

16th April, 1947.

Dear Darlington,

I do not know whether you noticed it, but there is a discrepancy between the theory I have developed on the sex chromosome in the House Mouse and one of your findings with *Rattus*, namely, that on the frequency of countable chiasmata you seem to make a total map-length of the pairing segment to be only about 50 units, whereas my material seems to require something like 120 at the least.

Further, it seems that ~~the figures~~ only about 10% of the figures show a chiasma between the centromere and the differential segment, which would lead to the estimate of only 5 units of the map distance in this region, whereas the whole basis of my ideas about recombination exceeding 50% require an arm length, I think, not much less than 100 units. This is one of the points I shall have to deal with in discussion, and I should very much like to know whether you see any way of reconciling the two types of observation.

The second point is that Mather in his early writings on the subject seems to imply that at least one chiasma is necessary apparently in each arm. This would require that the normal chromosome arms have 50 units of map distance at least. Could you put me wise as to your current state of opinion on this point. In developing the theory in more detail, can I take it that some chromosomes pair successfully and separate in the first <sup>e</sup> mitotic division without the formation of any chiasmata in either arm. This, of course, if

accented as a possibility in theory, would very rarely occur in practice with chromosomes of reasonable length. The average number of chiasmata observed among the twenty chromosomes of the House Mouse is said to be about 50, which would give an average map-length of 125 in each chromosome, and there is, I fancy, no reason to suppose that <sup>the</sup> pairing segment is particularly short. This <sup>is</sup> ~~is~~ gives me all the length I need, but I should like to know if you consider the formation of at least one chiasma a mechanical necessity, and if so, whether there must be one in each arm.

Yours sincerely,