

Analysis of Film OKs Warren Probe

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Science Writer

Professor Luis Alvarez, the University of California's imaginative, far-ranging physicist, has subjected Abraham Zapruder's famous "home movie" of the Kennedy assassination to an ingenious new analysis and come up with striking new evidence in support of the Warren Report.

The story is told in full for the first time in the current issue of *The Magnet*, published for employees and families of the Lawrence Radiation Laboratory. Parts of it were told on a CBS television review of the assassination controversy.

Prof. Alvarez has found that the Zapruder film itself contains indisputable evidence of the number and timing of the shots fired, presumably by Lee Harvey Oswald, at President Kennedy on November 22, 1963.

ODD STREAKS

The evidence lies in odd streaks, especially noticeable in highlight areas of the movie frames, at certain points of the film. These, Professor Alvarez first guessed, then proved in field tests, were caused by Zapruder's flinching at the instant of each shot.

One consequence of the new analysis is that Prof. Alvarez has shown there was a full seven seconds between the first and the third (and last) shot — a full second and a half more than was concluded by the Warren Report.

Foes of the Warren Report have hung much of their case on the alleged impossibility of firing three shots from Oswald's rifle in 5.6 seconds.

LONGER TIME

They will now have to prove it is impossible to fire three shots from the rifle in seven seconds.

Professor Alvarez first became interested in the controversy over the Warren Report on the day before Thanksgiving in 1966. He listened to graduate students heatedly arguing about the report in the Lawrence Radiation Laboratory cafeteria.

That night he got out an old issue of *Life* magazine containing reproductions of many frames from the Zapruder film (which *Life* bought from Zapruder) and examined them carefully.

SHOCK WAVES

Behind his curiosity were two factors not shared by other observers of the Zapruder frames:

Alvarez is an expert on shock waves. Alvarez is a lifelong amateur photographer with a special interest in suppressing camera move-

ment in hand-held movie photography.

First he saw something which wasn't there: He imagined that an American flag in several of the frames showed evidence of shock wave movement — the shock wave from the Oswald bullets, naturally.

This observation didn't stand up: He decided the flag movements were nothing more than rippling in the wind.

But he didn't stop there. He began looking at the frames — still the same magazine reproductions at which millions of Americans have looked — for other internal evidence.

He began making notes on what he saw. Here are some, taken from *The Magnet*:

STREAKS NOTED

November 28: "Note streaked highlights in frame 227 . . ."

November 29: "227 remains most puzzling picture . . . The extraordinary thing is that neither the men in the right middle or the squares in the background seem to be at all smeared . . ."

Why, he asked himself, were all the moving objects in the frame streaked and all the fixed objects sharp?

His conclusion: Zapruder was, like all good movie photographers, slowly panning his camera as the car occupied by the Kennedys and the Connallys moved by.

Earlier (and later) sequences of the film showed this in just the opposite way of frame 277: The moving objects were sharp, the fixed objects (past which Zapruder was panning his camera) were streaked.

Why, at frame 227, had Zapruder momentarily stopped panning?

'FLINCHED'

Alvarez's hypothesis: He flinched on feeling the shock wave of Oswald's bullet. He momentarily stopped panning, creating the anomalous streaking in that sequence.

Similar frame by frame analysis built up the rest of Prof. Alvarez's case: There are three groups of stop-pan streaking in the Zapruder film — from frame 182, from frame 202, from frame 313.

(The streaking is grouped around these frames: the numbers represent peaks in the streaking only.)

Scientists are not content with ingenious, plausible hypotheses:

Professor Alvarez persuaded a top firm of photo analyst to not only confirm his findings on the film, but also to shoot another sequence, using a hand-held movie camera like Zapruder's, during which rifles were fired at a distance from the photographer.

PROOF REVEALED

In his spite of his being an expert cameraman, in spite of his being prepared for the rifle fire, the test sequence clearly demonstrates the same involuntary reflex reaction to the shots — the camera's smooth panning is interrupted at precisely the point where the photographer perceives the shock wave.

Next Prof. Alvarez, still not satisfied with his case, appealed to a personal friend, Frank Stanton, president of the Columbia Broadcasting Company, to help him clear red-tape toward an examination of the full film, a copy of which is in the National Archive.

The film itself confirmed what Alvarez had concluded

from the magazine reproductions. Q.E.D.

Luis Alvarez has never narrowed his view solely to the field of high-energy particle physics in which he is an internationally known leader.

During World War II he worked on radar systems. Once he brought to safety a pilot lost in the fog off Cape Cod, by radar-spotting the plane in the fog and "talking" the astonished pilot to a nearby landing strip.

This was the first application of Alvarez's Ground Control Approach system of blind landing. Even the word "radar" was then secret.