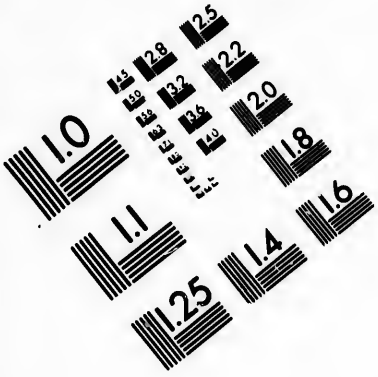

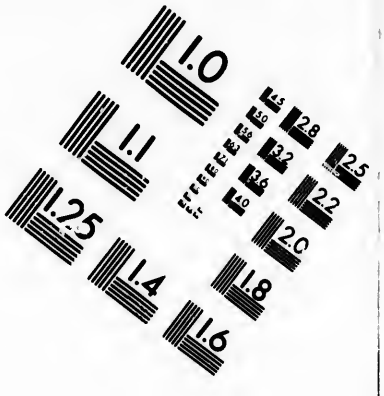

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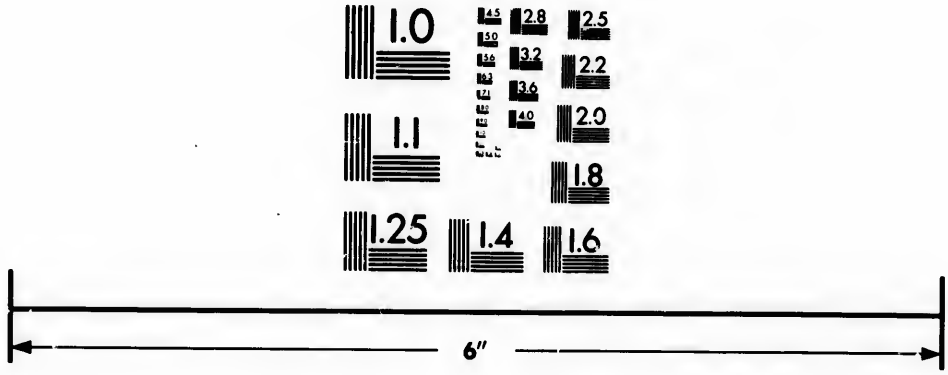

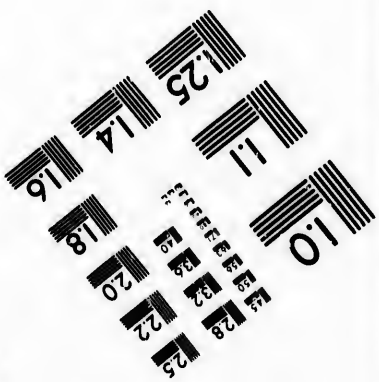

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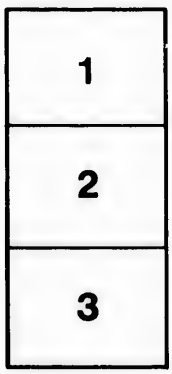

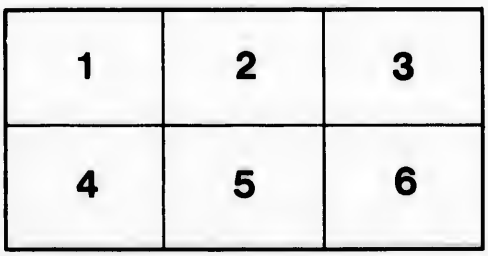

chrysalids of *Arcolatus*, *Eurytris* and *Sosybius* have the same general shape of *S. Alope*; stout and short, with the anterior end truncated, almost cut squarely off beyond mesonotum. But *Gemma* is long, slender, with the head case produced, and ending in two long conical processes like the horns of the larvæ. Probably *Cauthus* will be found to have a chrysalis of this description. Debis *Portlandia*, in all its stages, comes very near Neonympha. In the first two stages it most resembles *Cauthus*; after that, *Cauthus* and *Gemma*. Its chrysalis is of the Satyrid type, very like that of *Alope*. The egg differs from all the species somewhat. It is of the same general shape, however, but has a rounded protuberance on the under side, and a smooth surface. Judging by the preparatory stages of *Portlandia*, Debis ought to stand next Neonympha in the catalogues, instead of being separated from it by several genera, as Cœnonympha and Erebia. The preparatory stages of these two genera I only know from European authors, but species of both have barrel-shaped, ribbed eggs, and caterpillars with round heads, and no processes on vertices. These agree, therefore, with Satyrus, and the genera should stand near Satyrus.

The more I see of the preparatory stages of butterflies, the more I am impressed that no system of arrangement is a true one which does not consider these. Each unquestionably natural genus in the American diurnals is as distinct in its several stages as in the imago, so far as these are known. Between such genera fall some others less clearly defined, with the stages spoken of lying midway between also; as Euptoieta, which has the egg of an Argynnis, but the chrysalis of a Melitæa, while the larva is neither one or the other, though resembling Argynnis somewhat.

THE NORTH AMERICAN SPECIES OF NEMISTRINIDÆ.

BY S. W. WILLISTON, NEW HAVEN, CONN.

The family of Nemistrinidæ comprises throughout the world one hundred and ten described species, six or seven of which are from Southern Europe and three from North America, the remainder nearly equally distributed in Asia, Africa, Australia and South America. In their habits, so far as known, the species approach the Bombylidæ most closely, as also do many in their general appearance. Structurally they are of interest to

the Dipterologist, on account of their intricate and diverse neuration, which in some species is almost Neuropter-like in the reticulation.

Doubtless the number of our species will be augmented by future discoveries, but yet we can never expect a very material increase.

Our three described species, to which I here add a fourth, may be diagnosed as follows. I have never seen Macquart's species, but it may be distinguished without difficulty.

A. Proboscis short, protruding but little from the opening of the mouth. Antennæ small, short, broadly separated; wings not reticulate, three submarginal cells, the outer posterior one closed before the border of the wing, first posterior cell open, fourth (the one just behind the discal cell) closed, anal cell narrowly open.

a. Eyes pilose, second posterior cell open.—*Hirmoneura brevirostris.*

aa. Eyes bare, second posterior cell closed before the border of the wing. *H. (Parasymmictus) clausa* O. S.

B. Proboscis long, directed backwards. Face without protuberance: antennæ small, short, very broadly separated, third joint nearly orbicular, style of three joints. Eyes bare, contiguous in the male; ovipositor of female with two slender diverging lamellæ. Wings not reticulate, three submarginal cells, the outer ones open, first posterior cell open, fourth closed, the anal cell open.

b. Third joint of antennæ nearly orbicular, or slightly pear-shaped, third joint of style not much longer than first two together; second posterior cell closed and petiolate. Abdomen indistinctly fasciate. Length 9 m. *Rhynchocephalus Sackeni*, Wlstn.

bb. Third joint of antennæ obtusely oval, third joint of style three times as long as first two together. Wings more slender, second posterior cell open. Abdomen distinctly fasciate. Length 12 m. *R. volaticus*, sp. nov.

Hirmoneura brevirostris, Macquart, Dipt. Exot. Suppl. 1, 108, 8; Tab. 20, fig. 1. Yucatan. This species differs from the type of *Hirmoneura (H. obscura* (W.) Meig.) in the pilosity of the eyes, and closed second submarginal cell. Baron Osten Sacken mentions (Cat. Dipt. note 142) that he had seen a specimen of *Hirmoneura* from Colorado with the second posterior cell open. It is possibly this, but I suppose a new species.

H. clausa, O. Sacken, Western Dipt. 225, Texas.

Syn. *Parasymmictus clausus*, Bigot, Bull. Soc. Ent. Fr. 1879, No. 8; Annales 1881, p. 15.

The genus *Hirmoneura* has been used in a wide sense, but if such characters are made use of as serve to distinguish genera in allied families, most of the species would become generic types. The closed submarginal and second posterior cells in this species have induced Bigot to make it the type of a new genus, but the same reasons would require new generic names for *H. brevirostris* and the species of *Rhynchocephalus* described below. For the present, therefore, I believe it will be better to hold *Parasymmictus* in abeyance.

Rhynchocephalus Sackeni, Wlstn., Trans. Conn. Acad., vol. iv. p. 243, 1880.

Belongs in the division with closed second posterior cell, to which *R. Tauscheri* Fischer, the type, pertains. A male specimen from Washington Territory, since received, has the proboscis considerably shorter, the eyes nearly contiguous near the ocelli, ocelli with a conspicuous tuft of black pile and the style of the antennæ very indistinctly jointed, even under a compound lens.

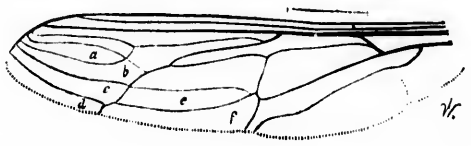

FIG. 4. —Wing of *Rhynchocephalus volaticus*, Wlstn.—*a*, third submarginal cell; *b*, *c*, *d*, *e*, *f*, first-fifth posterior cells.

Rhynchocephalus volaticus, sp. nov.

♀. Black with light yellowish pile. Head brownish black, thickly clothed with pile. Front thinly blackish pilose on the upper part; on the lower part, the face, cheeks and occiput with abundant sulphur yellow pile; antennæ short, reddish yellow, first joint concealed by the pile, second joint sub-quadrate, third joint obtusely oval; first joint of style very short, second about twice as long, third joint three or four times as long as first two together. Proboscis reaching about to hind coxæ. Thorax brownish black, clothed with the same sulphur yellow pile, abundant and bushy on the pleurae and pectus, on the dorsum thinner, the ground color

showing through. Abdomen short and broad, brownish black; second segment above thickly yellow pilose in the front part, behind more or less black, its hind border and the hind borders of the remaining segments conspicuously fringed with white tomentum: second, third and fourth with black somewhat intermixed with yellowish tomentum: remaining segments more or less clothed with yellowish pile, third and fourth segments on the sides with conspicuous tufts of black pile. Lamellae of the ovipositor slender, black, about as long as intermediate femora. Legs brown, femora concealed by abundant yellow pile, especially in the proximal parts, tips yellowish, hind tibiae and tarsi blackish. Wings hyaline, more slender than those of *R. Sackeni*, first and second submarginal, and first and second posterior cells open, third and fifth lying along the posterior margin, separated by the vein running into the posterior border. Length 12 m., of wings 11 m. Two specimens, Florida, Prof. Riley.

When denuded, the second and third segments of the abdomen may show a large reddish spot on each side: they are probably not, however, a constant mark. This species agrees with *R. caucasicus*, Fischer, in having the second posterior cell open.

The three other species of this genus now known are *R. Tauscheri*, Fischer, and *R. caucasicus*, Fischer, from Southern Russia and Asia Minor, and *R. albofasciatus*, Wied., whose habitat is unknown. That *volaticus* is not the same as *albofasciatus* seems evident from the description of the abdomen. The white fasciae are on the extreme hind borders, with the remainder of each segment black, while in Wiedemann's species the white fasciae are in front

ON THE NORTH AMERICAN CALPINÆ TO HELIOTHINÆ.

BY A. R. GROTE.

Since the groups are very difficult of scientific definition in the *Noctuidæ*, the present must not be considered as standing on more than a comparative basis. In my New Check List the genera are arranged between the *Calpinæ* and *Heliothinæ*. The arrangement I would only modify by restricting the *Calpinæ* to the North American genera—*Calpe*, with one species, perhaps the same as the European, and *Phiprosopus*, with the species *callitrichoides*, called a Geometrid by Zeller, and which in outline has a resemblance to the aberrant Noctuid genus *Dorycodes*.

NORTH AMERICAN SYRPHIDAE.

By S. W. Williston, New Haven, Conn.