



Dept. of Classics  
QUEEN'S UNIVERSITY  
KINGSTON, ONTARIO

19 December 1968

Dear Harold:

Enclosed are a copy of material that I just received from Canadian Industries Limited regarding the sighting in of the Mann.-Carcano, and a copy of my reply.

CIL went all out for me. Not only did they work out the theoretical trajectory, but they also performed actual firing tests with ammo of trajectory identical to that of the Mann.-Car. 6.5mm.

CIL's tests confirm my suspicion of the high trajectory. The conclusion that you can immediately draw from this is that if FBI agent Frazier had fired the rifle at 100 yards before he changed the sighting arrangement, the bullets would have struck about 30 inches high of the point of aim. This describes the condition of the rifle when Frazier first fired it. The assertion that it was in the same condition when it was found or when it was allegedly used to shoot the President is conjecture, but fairly well founded, in any case. The 6-shot group on the target that Frazier and Killion shot at 15 yards is quite tight and in itself tends to indicate strongly that the scope was firmly secured to the rifle at the time of firing and probably was not bumped before firing.

When I get one more bit of information, ~~in~~ I'll write ~~this~~ all this up in a succinct report that will also explain the principle that governs the sighting in of scoped rifles. But presently I am waiting for something from GSA that will help me to trim a dangling end.

Frazier and the Report say that the bullets ~~is~~ struck 4 inches high at 15 yards, and all our calculations are based on that figure. However, the target itself, as reproduced in vol 17 (CE548) shows the 6-shot group ~~about~~ about 3 inches high. I think that the reproduction in vol. 17 has been slightly reduced, so I wrote to GSA for an exact Xerox copy of it. I have not yet received it.

I don't know whether I have yet estimated for you the lateral trajectory of the bullets. Besides firing 4 inches high, the bullets also landed 1 inch to the right. The scope was mounted (1cm) to the left of the bore. This arrangements would cause bullets fired at 100 yards to strike about 9 inches to the right of the point of aim.

The final conclusion, then is this: if Frazier had fired the rifle at 100 yards before he changed the sighting arrangement, the bullets almost certainly would have struck about 30 inches high and about 9 inches to the right of the point of aim.

.....

The most exciting news since I last wrote to you is that Farewell America has finally arrived in North America. I shall be receiving copies from Montreal very soon, and hope to arrange for a showing of the movie here in Kingston.

Sprague told me about the authorship of the book, the identity of



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19 December 1968

Mr. S. H. Singer  
Sales Department-Ammunition  
Canadian Industries Limited  
Box 10  
Montreal 101, Quebec

Dear Mr. Singer:

Please accept my sincere thanks for the work that you and the CIL Ballistic Laboratory technicians did in answering my questions regarding the sighting-in of the Mannlicher-Carcano rifle which allegedly was used in the assassination of President Kennedy. You did far more work than I had expected, and I am exceedingly grateful.

I understand that the information contained in your letter of 18 December 1968 does not necessarily reflect your opinion regarding the conclusions of the Warren Report, and that you do not necessarily endorse any conclusions that I or other persons may derive from the results of your tests.

I greatly desire to communicate the contents of your letter to others who are interested in the assassination, but I wish moreover to respect your desire not to become involved in the disputes which surround this issue. Accordingly, unless you expressly forbid me to discuss your tests, I shall treat your information in the following manner. In my private correspondence with other researchers I may cite you by name as the authority for the test results, but I shall advise that if anyone desires to discuss the material in a published document, such as a book or an article, he should either refer to you simply as "a leading ballistic laboratory", or should seek your permission to cite you by name. If that arrangement is not suitable, please tell me so.

Again I wish to thank you sincerely for your splendid work.

Yours truly,

*Richard Bernabei*

Richard Bernabei



CANADIAN INDUSTRIES LIMITED

C-I-L HOUSE • TEL. 874-3000



BOX 10, MONTREAL 101, QUEBEC, CANADA

18th December 1968.

Mr. Richard Bernabei,  
Queen's University,  
Dept. of Classics,  
Kingston, Ont.

Dear Sir :

The questions raised in your letter of 27th November on the subject of certain trajectory data relating to your researches on the President Kennedy assassination weapon, were referred to our Ballistic Laboratory technicians, and we outline hereunder the crux of their reply, which we trust may be helpful to you. At this point may we merely state that it is not the desire of this Company to become involved in any manner whatsoever and that we have attempted to supply data merely to assist you in your personal research. It is therefore on this understanding that we have undertaken to check into the points you have raised.

Firstly, the calibre in question is the 6.5 x 52 m/m Mannlicher-Carcano, an Italian military type not commercially loaded in North America, and neither, to the best of our knowledge, in Europe. Though similar, it must not be confused with either the 6.5 x 53 m/m Mannlicher-Schönauer or 6.5 x 55 m/m Mauser cartridge types manufactured by C-I-L in sporting loads.

The 162 gr. bullet of the 6.5 x 52 m/m Man.-Carc. has a muzzle velocity of 2296 fps when fired from the carbine. The attached trajectory curve is that of the 160 gr. 6.5 x 53 m/m Mann.-Sch., which has a muzzle velocity of 2160 fps. Any difference in the theoretical trajectories of this cartridge and the 6.5 x 52 m/m Man.-Carc. over the range in question (approximately 100 yds.) is not significant.

You are correct in assuming that a horizontal sighting error will increase with the distance from muzzle to target. Unfortunately, trajectories cannot be calculated as simply as suggested. A trajectory curve was computed for the desired point of impact. A test firing was also carried out using a Mannlicher-Schoenauer carbine with a 20X Unertl target scope mounted  $1\frac{1}{2}$ " above the bore, as follows :

160 gr. Soft Point, 6.5 x 53 m/m Mann.-Sch. cartridges, sighted  $+4$ " at 15 yds.

Computed point of impact	29" high at 100 yds.
Test firing results	28 $\frac{1}{2}$ " high at 100 yds.

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However, this close agreement with the theoretical cannot always be expected. Point of impact for a particular sighting arrangement will vary from rifle to rifle, even between rifles of the same type. Bullets of different manufacture, but of the same weight and same apparent design, will have different points of impact, varying horizontally as well as vertically. The shooter can also influence the point of impact by the manner in which the rifle is held and by the material on which the rifle is rested.

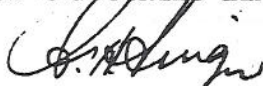
Because of the number of variables involved and the fact that no attempt whatever was made to duplicate the alleged firing conditions of the assassination, these results should be used only as a basis for further experiment.

You are concerned with the effect firing at an angle will have on the point of impact. Because of the relatively short range and small angle, this effect is almost negligible. It is interesting to note that as a result of the unusual sighting arrangement the effect is the reverse of that which is normally experienced, the point of impact being lower (26" high instead of 26½") for the 90.6 yd. distance described by you.

We trust our comments are helpful.

Yours very truly,

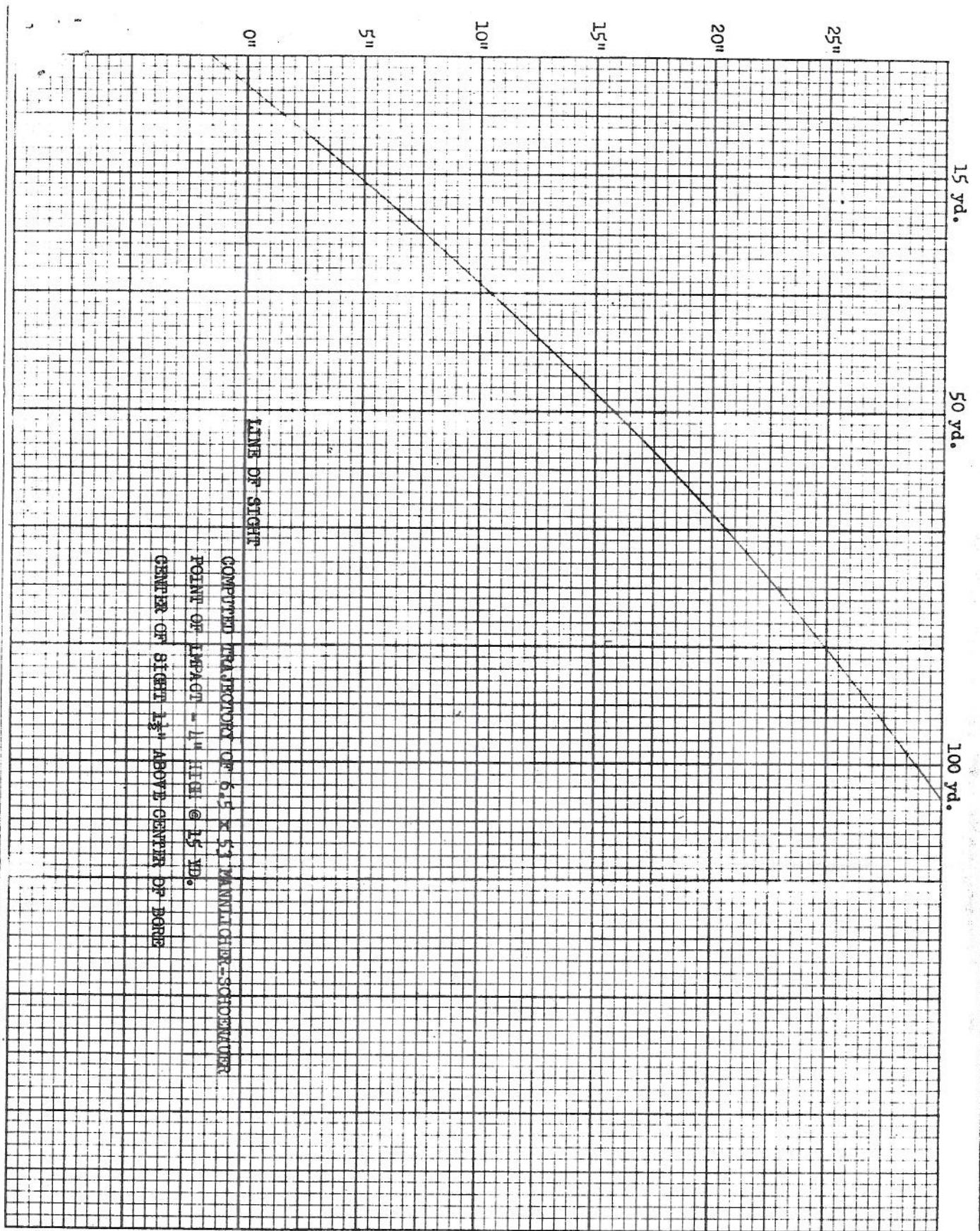
CANADIAN INDUSTRIES LIMITED



S.H. Singer,  
Sales Department-Ammunition.

SHS:IC.  
Encl.





LINE OF SIGHT  
 COMPUTED TRAJECTORY OF 6.5 X 51 MANILLONER-SCHNEIDER  
 POINT OF IMPACT - 7" HIGH @ 15 YD.  
 CENTER OF SIGHT 1 1/2" ABOVE CENTER OF BORE

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