

THE JFK MURDER

Can new technology

BY JEFFERSON MORLEY

CARL HABER WAS STUCK IN TRAFFIC one morning when he heard a radio report about the fragile state of historic sound recordings at the Library of Congress. Many popular songs and famous speeches from the early 1900s couldn't be played due to damage and decay. Archivists were looking for ways to restore and preserve them.

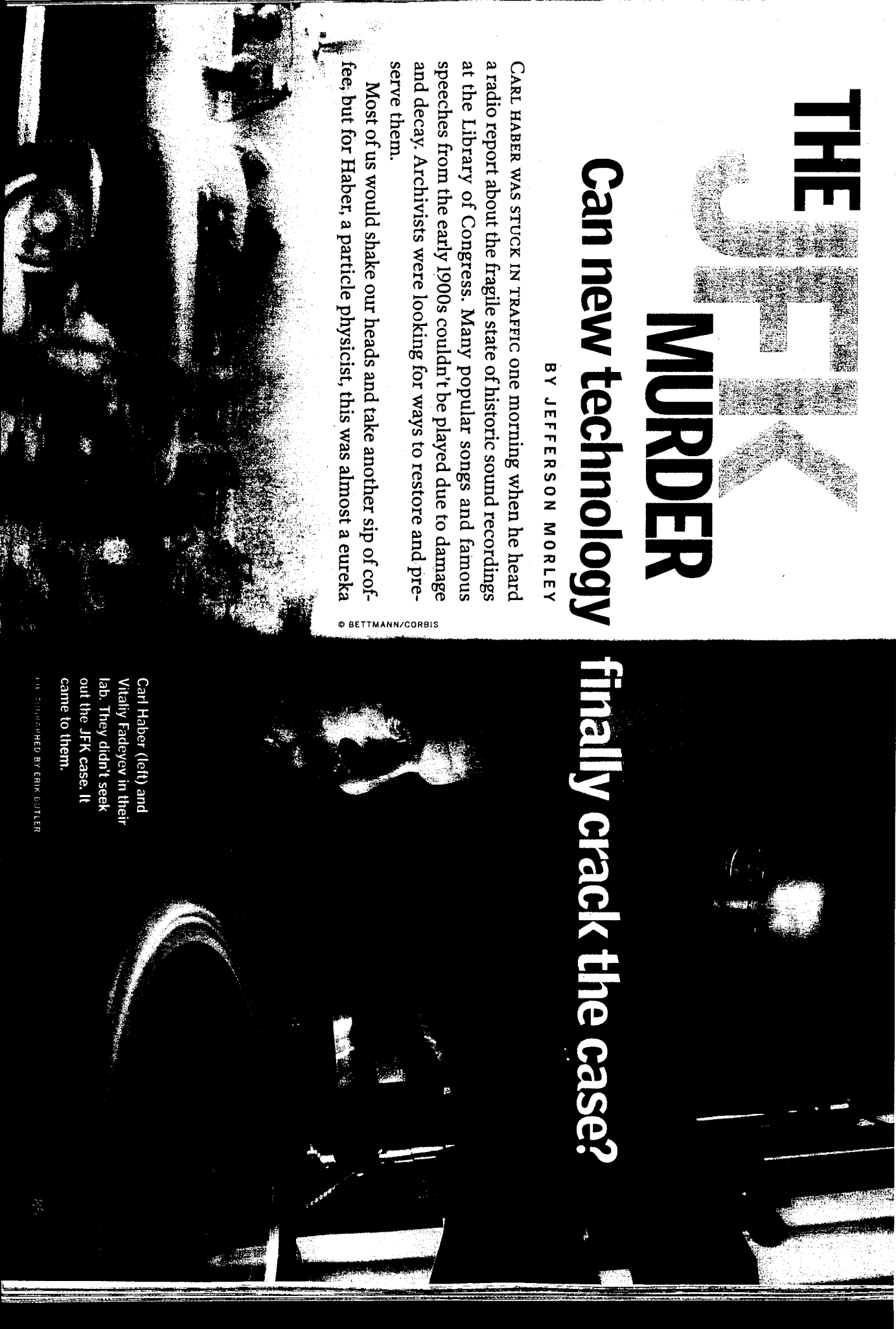
Most of us would shake our heads and take another sip of coffee, but for Haber, a particle physicist, this was almost a eureka

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finally crack the case?

Carl Haber (left) and Vitaliy Fadeyev in their lab. They didn't seek out the JFK case. It came to them.

PHOTOGRAPHED BY ERIC BUTLER



moment: He and Vitaliy Fadeyev, his colleague at the U.S. Department of Energy's Lawrence Berkeley National Laboratory, specialized in making sensors to map the tracks made by subatomic particles unleashed in physics experiments. Could their methods be used to map the microscopic contours of those old sound recordings' grooves?

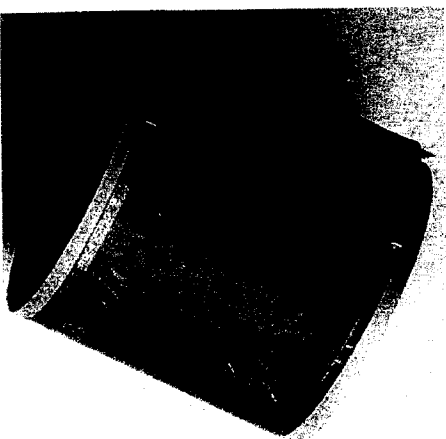
Haber thought so. By converting that analog information into a digital format, he theorized, a virtual copy of the old sound recordings could be created—without playing the originals.

He was right. What he didn't know was that his drive-time brainstorm would end up pulling him and his partner into the heart of the most infamous of American murder mysteries: the assassination of Pres. John F. Kennedy.

IN A NATIONAL ARCHIVES vault in College Park, Maryland, lies a loop of floppy blue plastic known as Dallas Police Department Dictabelt No. 10. It contains sounds of chatter and noise recorded on one of two police radio channels between 12:05 and 12:40 p.m.

Some people said they heard shots

on November 22, 1963. At 12:30 that day, President Kennedy and his wife were riding in an open limousine through downtown Dallas when gunshots rang out. One bullet struck the 46-year-old President in the head, killing him. Purely by accident, the radio microphone of a motorcycle cop riding with Kennedy's motorcade was



Some sound experts say this Dictabelt contains evidence of a JFK conspiracy. New forensic science may help prove it.

stuck in the "on" position. That microphone transmitted the motorcade sounds back to police headquarters, where they were recorded onto plastic rolls known as Dictabelts.

Haber and Fadeyev didn't know about Dictabelt No. 10 when they began attempting new sound preservation techniques. And they have little interest in the specifics of JFK's assassination. "The real story here,"

says Haber, "is that there are technologies around that can be brought to bear on preservation."

But, having successfully developed a method for reproducing old recordings, he and his partner don't entirely dismiss the possibility that their approach could have a benefit for the millions of people still fascinated by the

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JFK case. Their protests aside, it's possible that this new technology could, in effect, transform the 41-year-old Dictabelt into a new piece of evidence—and answer with scientific clarity a haunting question: Just how many shots were fired on that shocking day?

HABER AND FADEYEV launched their mission by paying a visit to a used record store. Armed with a 78-rpm disc of the Weavers' 1950 version of "Goodnight Irene," they scanned the record's grooves with a digital microscope known as a SmartScope. Fadeyev then wrote a software program to simulate the action of a phonograph needle traveling through virtual grooves. In October 2002, the two men ran the virtual recording through that program. When they heard music, it was an emotional moment.

The duo published their findings in a paper that was circulated to, among others, the Library of Congress. Archivists there agreed to loan Haber and Fadeyev a batch of early sound recordings in return for an assessment of how they might be preserved.

coming from the grassy knoll.

The two scientists turned to a device known as a confocal microscope. Unlike the SmartScope, a confocal probe doesn't scan an entire object. Instead, it focuses a beam of light on a very small area, capturing the reflection in a photo detector that, in turn, feeds the measurements into a computer and then assembles a com-

posite from thousands of tiny points.

Haber and Fadeyev decided to try to scan a so-called Edison cylinder, an early recording medium that was little more than a roll of finely engraved celluloid. A scan was made of a 1909 cylinder of the song "Just Before the Battle, Mother." The resulting digital copy eliminated much of the original's crackling and hissing.

Word of the duo's success spread among preservationists. When it reached Leslie Waffan at the National Archives, he thought of Dictabelt No. 10. Worn from countless playings by investigators and cracked due to improper storage, it was now off limits. Could a digital copy be made?

"It's a piece of American history," Waffan says. "It's our job to preserve it and, if possible, to make it accessible to the public." A fresh digital copy, he says, would be available to anyone who wanted to listen to it.

Last June, Waffan had the pair make a presentation to the Archives panel of preservation experts about how they would create such a copy. That panel recommended that they attempt it.

THE KENNEDY ASSASSINATION stunned and confused the country. The President was shot dead in broad daylight. A majority of witnesses said they heard three blasts coming from the Texas School Book Depository, behind the Presidential motorcade. Some people closest to Kennedy's limousine said they also heard gunfire coming

8 Seconds of Controversy

The Warren Commission said three shots were fired at JFK, all by Lee Harvey Oswald, in the book depository. A congressional inquiry found otherwise. A digital version of Dictabelt No. 10 could help resolve the disputed points (depicted below).



Warren Commission

The panel concluded in 1964 that the three shots (1,2,3) came in a period of 4.8 to 7 seconds. One hit JFK's neck. A subsequent one hit his head, killing him. A third probably missed. There was no conclusion about which struck where. *Case Closed* author Gerald Posner theorized that the shots occurred as shown above.

from the so-called grassy knoll, to the right and front of the motorcade. Lee Harvey Oswald, a 24-year-old ex-Marine and one-time detector to Russia, was arrested later that day. Forensic evidence linked him to a rifle found in the book depository and deemed to be the murder weapon. Meanwhile, in Miami, CIA-funded Cuban exiles fed reporters informa-

Congressional Panel

Hired by the House Select Committee on Assassinations, acoustic expert James Barger analyzed Dictabelt No. 10 and in 1979 said four shots (A,B,C,D) were fired as shown above—three from the book depository, one from the grassy knoll. (A 2001 re-examination of Barger's work detected five shots, the fatal one from the knoll.)

tion that Oswald had actively backed Communist leader Fidel Castro. Calling himself "a patsy," Oswald denied being the killer. Two days after his arrest, he was killed in police custody by Jack Ruby, a local nightclub owner with ties to organized crime.

Within days, pollsters found only 29 percent of Americans believed there had only been one gunman. But an in-

vestigatory panel led by Chief Justice Earl Warren concluded just that in September 1964: Oswald—for unknown reasons—had acted alone.

The conspiracy theories persisted. While leading journalists defended the lone-gunner theory, Kennedy's successor, Lyndon Johnson, privately speculated that JFK had been targeted in a Cold War-fueled conspiracy linked to Cuba. Another theory—that the murder was a mob hit—grew out of Ruby's organized crime ties. It didn't fade when he died in 1967, having hinted he never told all he knew.

By 1991, the debate over Oliver Stone's conspiracy-minded film *JFK* prompted the government to declassify a vast trove of assassination-related documents. And though the lone-gunner theory has believers—Gerald Posner's 1993 book *Case Closed* argued for it forcefully—a 2001 Gallup Poll found that just 13 percent of Americans accepted it.

HAT DICTABELT NO. 10 even exists is one of those odd occurrences that make history so compelling. After the assassination, Dallas detectives listened to many of the police Dictabelts from that day without detecting the sound of gunfire. The FBI examined the recordings in early 1964, and came up similarly empty-handed. The recordings sat in a police department file cabinet until 1969, when Officer Paul McCaghen was called in to identify them—and ordered to hide them "in a safe place."

Meanwhile, public skepticism about the lone-gunner theory mounted. Though *Life* magazine had published still images from the so-called Zapruder film within days of the assassination, nagging questions about what really happened bubbled back to the surface of public consciousness when ABC News broadcast the home movie for the first time in March 1975. The footage, taken by businessman Abraham Zapruder, showed Kennedy's head snapping backward as if hit by a gunshot from in front. Congress soon voted to reopen the JFK investigation.

In 1977, Mary Ferrell, a Dallas legal secretary and tireless JFK researcher, told the newly created House Select Committee on Assassinations (HSCA) that she'd heard an audiotape of Dallas police radio traffic around the time Kennedy died. That led the panel to retrieve the Dictabelts in May 1978. By then, the science of acoustic analysis had come a long way. The HSCA's general counsel, ex-federal prosecutor G. Robert Blakey, chose James Barger, a prominent audio scientist, to assess the recordings' value as evidence.

Barger decided to compare the sound impulses on the recordings with the sound of real gunfire. In August 1978, he led a team to Dallas for a series of elaborate ballistics tests. Setting up 36 microphones along the Dealey Plaza motorcade route, he recorded shots fired from the sixth-floor book depository window where Oswald was said to have fired, and from the grassy knoll. Barger compared the resulting sound patterns with the impulses on

Can a digital map of the Dictabelt

the Dictabelt. His findings contrasted with those of the Warren Commission, which ruled that Oswald fired three shots at Kennedy's limousine.

Barger identified at least four sound-wave patterns that he said closely resembled the muzzle blasts of gunshots in his test firing. Three of them closely resembled shots fired from the sixth-floor window. One resembled a shot from the grassy knoll, he said. Two other acoustic experts retained by the HSCA supported Barger's conclusion. The acoustic evidence became the key-stone of the House panel's finding in January 1979 that Kennedy had "probably" been killed by conspirators who, besides Oswald, couldn't be identified.

Other experts disputed the findings. In 1980, the Justice Department turned to the National Research Council, a government think tank. In May 1982, a 12-scientist NRC panel unanimously ruled that Barger's supposed gunshots were something else and "came too late to be attributed to assassination shots." (A Court TV analysis last year found essentially the same thing.)

Dictabelt No. 10 then went back to a file cabinet at the Justice Department. It was subsequently transferred to the National Archives. Then, in early 2001, Donald Thomas, a government scientist interested in the Kennedy assassination, published in a British forensics journal an article based on a mathematical review of all the acoustic evidence. Thomas's conclusion: Five

shots had been fired at Kennedy's motorcade from two different directions.

At issue now: Can a digital map of the Dictabelt add clarity to the debate by decisively confirming or refuting the existence of a second gunman?

Duplicating the original poses major challenges. A Dictabelt groove is 75 microns wide—about as wide as three human hairs—and five microns deep. It's also asymmetric, with a steep wall on one side and a sloping one on the other. The unique shape complicates the job of writing the algorithms needed to describe it for computer simulation. But Haber and Fadeyev are cautiously confident they'll succeed with the Dictabelt as they did with "Goodnight Irene." Their next step: prepare a "proof of concept" paper for the National Archives. If the concept proves valid, the recording will be made available for scanning.

Paul Horowitz, a Harvard physics professor and member of the NRC panel that dismissed Dictabelt No. 10, says such scanning won't add to the assassination debate. Horowitz says he and several colleagues have finished a reply to Thomas's article. He says the as-yet-unpublished paper shows that Thomas and Barger mistook random sounds for gunshots: "Digital playback of the Dictabelt is not going to change that conclusion."

Don Thomas disagrees. He says the timing of the Dictabelt's sound impulses matches the Zapruder film's vi-

prove there was a second gunman?

sual indications of gunfire. He cites a 4.8-second gap on the Dictabelt between what he views as the third and fourth shots. "On the Zapruder film, the gap between the crucial two shots is 4.8 seconds. Would random noises occur with that exact same timing?"

Vitaly Fadeyev says it's possible that a high-quality digital map of Dictabelt No. 10 could clarify a key JFK forensics issue: the "acoustic fingerprints" of the alleged gunshots.

"When the first studies [of Dictabelt No. 10] were done, the waveform analysis was fairly primitive," he says. Now the science of analyzing patterns made by sound waves is "much more so-

phisticated because we have so much more computing power." Researchers, he adds, should have "a much greater ability to confirm or refute whether those sound impulses actually match the acoustic fingerprints of rifle shots, or come from something else."

So, if all goes according to plan, Dictabelt No. 10 will be transported across the country to the Lawrence Berkeley lab later this year. Once there, it will go under the confocal microscope. Within a few months, a digital replica could be produced—a modern version of an old piece of evidence that may shed new light on one of the country's most enduring mysteries.

FAMILY SECRETS

My dear friend, a divorcee, never remarried, and her daughter wanted to know why.

"The men I know will bring too much heavy baggage to the marriage and I simply don't want to put up with it," my friend explained.

Taking her mother's hand in hers, my friend's daughter said sweetly, "I hate to break the news to you, Mom, but you're not exactly carry-on yourself." **JEAN BRADTKE**



After a minor accident, my mother accompanied me to the emergency room. Now, I'm five feet, three inches tall and pleasantly plump—not exactly Brad Pitt. But when the nurse asked for my height and weight, I blurted out, "Five-foot-eight and 125 pounds."

As the nurse paused to check her eyesight, Mom leaned over to me. "Sweetheart," she gently chided, "this isn't the Internet." **BOB MEYERSON**