

May 7 28

Cripps's Corner. Forest Row. Sussex.

My dear Fisher.

I think you asked me as to the difficulties I saw in regard to natural selection connected with useless characters. I have little new to say, as I blew off steam on that subject in my Cambridge pamphlet on Organic Evolution. There I think I showed how my father, in *Descent of Man* Vol 1, Chap II, 6th para from end, said that many useless structures, as now supposed, would be proved to be useful; but that his omission of the consideration of such structures was "one of the greatest oversights" of *The Origin*. It is probable, he said, that many peculiarities are of no service to the organism. He goes on to suggest an explanation, which does not seem to me to hold water. In *The Origin*, Chap VI, he speaks of interlocking species being absolutely distinct in every detail of structure.

I agree it is extraordinarily difficult to point to any quality and say that it is certainly not correlated with any useful character. But there are so many where no such correlation appears to exist. Specific characters are, I believe, generally not correlated physiologically with other characters, and we should look to them for most variation. This we find, but why the remaining uniformity, which is often very great? I used to think the height of man

was a good example. Tierra de Fuegians and Patagonians, Chinese and Japanese, negroes on the Nile and pygmies in the forest, represent remarkable contrasts. And, if I am not misinformed, ~~negro~~ ^{negro} tribes near together have great differences in stature. But now it occurs to me that assortative mating will make for uniformity, the means having a better chance of getting a mate than the extremes. Colours of flowers is a good example. Allied species have, I think, characteristic colours, the blues of gentians, for example; and although colour is useful, surely the exact colour cannot be so. Then the shape of leaves, and ^{many} other "details of structure".

I have half thought out another point. Hurst's work shows, I understand, that you can have a sudden mutation doubling the chromosomes, for example. Call them the x and $2x$ species. Now the qualities of the $2x$, in so far as they differ from x , cannot be due to adaptation, or were not so when the divergence took place. The doubling the chromosomes may inevitably produce some changes; but seeing how greatly plants can be altered by evolution, why should these non-adaptive differences remain? Miss Irene Houghton, who is working at the Origin, is at work on this subject, and I shall put her on the hunt.

I have put off writing on my address, and this gives me time to
boon my friends - a few of them - with letters. Do not answer
unnecessarily. Yours sincerely D. Darwin