

Thursby,
Carlisle,
Cumberland.

March 28th. 1930.

Dear Fisher,

Many thanks for your kind letter. I have today ordered your book, and I look forward most eagerly to reading it.

In regard to cyclic variations in numbers. I should have supposed that the numbers of a species were an equilibrium between its reproductive capacity tending to increase them and selection tending to diminish them. So that increase in numbers would suggest relaxation in selection. If this were so, there should be an outburst of variation as the numbers go up, owing to the spread of disadvantageous variations which would normally be kept in check. Once the optimum had been reached such variations would be weeded out, and a fortiori they would not spread when the numbers were decreasing under stricter selection. Thus I should rather have thought that variation would be worth more during "spring" than in "autumn". For then there would be an unusual opportunity for disadvantageous mutations to get into many combinations, with some of which they might act in a new and more advantageous manner.

Of course I only suggest this. But here is an

instance from my own experience.

I have been studying an isolated colony of the butterfly Melitaea aurinia; personally for 13 years, and previously to that back to 1894 by means of specimens caught and records kept by a careful observer who worked the locality from then to 1915.

From 1894 to 1900 the species was exceedingly common: thousands flying together. the race was characteristic in appearance and very constant, varieties of all kinds were rare. From 1900 it gradually decreased, and by 1912 one had hard work to capture two or three specimens during the season. In this condition it remained up to and including 1919.

In 1920 the numbers began to increase. They increased rapidly until 1924, when the insects were once more in thousands. Since then the numbers have remained fairly constant, with a slow steady increase until now.

From 1920 to 1924, while the numbers ~~were~~ were increasing, there was a most extraordinary outburst of variation, both in size colour and marking. Great numbers of the insects were in various ways crippled and deformed; generally the most extreme variations were the most affected.

When the numbers became nearly constant variation practically disappeared, and so did malformation. For the last

four years it has been extremely difficult to obtain any marked variations at all, although the species is now so exceedingly common. It has settled down once more to a constant form which is recognizably distinct from that which was found during the former period of abundance. These two distinct forms, and the insects caught during the period of great variability, make quite an interesting comparison.

During the former period of abundance the insect increased beyond its food supply. It feeds on Scabiosa succissa, of which there is a limited amount. The larvae were starved into eating honeysuckle, a food which otherwise they have only been known to take under compulsion in captivity.

Perhaps the greatest factor in reducing the numbers was parasitism. About 1902, 80% to 90% of the wild larvae ~~were~~ were parasitised (parasitism is always fatal). From 1920 to 1923, though I ~~had~~^{bred} hundreds, I never found one parasitised. Now parasitism is appearing again. Two years ago about 12% were affected, last year about 30%.

I am afraid I have bothered you with a very long letter. But if you are busy (as no doubt you are) do not bother to reply at once - I should quite understand.

Yours sincerely,

E. B. Ford.