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NOTE: See 1871, *The descent of man, and selection in relation to sex*. 1st ed., F937.1 & F937.2.

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Sexual Selection

IN the first volume of "The Descent of Man," at page 396, Mr. Darwin says, referring to butterflies, that

"the lower surface (of the wings) generally affords to entomologists the most useful character for detecting the affinities of the various species."

I think, also, that this lower surface might afford another link in the chain of argument by which Mr. Darwin supports his theory of Sexual Selection. Thus, for example, to speak of British species only, in the cabbage butterflies, the under surface of the wings is alike in both sexes of *Pieris Brassicæ*. The black spots, however, which appear on both surfaces of the forewing of the female vanish from the upper surface that of the male, probably because the female has some dislike to them. There is no difference in food-plant, habit, or need of protection here; the only explanation seems to be a whim of the female or a whim of nature, and we have lately discarded all thought of nature being freakish.

In *P. Rapæ* and *P. Napi* a similar difference prevails, though less constant and in a degree less marked. In the allied *Anthrocharis Cardamines* the under surface of both sexes is alike, notwithstanding the vast difference of their upper surfaces. When these butterflies alight and close their wings, the under surfaces of the hind wings are alone visible, and these are, apparently, the parts of the insect modified for the sake of protection. The simple yellow in *Brassicæ* and *Rapæ*, the green-veined yellow in *Napi*, the green marbling in *Cardamines*, of the under sides of the hind wings, are well fitted to conceal those insects as they settle on the wild flowers which they prefer.

Again in *Hipparchia Janira* the light brown patch so conspicuous on the upper surface of the fore wing of the female vanishes from that of the male; and in *H. Tithonus* and *H.*

hyperanthus a tendency to decrease the quantity of light colour on the upper surface of the male butterfly prevails. So is it also with one of the Hair Streaks, *Thecla Betulæ*, the under surface still remaining alike in both sexes of these different species. In this case the female butterflies would seem to wish their partner; to be of a duskier hue than it is granted to themselves to be. The differences mentioned above are so slight that Mr. Darwin says at page 317,

"With those (butterflies) which are plain-coloured, as the meadow-browns (*Hipparchiæ*) the sexes are alike."

But it will be admitted that though these differences are slight they are yet important, as showing a tendency, more or less marked, to follow the rule which Mr. Darwin has laid

down; and every sign of such a tendency strengthens his case.

In *Apatura Iris* the under surface of both sexes is alike, though the male has his upper surface glorified with purple for the delight of his plain brown wife. In the blues, *Polyommatus Alexis*, *P. Corydon*, *P. Adonis*, and *P. Ægon*, the under surface of both sexes is also alike, though in the males the blue and in the females the brown of the upper surface forms the background of the spotty design. The blue blood is very strong in these butterflies, and will show itself sometimes even in the females; who, if powerless over their own decoration, have at least succeeded in bringing out the innate splendour of their handsome husbands. With the blues, as with the cabbage butterflies, the under surface of the hind wings seems specially adapted for protective purposes; every butterfly-hunter knows how difficult it is to distinguish the common blue when it is sitting, shut up, on a scabious flower. It is the same with the small copper butterfly, which has its under surface dotted very similarly. But burnished copper and dazzling blue are not colours for protection, surely. We may give the under surface to Mr. Wallace, but we must yield the upper surface to Mr. Darwin.

At page 399, speaking of the ghost moth (*Hepialus humuli*) and others of the moth kind, Mr. Darwin says,

"It is difficult to conjecture what the meaning can be of these differences between the sexes of darkness or lightness; but we can hardly suppose that they are the results of mere variability, with sexually-limited inheritance, independently of any benefit thus derived."

The female ghost moth follows Mr. Darwin's rule, that females are most conservative of the features of kinship. In her colouring she closely resembles the other *Hepialidæ*. And the male notwithstanding his shining shroud, keeps to the same sober under-colouring as his mate. Now *H. humuli* is more nocturnal in its habits than any of the other species in the genus *Hepialus*; I have caught *H. hectus* and *H. lupulinus* flying in bright sunshine, but I have never seen the ghost moth until dusk was far advanced. May it not be that sexual selection has come into play here by the female preferring the whitest male, he being the most distinguished when all colour has faded into dimness? She could not decide between differing patterns of gold and amber at that hour, but a snow-white surface would then be quite visible. The fact mentioned at page 402, that

"in the Shetland Islands males (of *H. humuli*) are frequently found which closely resemble the females"

(I have seen similarly varied males in Peterhead collections), would seem to confirm this theory; for the twilight of the north, at the season when the ghost-moth abounds is so bereft of dusk that whiteness would not be needed to render the males visible.

It is possible that those acquainted with the habits of the other moths of which Mr. Darwin speaks, may be able to reconcile their appearance with the rules of Sexual Selection which he has laid down so clearly and illustrated so fully in his last great work.

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