Report to the ARRB - President John F. Kennedy Assassination

Analysis of Selected Photographic Evidence

Introduction

Background

In 1996, discussions between Kodak and the Assassination Records Review Board (ARRB) identified the need for an assessment of questions regarding some of the photographic evidence of the JFK assassination, including motion picture films, stills and x-rays. Part of the requested study was to include an analysis of film types, edge numbering, and corner markings of the photographic evidence held by the National Archives Records Administration (NARA). Mr. Roland J. Zavada, Eastman Kodak Co. retired[1], was requested to assist in this analysis because of the vintage of the photographic evidence and his background.

In our first meeting with the ARRB, 11 September 1996, Mr. James Milch, Director, Image Science Division, Research Laboratories, and I visited the National Archives, College Park, MD. There we made a very basic preliminary visual evaluation of the film identification markings present on the selected photographic evidence presented to us, including the A. Zapruder movie film and a copy held by the NARA. The results of this evaluation were provided to Mr. Milch in a *Follow-up Report dated 19 December 1996* and submitted to the ARRB with his letter of 7 January 1997 and appended to this report.

Program of Work

The preliminary meeting, and its reports, led the ARRB to develop a list of projects and priorities. A meeting was then held at Eastman Kodak in Rochester, 21 August 1997, to develop a program of work. Part of the program includes definitive analyses by Mr. Zavada in cooperation with the Digital Imaging Resource Laboratory, Eastman Kodak Company. To fulfill the ARRB's identified requirements, these projects are categorized and developed as four *Studies*.

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[1] Brief Bio Appended.

STUDY 1 - *Edge Print Analysis and Supporting Technical Information of the Zapruder "out-of-camera[2]" original movie film and its first generation copies.*

Part 1. *Edge Print Analysis of the Zapruder 8mm "Out-of-Camera" Original 8mm Movie Film* - An analysis of the Zapruder "out-of-camera" original movie film edge print and other identification codes or markings noted on the film.

Part 2. *First Generation Copies of the Zapruder "Out-of-Camera" Original 8mm Movie Film* - An analysis of film edge print of the first-generation printed by JAMIESON film company.

a. Copy identified as Secret Service copy 1 of the Zapruder "out-of-camera" original held by the NARA.
b. Copy identified as Secret Service copy 2 of the Zapruder "out-of-camera" original held by the NARA.

Part 3. *Processing Laboratory Identification on Movie Film* - A study of Kodak's Processing Laboratory edge print and perforated identification "standard practice". To ensure a careful analysis of all code or identification marks, this study expanded into a review and re-analyses of the handling (for processing) of the Zapruder "out-of-camera" original movie film and the copies processed the same day.

STUDY 2 - *Edge Print Analysis and Supporting Technical Information of two 35mm films.*

(Two 35mm prints, derived from the Muchmore and Nix 8mm originals, were provided to the ARRB by Mr. Robert Groden for examination. The examination provided an analysis of film edge print and other codes - to estimate their vintage.)

Part 1. *Edge Markings on the 35mm Films Blow-up of Nix Film* -

Part 2. *Edge Markings on the 35mm Films Blow-up of the Muchmore Film* -

Part 3. *Comments on Motion Picture Optical Printing Technology-*

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[2] "out-of-camera" prefix to "original" is the National Archives file designator for the original double 8mm Kodachrome II movie film taken by Mr. Zapruder. In the glossary of motion picture terms, "original" typically refers to a camera film and therefore may be used interchangeably without the prefix throughout this report.

STUDY 3 - Initial Motion Picture Printing of the Zapruder 8mm Original

In studying the edge print of the two Secret Service copies in *Part 2 of Study 1, Edge Print Analysis and Supporting Technical Information etc.*, certain image characteristics, resulting from printing practices to support footage number and edge number printing, were noted which encouraged further study. A review of the initial contact printing of the Zapruder camera original, including practical tests on a similar machine, was undertaken to gain and document a basic understanding of the printed image characteristics of the Bell & Howell printer believed used by the JAMIESON film company. Further, during the visual examination at NARA, it was noted that Secret Service Copy 1 differed in density from Secret Service Copy 2. This difference mandated study and the development of a hypothesis of the possible cause.

STUDY 4 - The Bell & Howell 414PD 8mm Movie Camera Image Capture Characteristics

In the analysis of the A. Zapruder "out-of-camera" original film, certain image anomalies were noted. In general, these anomalies appear to be primarily related to the scene information being recorded or imaged into the area between the perforations. Because some image anomalies are present, there is great significance attached to this area by various researchers who speculate that the anomalies may represent not the peculiar optics of Zapruder's Bell and Howell camera, but rather, evidence of film alteration. It is important, therefore, to understand how the camera optics record images in this area and why certain anomalies are present - which are part of the objective of this study.

Note: Each of the four Studies is numbered independently.

ACKNOWLEDGMENTS

Eastman Kodak's commendable response to a national need for expert study and image analysis of the President Kennedy assassination photographic evidence provided an opportunity for me to become involved in an interesting and rewarding project. I appreciate the company's expression of confidence by requesting me to assist them in this endeavor. To begin, my thanks to Jim Meyer, CTO, Jim Milch and Jim Toner for their support in providing me the opportunity to review technical history.

A project of the scope and magnitude required for the investigation of selected photographic evidence of the President Kennedy assassination requires input and assistance from a broad range of sources. The need for effective memory and "pack-ratted" bits of information becomes critical in trying to effectively and accurately recall and relate thirty-five year old technology. The support I received from old friends and new colleagues at Eastman Kodak was outstanding. The studies also gave me an opportunity to reach out with a purpose to renew acquaintances from my years in the motion-picture industry. Also, being retired, I have the support of an in-house colleague, my wife, Carol, a retired professional secretary; who typed, edited, modeled, listened, and postponed innumerable home projects to make this report possible.

The mere mention of the names that follow is not representative of the time and support they gave, but is, in writing, my thanks and a handshake of appreciation.

At Eastman Kodak:

The Digital Resource Laboratory, Jim Toner's team: John Birkelund, Tom Brooks, Patti Butcher, Dave Callahan, Ted Cipura, Brian Cox, Donna DeMay, Ted Gindele, Donna Hofstra, Ron Huber, Hank Mellars, Rich Repka, and Dave Schond.

John Donahue, for 8mm film; Steve Champagne, for edge print assistance; Reed O'Connell, emulsion records; John Pytlak, motion picture technology; Norm Reeves, Kodachrome sensitometry and processing; Geof Whittier, Model J Printer evaluation; Dave Fox, studio support; Bill Lane, processing and technical support; Christopher Araujo, Qualex processing; and Tim Mathers, PhotoShop and Photo CD support.

Industry Experts:

Study 1 — Former Dallas Processing Laboratory personnel; Dick Blair, Jack Cook, Phil Chamberlain, Kenny Anderson and Tom Nulty.

Study 2 — Moses Weitzman, optical printing expertise and fascinating insight.

Study 3 — Bruce Jamieson, who was there then and ever helpful now; John Ehrenberg, for his Model J background and engineering drawings; Irwin Young, for his personal printing background and historical records; Bob Colburn, for printing resources; Blain Baker, for historical Model J input; Richard Sidener, for sprocket and manual resources; Ted Wilson, for an alternative septum consideration; Rod Ryan, for equipment expertise; and Herb Farmer, USC, for film clips and a working Model J.

Study 4 The former management of Bell & Howell engineering, for insights about the camera and lens design, test methods and results, and to really know that Zapruder's camera did receive special testing; Dr. Arthur Cox, Malcolm Townsley, Frank Mellberg, Hal Miller, Rudolf Hartmann, and David MacMillin; My brother-in-law Bud Guba, for locating needed old cameras; Mr. James Roemer, CEO of Bell & Howell, and Messers. Duchardt and D'Ambrosio for their support and review of historical records; Todd Gustavson of the George Eastman House for the contingency cameras backup; Alan Kattalle, for his historical leads and willingness to loan his B&H 414 camera for evaluation; Les Edgecomb, for the loan of his camera; Jan Muddle, for extensive patent search, and M. E. Brown for basic 8mm technology.

Finally, our principle contact with the Assassinations Records Review Board and the National Archives, Doug Horne, who provided constant clarification of needs and ensured our efforts focused on key issues. Throughout this past year our contact became our friend.