

BLAKEY NARRATION: NUMBER, DIRECTION AND TIMING

Monday, September 11, 1978

Mr. Chairman, three days of testimony before the Committee--both first hand and expert in character-- have indicated that a number of crucial issues in the Kennedy assassination turn on questions relating to the shots fired by the assassin or assassins.

How many were fired?

What was the time span between them?

From what direction were they fired?

Put succinctly: resolving the question of the number of those who participated in the assassination itself-- a lone assassin or more than one gunman, that is, a conspiracy--may well hinge on the number of shots fired, the time interval between them, and the direction from which they were fired.

As we have seen, the Warren Commission was persuaded there were at least two shots--more probably three--and they all came from the Texas School Book Depository, which was to the right rear of the presidential limousine. The Commission found the discovery of three spent cartridge cases on the floor of the sixth story of the Book Depository its most persuasive evidence on the question of the number of shots, even though the medical and ballistics evidence

could account for only two shots. Based on expert FBI testimony that the minimum time required to fire the rifle ranged from 2.25 to 2.3 seconds and an analysis of the Zapruder film, it also concluded that the time from the first to the last shot probably ranged from 7.1 to 7.9 seconds.

The best way, of course, to determine the number of shots is to listen to them - either when they occur or subsequently - on a sound recording, if one were to exist. The Warren Commission was alerted to the possibility of such a recording, one that was made by Dallas radio station KBOX and later used as part of a phonograph record produced by Colpix, Inc., "Four Days that Shocked the World." A private citizen who had bought the record informed the Commission on January 8, 1964 about the program and suggested that sounds of shots could be detected in an on-the-scene account of the assassination by Dallas reporter Sam Pate.

The Commission obtained the recording from KBOX, and on June 29 Assistant Counsel Arlen Specter wrote a memo to General Counsel J. Lee Rankin in which he noted, "Several members of the staff listened to the tape and heard two noises which sound like gunshots..."

On June 30, the Commission sent the tape to Dr. Lawrence Kersta of Bell Telephone Laboratories, Murray Hill,

N. J. Dr. Kersta's analyses of the tape, however, were apparently inconclusive. I say "apparently", because attempts by this Committee to find reports of Dr. Kersta's work have been to date unsuccessful.

Another way to try and pin down the number, time sequence and direction of the shots is to take testimony from on-the-scene witnesses. The Warren Commission conducted - or had conducted for it - exhaustive interviews of this character. The recollections of the witnesses, however, were far from consistent. On the number of shots, the range was from two to six, although three was the consensus. The time sequence ranged from 5 to 6 seconds. On their origin, reactions were also mixed. Many witnesses thought they came from the general direction of the Book Depository, but a significant number of others put the firing point at a piece of elevated landscape to the front and right of the limousine that has come to be known as the "grassy knoll". Many witnesses frankly confessed confusion. For example, Abraham Zapruder, who stood on a concrete abutment in front of the grassy knoll and took his widely viewed movie of the assassination, said that he thought it came "from back of me", but that there was "too much reverberation" to tell for sure. In any event, it

seems clear that any serious effort to explain or understand what happened in Dealey Plaza must take into account all of the firsthand evidence on number, time and direction - even when it is apparently in conflict.

On the other hand, some of the testimony relating to the direction of the shots was based on more than a reaction to the bark of a rifle. Howard L. Brennan, for example, said he actually "saw a man fire one shot" from the Depository. James Jarman, who was on the fifth floor of the Depository, also said he heard the sound of the bolt action of a rifle and the cartridge cases dropping to the floor above him.

Nevertheless, many critics have alleged that the Commission, in the ultimate analysis, forced the evidence on the question of number and direction into a mold consistent with the discovery of the three cartridge cases on the sixth floor of the Book Depository. Mark Lane, for example, argues that this was how the single bullet theory came into being. In his Rush to Judgment, Lane writes the Commission " ...salvaged its basic working hypothesis (the lone assassin theory) by concluding that the bullet that struck Governor Connally first struck the President."

Josiah Thompson, in Six Seconds in Dallas, did a statistical analysis of the statements of the witnesses to

the shots. His findings support the Commission on the number of shots, but dispute it on the direction from which they came: 84.4 per cent of them heard three shots, Thompson found, but of those who had an opinion as to direction, 52 per cent thought they came from the grassy knoll, 39 per cent from the direction of the Depository.

Inevitably, of course, the Select Committee has had to attempt to unravel these conflicting views. Fortunately, it has had the aid of modern technology. New scientific methods have been applied to old evidence in some cases; in other cases, it has analyzed important pieces of new evidence that had previously been overlooked. For one example, the Committee devised new tests for the Zapruder film, an original piece of evidence. For another, the Committee asked a consultant to perform advanced computer studies with new evidence, a sound recording of the assassination itself that has been only recently turned up.

The photographic experiments were conducted by the Committee's photographic panel of experts. They involved attempts to analyze camera "jiggle" in an effort to record what well might have been startled reactions to gunshot wounds. The thought was that Zapruder may have reflexively moved his camera when he heard each shot. By measuring the intensity of blurs on given frames, it was hoped that

the timing of the shots could be indirectly pinpointed.

Dr. William Hartmann was in charge of what came to be known as the "jiggle analysis." Dr. Hartmann received a B.S. degree in physics from Pennsylvania University in 1961, an M.S. degree in geology from the University of Arizona in 1965 and a Ph.D. degree in astronomy from the University of Arizona in 1966. He has been assistant professor at the University of Arizona Lunar and Planetary Laboratory, associate and senior scientist at the IIT Research Institute and currently is senior scientist at the Planetary Science Institute of Scientific Applications, Inc.

Dr. Hartmann is a member of the American Astronomical Society and is the co-winner of the 1965-66 Ninninger Meteorite Award. He has written numerous professional articles and has served as associate editor of the Journal of Geophysical Research. He has authored a planetary textbook and co-authored a book on the planet Mars.

Dr. Hartmann served as photo analyst and co-investigator on the Mariner 9 mission to photograph Mars.

It would be appropriate at this time, Mr. Chairman, to call Dr. Hartmann.

In September 1977, the Committee learned of the existence of a Dallas police tape, one that had recorded the sounds of the assassination from the transmitter of a motorcycle policeman who had accidentally left his microphone switch in the "on" position. There was immediate hope that by scientifically enhancing the tape, the sound of the shots could be made audible.

The Committee was told by the Dallas Police Department ^{IT THOUGHT THAT} that all of its assassination evidence had been turned over to the FBI. It did not have a copy of the tape. One was obtained, nevertheless, from Mary Ferrell, a critic who lives in Dallas.

The Committee then set out to find an acoustical consultant to analyze the tape. After consideration of five candidates, the Committee picked the firm of Bolt, Beranek and Newman of Cambridge, Massachusetts. Bolt, Beranek and Newman can count among its many important forensic accomplishments an analysis of the tape-recorded sounds of the Kent State shooting incident in 1970 and discovery ^{+ ANALYSIS} of the 18-minute gap in the Watergate tapes.

BB&N first analyzed the segment of the radio program, "Four Days that Shook the World" that had been believed to have covered the assassination. As it turned out, it was not contemporaneous with the actual shooting of the President.

BL'S STYLE -
NOT TO
CORRECT HIS
VERBAL SLIPS

The Committee then forwarded the tape it had obtained from Mary Ferrell to BB&N, but no audible sounds could be discerned in the analysis.

Meanwhile, Committee investigators working on the case in Dallas were in contact with Paul McCaghren, a retired assistant police chief, who had been assigned to a special Dallas police assassination investigating squad. McCaghren was one of several Dallas police veterans who donated their firsthand knowledge of the city to the Committee. They "read us into their backyard," so to speak, as one of our investigators put it. Their help has been invaluable.

Among the original documents and tapes that McCaghren supplied the Committee was a crucial November 22, 1963 dispatch tape along with the dictabelts that recorded the transmission from the motorcycle with the open mike. These materials were promptly sent to Bolt, Beranek and Newman.

To supplement the analysis of the tape, BB&N experts also went to Dallas last month to conduct an acoustical reenactment based on the live firing of a rifle in Dealey Plaza. In these tests, the DPD was exceptionally cooperative - it obtained weapons, constructed the bullet "traps" and rerouted traffic during the five hours of testing. Police marksman fired rounds from the Book Depository, as well as from the "grassy knoll". The final results of this work

have only recently been received by the Committee. *NEVER THAT'S, THEY HAVE
BUT THOROUGHLY
ANALYZED*

The man in charge of the Bolt, Beranek and Newman acoustical analysis is Dr. James E. Barger, the firm's chief scientist.

Dr. Barger received a B.S. in mechanical engineering from the University of Michigan in 1957, an M.S. in mechanical engineering from the University of Connecticut in 1960, and an A.M. in applied physics from Harvard University in 1962. In 1964 he received a Ph.D. in applied physics from Harvard University. He has been a sonar project officer at the U.S. Navy Underwater Sound Laboratory, a research assistant at Harvard University's Acoustics Research Laboratory, senior scientist and director of the Physical Science Division with Bolt, Beranek and Newman, Inc.

Dr. Barger is the author of numerous scientific papers. He has lectured in the field of applied acoustics in the United States and Canada and currently is a lecturer on sound scattering and reverberations with Bolt, Beranek and Newman's antisubmarine warfare course. He has been a National Science Foundation Fellow and currently is a fellow of the Acoustical Society of America. He is also a member of the U.S. Navy Advisory Board for Underwater Sound Reference Services.

As chief scientist with Bolt, Beranek and Newman,

*ALL
READ*

Dr. Barger personally supervised the analysis of the eighteen minute gap on the Nixon-Watergate tapes and the analysis of gunfire sounds recorded during the *UNFORTUNATE* shooting episode at Kent State University.

Mr. Chairman, it would be appropriate at this time to call Dr. Barger.

The Committee also considered the testimony of witnesses to the assassination. Specifically, it sought to determine the extent to which ear witness accounts as to number and direction could be relied on. For this purpose, the Committee compiled all of the pertinent testimony taken soon after the assassination and had it subjected to psycho-acoustical analysis. In all, the testimony of 178 witnesses, extracted from FBI reports and other Warren Commission documents stored at the National Archives, were studied and statistically charted.

In addition, the team that performed the psycho-acoustical analysis went to Dallas to witness the live firing in Dealey Plaza described earlier. The purpose was to listen to the shots and get an on-the-scene feeling for their possible source and their magnitude.

The chief scientist in the ear witness project is Dr. David Green. Dr. Green is a professor of psychophysics and chairman of the Department of Psychology and Social Relations at Harvard University. He received a B.A. from

the University of Chicago in 1952 and from the University of Michigan he received a B.A. in 1954, an M.A. in 1955 and a Ph.D. in 1958. He has been a professor of psychology at the University of California, an associate professor of psychology at the University of Pennsylvania and an assistant professor of psychology at the Massachusetts Institute of Technology.

Dr. Green is the author of numerous scientific publications and he serves on the editorial boards of several scientific journals. He is a fellow of the American Psychological Association and the Acoustical Society of America.

Dr. Green is the chairman of the National Research Council Committee on Hearing, Bioacoustics and Biomechanics. He has received the Acoustical Society of America's Biennial Award and a Guggenheim Fellowship. He was an overseas fellow at St. John's College in Cambridge, and in 1978 he was elected to the National Academy of Science.

At this time, Mr. Chairman, it would be appropriate to call Dr. Green.