2 November 1931.

Dr A.S. Wiener,
The Jewish Hospital of Brooklyn,
BROOKLYN,
N.Y., U.S.A.

Dear Sir:

I am much obliged for your letter of 19 October and for the very interesting reprints which you have sent me.

I am sending a group of papers on χ^2 of which "The conditions under which χ^2 measures the discrepancy between observation and hypothesis" is the most complete theoretically.

In respect of the problem of the frequencies of homozygotes and heterozygotes in a population breeding at random, it may be worth noting that the Maximum Likelihood estimate is:

$$p = \frac{2a+b}{2n}, \qquad q = \frac{b+2c}{2n}$$

where a, b, c are the three observed numbers, and that taking this estimate

$$\chi^2 = \frac{(b^2-4ac)^2 n}{(2a+b)^2(b+2c)^2}$$ for one degree of freedom

so one can take $$\frac{(b^2-4ac)\sqrt{n}}{(2a+b)(b+2c)}$$ with unit standard error,

instead of $2(\sqrt{m} - \sqrt{a} - \sqrt{c})$ to measure the fitness of the hypothesis.

Yours sincerely,

R. A. F.