

them of the approach of danger, as they are sensitive when touched, and the jarring of the surface on which the moth rests is probably first communicated to the antennæ, which lie parallel with the plane of repose. The wings are deflexed in the majority of the moths (Fig. 33) when in repose, and clapped together and held upright in the butterflies.

In the *Hesperidæ*, the lowest butterflies, the front pair of wings are often alone elevated when the insect is sitting or walking, the hind pair being flatly extended as in many moths, particularly the Spanners. Certain moths sometimes elevate the wings when resting as the larger Bombyces, and many *Geometridæ* do the same when walking. The butterflies want the frenulum, or bristle and hook, which connect the front and hind wings in the majority of moths, and hold them together when flying. As a whole, the nervures are stouter and the wings perhaps stronger in the butterflies. The hawk moths have the wings, however, very

strongly built, narrow and with thick ribs; their flight is correspondingly rapid and extended. The body is more thinly scaled in the butterflies, becoming more hairy and tufted in the moths, in which the total vestiture is looser and longer, more downy and somewhat easier abraded. In the butterflies the scales are more complicated in structure and the wings themselves are, on the whole, more equal-sized and with shorter fringes. The legs of the moths are, as a rule, stronger, being often curiously armed and spined. Dr. Boisduval called the moths *Heterocera*, or diverse-horned, in contradistinction to the butterflies, and these terms probably signalize an important difference or degree in the use of the antennæ in the two divisions of Lepidoptera.

The writings of Mr. S. H. Scudder afford us some insight into the ancestry of existing Lepidoptera. In particular, he has called attention to the fact that all the diverse patterns which adorn the wings have originated from shaded bands or lines which run parallel with the outer margin, and have become broken up into spots of such varied form as to make it strange that they should have come from so simple an element. (Fig. 34.)

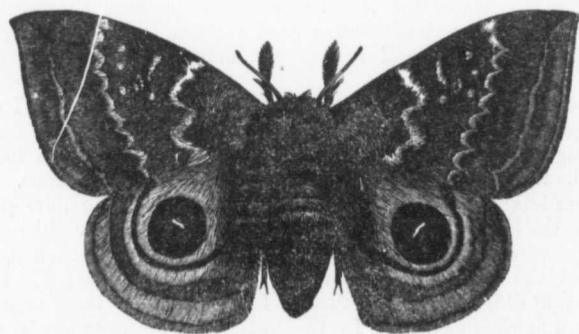


FIG. 34.

It is evident, however, that this is the correct view. I had previously shown that the ringed spots of the wing in the *Noctuidæ* originated from loopings of the usual transverse lines. There seems to be a correlation between the length of tongue in the Lepidoptera and the corolla of flowers. It is probable that the butterflies came in with the flowering plants and that they were preceded in point of time by moths which had short maxillæ and simply hairy, unscaled wings, unicolorous or faintly banded, and having their parentage in the ancient Neuroptera or dragonflies. These may have had aquatic larvæ and less complete transformations, active in the darkness; living, indeed, at an epoch when the light of the sun was less potent at the surface of the earth than it is at the present day.

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