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SYSTEMS DIVISION

October 18, 1967

Mr. Paul L. Hoch  
2537 Regent Street, Apt. 202  
Berkeley, California 94704

Dear Mr. Hoch:

First of all let me apologize for not answering your correspondence to me sooner. The pressure of my normal work has naturally dictated a rather low priority to the aftermath of the CBS study which I made in cooperation with Dr. Alvarez.

As you are undoubtedly aware, this study was prompted by the suggestions and previous thinking of Dr. Alvarez with respect to the Zapruder film. My role was basically one of substantiating certain of his findings and then publicly presenting the results.

Your last letter suggests to me that you perhaps appreciate the reasons which necessitated the relatively brief treatment CBS gave to that portion of the program in which both Dr. Alvarez and I were involved. Although all of the facts were not presented because of time limitations, it is my opinion that CBS presented a correct picture. It is perhaps true that the conclusions stated by them could not have been logically reached entirely on the basis of the presentation as made. There were definitely other facts which aided in arriving at their conclusions. These were not included in the presentation for editorial reasons as previously mentioned.

I do not consider the CBS presentation to have been a scientific treatise nor do I believe this was their intent. Whatever their reasons were for the presentation in its existing format, my experience with them leads me to believe that CBS was sincere and honest in presenting their program even with its limitations.

Now getting down to the areas of specific interest to you, there were definitely more than the three instances mentioned of blurred frames.

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The majority of these could reasonably be accounted for by voluntary motion of the camera as Mr. Zapruder followed the action of interest. The blurred frames which both Dr. Alvarez and I singled out as signatures of Mr. Zapruder's startled reaction to possible gun shot blasts had a distinct pattern not found in the other blurred frames. These instances appeared to have a slight oscillatory pattern associated with them which could not be detected in the other blurred frames with the following exception. Dr. Alvarez noted a disturbance in the area around frames 290-300 which he suggested as being caused by a siren. I confirmed his findings of blurred frames at 291 and 296 and agreed that this disturbance has an oscillatory pattern somewhat similar to the other three disturbances. The magnitude is less severe than the others. Thus, this signature could logically be attributed to the siren as suggested by Dr. Alvarez.

I might mention at this point that I could not substantiate Dr. Alvarez's findings that the President's car slowed down measurably some time prior to the fatal shot. I did find irregularities in the velocity but nothing suggesting a definite trend in change of speed.

Testing of the cameras, which were similar to the one used by Mr. Zapruder, included conditions of temperature, humidity, amount of spring tension, and position in the roll of film. It is my opinion that this sort of camera could not be expected to be repeatable with a precision greater than  $\pm 10\%$ . Stroboscopic studies made by me showed that even the same camera would vary in speed over such limits within a single run. The speed also varied from run to run with the same spring winding and the same position along the roll of film. Such a tolerance of variable speed is commonly acceptable in an amateur motion picture camera similar to Mr. Zapruder's and should not be construed as derogatory criticism of the camera. My point is that the camera is not built as a precision instrument and should not be used as such. Based upon the total number of cameras which I tested (8 in all), if I had to make a guess of the probable film speed of Mr. Zapruder's camera during the assassination sequence, I would say that it was very probably operating at a speed of  $17 \pm 2$  frames per second.

I hope this information will be helpful to you.

Very truly yours,

*Charles W. Wyckoff*  
Charles W. Wyckoff

Advanced Research Division

CWW:el

cc: Mr. Leo M. Kelly

Mr. Walter Lister, CBS News