"The other instrument consists of two large coils of very "fine wire (No. 36) placed upon opposite sides of a coil of "coarse wire, (No. 16,) the fine coil being connected so that "the induced currents neutralize each other, thus:



"I am sorry to be obliged to say of this as of the other, that "it is no more sensitive than the one sent. To produce the "best effects from the instrument which you have it will be "necessary to use all the battery power possible without burn-"ing the coils, and two receiving telephones of the best con-"struction must be used.

" As I stated in the first instance, if the ball is more than "two inches deep, I think it cannot be located by this means. "If larger coils were used the instrument might be operative

" at a greater distance, but the area indicated as containing the " ball would be so large that the result would be indefinite and " without value.

" Hoping that Prof. Bell will be able to succeed, I remain, " Yours very truly,

"GEO. M. HOPKINS."

Prof. Hughes of London. England, Prof. Trowbridge of Harvard College, Prof. Rowland of Johns Hopkins University, and other authorities were consulted by telegraph as to the best theoretical form of induction balance for the purpose required, while empirical experiments were being carried on under my direction in my laboratory at Washington by Mr. Summer Tainter; in the electrical work-shop of Davis and Watts, in Baltimore, by Mr. J. H. C. Watts, and in the establishment of Mr. Chas. Williams, Jr., in Boston, by Mr. Thomas A. Gleason. To test the influence of size of coil an instrument was constructed in which the coils were no larger than the bullet for which we sought, (as had been suggested by Prof. Newcomb,)¹ and experiments were also made with the enormous coils used by the late Prof. Henry in his researches upon induction, which

¹See Appendix, note 5.

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