22 November 1932

Professor C.G. Darwin, F.R.S.,
   4 Churchhill,
     EDINBURGH.

Dear Prof. Darwin:

Sorry I left the $(x_2 - \bar{x})(y_1 - \bar{y})$ evaluation obscure. The argument would go like this:

Hens selected for or the aggregate of hens having x_2 will have taste above the average by $r(x_2 - \bar{x})$ They will therefore mate with cocks above the average in beauty by $rk(x_2 - \bar{x})$ and therefore with cocks above the average in taste by $r^2 k(x_2 - \bar{x})$

So the average of $(x_2 - \bar{x})(y_1 - \bar{y})$

will be the average of $r^2 k(x_2 - \bar{x})^2 = r^2 k.$

The term does not matter, and I doubted its existence for a while, but it does belong.

I am sending this without answering the rest of your letter, so as to catch you with the point still in mind. Selous' observations on the Ruff, where he has seen the hen passing with perfect/composure among the crowd of males, who await, but cannot hurry, her choice, provide a perfect ecological framework for this necessary type

of selection.   The hens choose the fashion of their sons'
ornaments.

The exponential element, which I agree is the kernel
of the thing, arises from the rate of change in hen taste
being proportional to the absolute average degree of taste
($\delta y \propto \bar{y}$).   The milk yield is, of course, transmitted
through the bull, but the intensity of selection in favour
of higher milk yield is not determined by the average milk
yield.   Again the drone bee has large eyes probably only
to see the queen during the nuptial flight, and this quality
selected thus in the male is transmitted presumably both
to his sons, and to his daughters' sons, but the intensity
of selection in no way depends on the actual average size
of the eye, so there is no tendency to exponential increase.

Yours sincerely,