

THE HIND WINGS OF THE DAY BUTTERFLIES.

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I wish to offer here a few remarks on the structure of the hind wings of the diurnals especially, in extension of my recent paper on the Butterflies of Hildesheim.*

The first point relates to the fact that the hind wings are more specialized as compared with the primaries. The probable explanation I offer is, that the hind wings bear more of the weight of the body (abdomen), and that they regulate the downward stroke of the fore wings. A parallel suggests itself with the vertebrates in which the hind legs are more specialized; and the cause is then, in both cases, a mechanical one. This specialization in the hind wings of the day butterflies manifests itself primarily in the inequality of the wings, of which the secondaries have the Radius 1 branched, the primaries 3 to 5 branched. In the second place by an advance over the front wings in the process of the absorption of the median veins, so that the radius or cubitus of the secondaries draws the branches nearer to itself than the corresponding vein of the primaries. Vein IV₂, in the case where its condition is not permanently generalized (*Lycaenidae*, *Riodinidae*, *Hesperiidae*), is thus usually more drawn out of its original central position on the secondaries; it submits also first to degeneration (*Hesperiidae*) on the hind wings, showing that here the cross vein has degenerated for a longer period than in the primaries, isolating the vein and depriving it of nourishment over a longer ancestral line. The cross vein itself vanishes first on the secondaries. Here the cell may be open, all trace of the scar vanished (*Araschina*, *Melitaea*), while on the fore wings the degenerate vein is present, closing the cell.

The progress in the evolution of the neururation is evidently taking place in identical directions on both wings. The generalized condition of the radius (it being 5 veined) of the primaries in *Papilio* gives way to a specialized condition (4-veined) in *Parnassius*, with an intermediate 5-veined state in *Thais*, in which latter the upper branch of the median series, vein IV₁, which has left the cross vein to emerge from the radius in *Parnassius*, leaves the cross vein near the upper angle of the cell.

The absorption of the veins is everywhere attended by the same indications of a physiological process which, in its external manifestations, it is easy to trace. It is the same with veins II. and III. of the hind

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