of their antimony content--621 ppm for the brain fragments and 638 ppm, 647 ppm, and 602 ppm for the pieces of metal from the car. (HSCA, I, p. 538)
3. Alleged homogeneity of antimony content was also the basis of Guinn's statement that the fragments removed from Governor Connally's wrist matched drillings taken from the lead core of CE 399, the famous bullet allegedly found in a stretcher at Parkland Hospital. The three wrist fragments contained 797 ppm of antimony, while the stretcher bullet showed 833 ppm.
4. Thus, the evidence Dr. Guinn presented to the committee reinforced the previously findings of the Warren Commission and provided a "scientific" basis for the later findings of the House Select Committee on Assassinations:
 - a. The finding that only two bullets struck the car and its occupants is consistent with both the earlier Warren Commission conclusions and the later HSCA report.

- b. The finding that all bullet leads involved were of WCC Mannlicher-Carcano manufacture tied the fragments to evidence on the sixth floor of the Texas School Book Depository.
- c. The finding that fragments from Connally's wrists were from the stretcher bullet made the single-bullet theory scientifically possible and elevated the stretcher bullet, once called the "bastard bullet," to the status of key and legitimate evidence.
- d. Dr. Cyril Wecht had testified before the committee earlier in the same afternoon as Guinn. Wecht had raised many objections to the single-bullet theory, one being that the bullet involved would have to have been more deformed. Counsel Wolf asked Guinn about Wecht's belief.

WOLF. Dr. Guinn, on the basis of your scientific analysis, do you believe Dr. Wecht to have been correct?

GUINN. Well, I think that is his opinion, but like many opinions and many theories, sometimes they don't agree with the facts. (HSCA, I, p. 505)

5. Dr. Guinn had apparently brought the committee "the facts"

THE CRUCIAL QUESTION OF HOMOGENEITY

1. But what is the evidentiary basis for Dr. Guinn's "facts"? He clearly based his entire neutron activation analysis in this case on the proposition that Western Cartridge Company Mannlicher-Carcano ammunition varied greatly from bullet to bullet but showed homogeneity within a given Mannlicher bullet. This turns out to be contradicted by the results of Dr. Guinn's own tests.
2. As Mr. Wolf prepared Dr. Guinn for the coup de gras by having him state his finding that it was "highly probable" that the fragments found in Connally's wrist came from CE 399, Dr. Guinn made these remarks:

"One can only show what information we have, and that is that you simply do not find a wide variation in composition within individual WCC Mannlicher-Carcano bullets, but you do find wide composition differences from bullet to bullet, for this kind of bullet lead." (HSCA, I, p. 505. Emphasis added.)
3. But a study of "what information we have" shows (a) that Dr. Guinn had very little information on which to base any conclusion about intra-bullet homogeneity, (b) that tests performed in his own laboratory revealed great variations, some of over 100% in the antimony content of test fragments taken from the Mannlicher bullet, bringing into question the data on which Dr. Guinn based all his important findings given to HSCA; and (c) that **Dr. Guinn had given a quite different interpretation of homogeneity within individual Mannlicher bullets in a paper he had recently written.**

4. During the years 1973-75, Dr. Guinn performed tests on bullet samples from the 4 production lots of Western Cartridge Company Mannlicher bullets made available to him by Dr. Nichols. In addition to testing bullets from different lots, Guinn, on one occasion took one bullet each from lots 6001, 6002 and 6003, then broke each of the chosen bullets into 4 fragments. NAA tests for composition of antimony, silver, and copper were then run on the bullet fragments.
5. The results are printed on page 549 of Volume I of the HSCA Hearings and they are astonishing, especially in the light of Dr. Guinn's subsequent statement that "you simply do not find a wide variation in composition within individual WCC Mannlicher-Carcano bullets."
 - a. The 4 fragments from one bullet from lot #6002 showed the following antimony composition:
358 ppm, 983 ppm, 869 ppm, and 882 ppm
This represents a variation of 625 parts-per-million between two of the fragments.
 - b. The 4 fragments from one bullet from lot #6003 showed the following antimony composition:
667 ppm, 395 ppm, 363 ppm, 441 ppm
This represents a variation of 304 parts-per-million between two of the fragments.
 - c. The 4 fragments from one bullet from lot #6001 showed the following antimony composition:
1139 ppm, 1062 ppm, 1235 ppm, and 1156 ppm
This represents a variation of 173 parts-per-million between two of the fragments.
6. **It appears that on the day Dr. Guinn told HSCA that "you simply do not find a wide variation in composition within individual WCC Mannlicher-Carcano bullets," the entire data base on which he based this statement consisted of three broken WCC Mannlicher bullets, one of which showed an intra-bullet variation of 175%, one of which showed an intra-bullet variation of 84%, and a third which showed an intra-bullet variation of 16%. [See Appendix B for Guinn's test charts, as well as a comparison of intra-bullet variations with lot variations in his tests.]**
It is reasonable to assume that if Dr. Guinn had performed other tests of fragments from single Mannlicher bullets and they had shown greater homogeneity, he would have included them in his test results.. Further, the fact that he worked with only 14 bullets limited the number he had available for fragmenting and testing.
7. It is shocking to learn that the basis for Dr. Guinn's authoritative statements about homogeneity rests on such narrow and contradictory testing. **What significance can be given to the presence of ANY given amount of antimony in ANY Mannlicher samples from WCC--whether from Connally's wrist, a hospital stretcher, or Guinn's reactor-- when it is realized that another piece of the same lead core, located a millimeter or a centimeter away along the length of the bullet, may vary in its antimony content by as much as 600 ppm, may have half as much or twice as much antimony?**

8. What Dr. Guinn really found is that Mannlicher-Carcano bullets cannot be differentiated by NAA. The answer may well lie in the process of their manufacture. The use of recycled lead brings together a potentially-very heterogeneous collection of bullet-lead. This is shown in the wide variations which Guinn obtained between bullets from different lots and bullets from within the same box. What would be the basis for expecting that unmeasured, heterogeneous, recycled lead could come together homogeneously in a given bullet? If the bullet lead went into the manufacturing process in a heterogeneous form, by what manufacturing step would it be made homogeneous? (Recall that NAA on non-Mannlicher ammunition had yielded homogeneity throughout the analytical process--within bullet makes, within boxes of bullets, and within individual bullets.

9. Furthermore, there is compelling evidence that Doctor Guinn held the opinion that fragments from an individual Mannlicher bullet were, in fact, **HETEROGENEOUS** in antimony content instead of homogeneous, as his conclusions required. On the same day that he told Wolf, the HSCA, and the world that "...you simply do not find a wide variation in composition within individual WCC Mannlicher-Carcano bullets", Dr. Guinn submitted a paper said to support that conclusion. In his bibliography he included an article he had co-authored ("Neutron Activation Analysis of Bullet-Lead Specimens: The President Kennedy Assassination," **TRANSACTIONS OF THE AMERICAN NUCLEAR SOCIETY**, 28 (1978), PP. 92-93. In that article, the same man who told HSCA that variations are not found in WCC Mannlicher bullets wrote, "In the U. C. Irvine INAA [Instrumental Neutron Activation Analysis] background studies of the Mannlicher-Carcano ammunition, it was found that this bullet lead is remarkably **HETEROGENEOUS...SOMEWHAT WITHIN A GIVEN BULLET....** (Emphasis added).

10. It is difficult to find a more shocking statement. Homogeneity within a bullet is the key to his entire interpretation. He swore that there are not wide variations "within individual Mannlicher-Carcano bullets", but he had recently written that there was heterogeneity--not homogeneity--"within a given bullet." When I first discovered this statement, I was overwhelmed by the misuse and perversion of science it implied. Conclusions are inescapable:
 - A. Tests in Guinn's own lab indicated that fragments from WCC Mannlicher bullets showed more intra-bullet heterogeneity than homogeneity.
 - B. Nonetheless, Guinn testified that one did not find heterogeneity within individual bullets.
 - C. Guinn was well aware that his tests indicated heterogeneity instead of the publicly-stated homogeneity.

11. And there is more. In the same article in Transactions of the American Nuclear Society, Guinn quoted results from the FBI's 1964 NAA tests, tests which he insists actually were conclusive, not inconclusive as the FBI reported. [In his HSCA testimony, Guinn told Congressman Fithian that the FBI's scientists had the correct test results back in 1964, but had

not made the proper interpretations.] Referring to the FBI tests, Guinn writes "...the 17 values obtained for various portions of the 'Connally stretcher' bullet averaged 837-ppm Sb [antimony], but ranged all the way from 636 to 1125 ppm."

a. Amazing. So much for homogeneity within a given bullet. Guinn took one 10.7 mg sample from CE 399, the "stretcher bullet," and found it contained 833 ppm of antimony. This led him to match it with CE 842, the alleged Connally wrist fragments, which contained 797 ppm. That match is the scientific underpinning for the single bullet theory.

b. But Guinn knew the FBI had taken numerous portions, from this same bullet and had found no homogeneity among the portions! He had their data before him. Guinn's finding of 833 ppm in a given piece of CE 399 has no meaning because, according to the FBI tests (which Guinn thinks gave accurate data), an adjoining piece of the same bullet had anywhere from 636 ppm to 1125 ppm! Guinn was forewarned of the obvious heterogeneity in CE 399, a heterogeneity he never found because he never took multiple samples.

c. Consider for a moment the ranges the FBI did find in CE 399. A glance at Guinn's charts shows that the piece of CE 399 which had 636 ppm would have most closely matched the fragments alleged to be from the floor of the limousine--not the Connally wrist fragments, while the piece which had 1125 ppm would not fall within 300 ppm of the Connally wrist fragment or any of the other fragments said to be associated with the car or its occupants. The FBI got a lot of things wrong in the Kennedy investigation, but the Bureau was right on target when it called its NAA tests "inconclusive."

THE WCC PRODUCTION LOTS

1. Dr. Guinn felt he could make his assertions about the nature of Mannlicher bullets with certainty because he believed he had examined bullets from every production lot manufactured by Western Cartridge Company.

WOLF. Did you examine bullets from every lot produced by the Western Cartridge Company?

GUINN. Yes. The Western Cartridge Company reportedly made 1 million rounds of each of 4 production runs, lots 6,000, 6,001, 6,002, and 6,003. They were made at different times in 1954, and reportedly those were the only lots they ever produced, and we had boxes from each of those lots.

(HSCA, I, p. 494)

2. But Guinn was again in error. His assumptions were false. Western Cartridge Company had produced ammunition for the 6.5 Mannlicher-Carcano before 1954 and this ammunition had found its way into the mainstream of sellers and distributors. This had been told to the Warren Commission fourteen years before Guinn testified:

"On March 23, 1964, Mr. R. W. Botts (District Manager, Winchester-Western) advised the Western Cartridge Company...manufactured a quantity of 6.5 M/M Mannlicher-Carcano ammunition for the Italian government during World War II. At the end of the war, the Italian Carcano rifle, and no telling how

much of this type of ammunition was sold to the United States gun brokers and dealers and subsequently was distributed by direct sales to wholesalers, retailers, and individual purchasers."

(WC Exhibit 2694, Vol XXVI, p. 62)

3. The purpose of Mr. Wolf's question and Dr. Guinn's answer was clearly to establish the comprehensiveness of the work at Guinn's laboratory and to insure that no kind of 6.5 Mannlicher ammunition had evaded his testing. Once again, Dr. Guinn's answer is at variance with known facts.

CONCLUSIONS

1. It is troubling that that both Mr. Blakey and Dr. Guinn misrepresented Dr. Guinn's previous relationship to inquiry into the assassination of President Kennedy.
2. It is troubling that Dr. Guinn made blanket statements about the characteristics of WCC Mannlicher-Carcano ammunition while unaware of the existence of Mannlicher-Carcano ammunition from production lots he had never tested.
3. But these facts should not detract from two other points which go the heart of the findings of the House Select Committee on Assassinations;
 - a. By his own admission, Dr. Guinn did not examine ANY of the same fragments the FBI had tested earlier, even though the fragments he received for testing bore the same exhibit numbers as those analyzed in 1964, and even though the type of testing done by the FBI would not have destroyed any parts of those fragments. HSCA's explanation for the failure of the samples to match in weight or count is both unsatisfactory and contradicted by Dr. Guinn himself. The purpose of individual exhibit numbers is to lend specificity to the sample. "CE 842" or "CE 567" or any of the other numbers refer to a single entity-- or at least they are supposed to do so. In this case, they do NOT, thus throwing into serious question the source and nature of the materials provided Dr. Guinn.
 - b. But from an evidentiary point of view, it wouldn't have mattered which fragments were given to Guinn. The tests he performed, no matter what materials were used, were meaningless. Guinn presented no evidence to support his claim that WCC Mannlicher ammunition could be identified and differentiated by neutron activation analysis; in fact, his own tests and his own earlier interpretation of those tests indicated the opposite. **MANY WILL FIND IT SHOCKING THAT KEY FINDINGS IN A 2-YEAR GOVERNMENT INVESTIGATION INTO THE ASSASSINATION WERE BASED ON CONTRADICTORY DATA FROM THREE FRAGMENTED BULLETS.**

The Testimony of Dr. Guinn:
Some Troubling Questions
APPENDIX A

- Using Dr. Guinn's figures from his own laboratory tests, let us try to group Mannlicher-Carcano bullet fragments.
- We will use 5 actual fragments from 2 bullets--2 from bullet 6002 [circles] and 3 from bullet 6003 [squares]. Top figure for each bullet is antimony content, bottom figure is silver content.

A	B	C
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> $\frac{363}{8.3}$ <p>6003A2</p> </div> <div style="text-align: center;"> $\frac{358}{9.1}$ <p>6002A</p> </div> </div>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> $\frac{983}{10.3}$ <p>6002A1</p> </div> <div style="text-align: center;"> $\frac{358}{9.1}$ <p>6002A</p> </div> </div>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> $\frac{983}{10.3}$ <p>6002A1</p> </div> <div style="text-align: center;"> $\frac{395}{9.6}$ <p>6003A1</p> </div> </div> <div style="margin-top: 20px;"> $\frac{667}{15.9}$ <p>6003A</p> </div>

- In Situation A, would Guinn not have made the interpretation that these were two fragments from the same bullet? THEY ARE ACTUALLY TWO FRAGMENTS FROM TWO DIFFERENT BULLETS.
- In Situation B, would Guinn not have made the interpretation that he had found 2 fragments from two different bullets? IN FACT, BOTH FRAGMENTS ARE FROM ONE BULLET.
- In Situation C, how many bullets probably produced the 3 fragments? Guinn's findings would probably have pointed to 3 separate bullets. IN FACT, THE THREE FRAGMENTS ARE FROM TWO BULLETS. [Ironically, if Guinn chose to go to his second most important element, silver, in this analysis, this would have led him to link the two fragments which had silver contents of 9.6 and 10.3--the wrong combination!]

APPENDIX B
Results of NAA Testing on Various Bullet Leads

TABLE II

Uniformity of Antimony Concentration Among Bullets Taken from Single Boxes

Caliber	Bullet Make	No. of Bullets Sampled from Box	Antimony Concentration	
			Avg. %w	Std. Deviation, %w
0.38	Remington	10	0.85	± 0.02
0.38	Western	10	2.59	± 0.10
0.22	Lapua	50	1.22 (a)	± 0.04
0.22	Sears	20	1.26 (a)	± 0.03
0.22	Imperial	20	0.99	± 0.04
0.22	Peters	20	0.87	± 0.08
0.22	Remington	20	0.85	± 0.04

(a) Also found: Sn: 1.04% in Lapua, 0.18% in Sears.
 Al: 1.09 ppm in Lapua, 1.25 ppm in Sears.

TABLE III

Sample	Norma (Wire) Section 1	Norma (Wire) Section 2	Remington (Bullet)	Western (Bullet)
1 (outermost)	5140	5346	1142.1	1138
2	5721	5438	1060.0	1200
3	5363	5573	1140.8	1195
4	5235	5591	1085.5	1195
5	5500	5651	1155.1	1186
6	5359	5401	1162.1	1165
7	5545	5522	1162.1	1105
8	5681 (center)	5288	1108.4	1150
9		5700	1103.6	1195
10		5332	1130.1	1163 (center)
11		5650	1078.5	
12		5517 (center)	1124.2 (center)	
Avg.	5450	5505	1123.2	1177.1
σ, % of value	± 3.85	± 2.50	± 2.85	± 1.98

TABLE II Note the large numbers of bullets sampled from each box, as opposed to the 2-4 sampled by Guinn in his Mannlicher-Carcano tests. Note also the homogeneity of the antimony concentrations, as indicated by the low standard deviations, even when sample weight and not ppm is used in averaging.

TABLE III As many as twelve samples were taken from the cores of several bullets and bullet wires in these 1968 tests. Note that 12 fragments from a 0.38 caliber Western bullet varied only 62 ppm in antimony content. Other 0.38's showed similar figures. This is true homogeneity within a given bullet. Compare with Guinn's figures for "homogeneity" in Mannlicher bullets in Appendix C.

[from "Comparison of Bullet Lead Specimens by Nondestructive Neutron Activation Analysis," Journal of Forensic Sciences, Vol 16, No. 3, pp. 304-305]

APPENDIX C
Dr. Guinn's Figures from Testing WCC Mannlicher Bullets

TABLE II-A

THE TRACE-ELEMENT COMPOSITION OF MANNLICHER-CARCAWO 6.5 mm BULLET
 LEADS FROM LOTS 6000, 6001, 6002, AND 6003
 (INAA results obtained by V.P. Guinn during 1973-1975)

Lot No.	Bullet Sample No.	Wt. (mg)	ppm Element Found, and Standard Deviation in ppm*			
			Silver	Antimony	Copper	Sodium
6000	A	51.2	11.8±0.4	173±3	372±6	13±1
	B	49.6	13.3±0.5	261±3	167±4	15±1
6001	A	47.8	12.2±0.6	158±3	(2766±16)**	13±1
	B	57.9	15.3±0.5	732±5	23±2	13±1
	C	58.5	8.5±0.4	1218±7	48±2	15±1
	D	47.2	11.6±0.4	161±3	147±4	17±1
6002	A	51.8	9.1±0.4	385±4	30±2	12±1
	B	52.8	9.7±0.4	949±6	25±2	12±1
	C	55.3	6.0±0.3	24±1	120±3	15±1
	D	51.3	8.3±0.6	131±2	(4516±21)**	13±1
6003	A	54.3	15.9±0.5	730±5	21±2	12±1
	B	44.6	7.9±0.4	80±2	52±2	20±2
	C	44.7	8.8±0.4	464±5	16±2	17±1
	D	44.0	8.7±0.4	240±3	17±2	15±1

TABLE II-C

HOMOGENEITY MEASUREMENTS ON FOUR SPECIMENS FROM EACH OF THREE INDIVIDUAL MANNLICHER-CARCAWO BULLETS (MADE BY V.P. GUINN, PNEUMATIC-TUBE CONDITIONS)

Production Lot	Specimen	ppm Element Found +		One Standard Deviation*
		Antimony	Silver	
6001	6001C	1139±60	8.5±0.4	67±11
	6001C1	1062±60	9.5±0.4	(391±17)**
	6001C2	1235±93	10.1±0.6	20±7
	6001C3	1156±90	9.2±0.5	23±10
	mean:	1148±71	9.3±0.7	37±26
6002	6002A	358±47	9.1±0.4	45±11
	6002A1	983±51	10.3±0.3	34±5
	6002A2	869±47	9.9±0.3	58±6
	6002A3	882±81	10.2±0.5	30±8
	mean:	773±281	9.9±0.5	42±13
6003	6003A	667±58	15.9±0.5	17±10
	6003A1	395±54	9.6±0.4	28±6
	6003A2	163±39	8.3±0.3	(257±12)**
	6003A3	441±51	9.8±0.4	16±5
	mean:	466±137	10.9±3.4	24±7

TABLE II-A These are Dr. Guinn's figures showing variations of antimony, silver, and copper content of individual WCC Mannlicher bullets from the 4 lots he tested. He rightly called the results evidence that Mannlicher ammunition had no homogeneity from lot to lot or bullet to bullet.

TABLE II-C The results of Dr. Guinn's tests on 4 fragments from each of 3 individual WCC Mannlicher bullets. He cited these as evidence of intra-bullet homogeneity. Note huge variations in antimony content, especially in bullets #6002 and #6003. Note also large variances in silver and copper content. Compare these with Table III in Appendix B. It appears that Dr. Guinn based his key conclusion about homogeneity on the fragments of these three bullets.

Comparison of Tables II-A and C (1) Selected fragments from each of the 3 bullets tested varied from one another more in their antimony content (Table C) than did the 2 whole bullets tested from Lot #6000 (Table A); (2) Selected fragments from bullet #6002 varied from one another more in their antimony content (Table C) than did 3 of 4 whole bullets tested from Lot #6001 (Table A); (3) Selected fragments from bullet #6002 varied from one another more in their antimony content than did 2 of 4 whole bullets tested from Lot #6002 (Table A); (4) Selected fragments from bullets #6002 and #6003 varied from one another more in their antimony content (Table C) than did 3 of 4 whole bullets tested from Lot #6003 (Table A).