Cripps's Corner. Forest Row Sussex.
March 8. 29

Dear Fisher.

The impression I get from this chapter is that you have been digging in virgin soil, and that if you have not turned the whole surface, it is because the ground is very very stiff. In pioneer work of this kind, no one can be expected to solve all the problems.

I have the satisfaction — perhaps not wholly unalloyed — of finding that my father's views as to big species (Origin p 127) are right, and that my statements on p 19 of my Organic Evolution are wrong! At least that is how I read your conclusions. My outstanding puzzle about useless characters is a bit lessened, though not, I think solved, by finding how little useless characters increase variance.

I should have read these pages more easily if I had recently read your previous chapters. Definitions and explanations go out of my old head rather quickly now. I don't know how you define 'species' for the purpose of this discussion. Do not cousin marriages — in the widest sense — decrease variance like homogamy? Do not cousin marriages

increase the more widely a population is scattered, with a consequent decrease of variance? Thus a species, in the ordinary sense, ought to increase in variance both with its numbers and its density. I don't know if you have dealt with this point, if correct.

I give on * separate pages a few notes. They are of little value, but I wrote them down as I thought about it.

Don't bother to discuss any point.

It is a big work, but you will win through

Yours sincerely

Leonard Darwin

p. 1 (1) This probability is not here proved. I should have thought it improbable. A gene must either mutate only in one way, or the new mutant must disappear before the gene mutates in a new direction, if no triumphant factors are to be formed. I should have bet against this.

p1. (2) Does "loci available occupied by" = "individuals containing each ~~type~~ of"

p.3. (3) a little clearer to say "genes, like or unlike each other"

p 4.

p 12. I suspect there is no help for it, but the use of the word 'distribution' gives the idea of a simultaneous creation of things. "distribution of the numbers attained by" could this be translated by "law of the probability of the survival of"? Statisticians of course wont boggle over this word.

A
p. 14. (5) There may be extraordinary rapid changes of population at times. Buds vary much in number. All the females nearly were killed one hard winter. There are short period changes, which may not affect your theory.

p 15 (6) A factor may can have no allelomorphs, may can it not? Should the words "which have no allelomorphs" come after "factor".
See also p. 51 (9).

p-29. Are there other cases where there is a limiting value to gene ratios, besides the heterozygote you go on to discuss? Reading this page alone I puzzled to think what it alluded to.

p. 47-(7) Have flat fish and sloths great vertebral variability? You do not say so. How about glow worms? These are eel like ~~fish~~ amphibia

p 50 (8) 'they' rather unclear. Can this be put — "There will be most factors contributing to variance when the allelomorphs are increasing or decreasing least rapidly in numbers"