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Prof. Josiah Thompson  
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Dear Dr. Thompson,

Dr. Alvarez, who is (as you know) extremely busy, has asked me to add my comments to his reply to your letter of January 1, 1969, concerning his analysis of the Zapruder film. (I am a graduate student here at the Radiation Laboratory, but not one of those directly responsible for his interest in this matter.)

One of Dr. Alvarez' major contributions has been to point out what kind of analysis can be done on such films. The initial reaction of the people at Life, that the data was too rough to be useful, was a natural one, but I think incorrect. Certainly one can not rule out the possibility that Zapruder jumped in reaction to something other than a bullet. But it is worthwhile to carry out the analysis and see if there is a lot of such "noise" in the data. In this respect the "control" tests done by CBS are crucial. If, as they say, there are only 3 or 4 significant series of oscillations in the film, it is natural to correlate them to shots. Of course this is not conclusive, but I think you discarded the idea too soon.

Your third paragraph indicates that you have misunderstood the details of the analysis, which are presented in Dr. Alvarez's letter of August 15 to Dr. Menaker. Frame 200 is quite clear in CE 885 also; what is plotted is not the angular velocity (which is proportional to the blurring), but the angular acceleration.

I feel that your argument against the "siren" explanation for the oscillation starting about frame 290 is basically valid. But I don't think there is anything logically improper about looking for such an explanation of the data. (That is, after all, how science gets done.) One is required to look for all reasonable explanations for the data before selecting one. I feel that a fourth shot is a quite reasonable possibility. In any case, I certainly don't want to get in the middle of an exchange of strong language between you and Dr. Alvarez.

Incidentally, your penultimate paragraph may be read as an accusation that Dr. Alvarez knowingly participated in a fraudulent presentation of his work. Although I share your low opinion of the CBS show, I know enough about Dr. Alvarez' participation in it to be able to assure you that such an accusation would be unjustified. Frankly, I think that the CBS programs were so obviously flawed that not many people were swayed by them - at least, I hope so. What may have been more damaging, in the long run, was that CBS (with NBC and the AP) persuaded many people (including me) that Garrison must have something, since he was being so strongly and unfairly attacked, by all the right enemies.

I am enclosing some notes of mine on Dr. Alvarez' analysis, an article (obviously inaccurate, but with some interesting background material) from the Magnet, and my correspondence with Dr. Wyckoff. Since I doubt that we will be

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able to get more details from the CBS people, and since Dr. Alvarez' measurements were admittedly preliminary, I would suggest that you get someone to repeat his measurements on the best available copy, if you are interested in the detailed results. (Although I don't think that the results can be conclusive as to the number of shots fired, it might be worth the small amount of work required.)

One of the problems with the CBS reconstruction is the short time between the first and second shots, although one can argue that the first shot was somewhat before frame 186. (the tree, after all, did move in the wind, and the Commission's reconstruction photos were not that exact). I have never understood why the Commission did not conclude that the first shot missed. The reasons presented in the Report seem particularly weak. Was it the time problem? Tague? the implausibility of Oswald shooting at that time? the extremely slow reaction time by the SS agents that would be implied? or something we don't know about? What CBS appears to have done is taken an ingenious but inconclusive analysis, presented it as more different from the Commission's version than it really was, and emphasized that one problem (the time between the second and first shots) is alleviated while ignoring or deemphasizing the other problems with the Commission's reconstruction.

I have just obtained a copy of the 16 page study of the autopsy material released by the Justice Department. Most striking is the reference to metal fragments associated with the non-fatal wound, and the description of the head entry wound as 100 mm. above the occipital protuberance. My first reaction was that the latter had to be a typographical error, but it appears twice. More significantly, although I haven't yet checked carefully, I have not found any other precise localization of this entry wound - in the autopsy report, the testimony, etc. From CE 388-390, it is clear that this new location is at least no less consistent with a shot from the TSB. I am awaiting an expert medical analysis of this Panel report. But it is clear that the hypothesis of a double head hit must be reexamined closely. Although the material in your book is persuasive, I am not quite convinced. When Vince and I examined the film at the Archives, and (at my suggestion) superimposed adjacent frames, it was my impression that the forward motion in 312-313 was a continuation of a gradual forward slumping. I would really have to repeat the measurements myself to be convinced of a significant forward acceleration at that point.

Sincerely yours,

*Paul*

Paul L. Hoch