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VII.—*The Moths of New Mexico*. By AUG. R. GROTE,
President of the New-York Entomological Club*.

DURING the last ten years our knowledge of the Lepidopterous fauna of the western and south-western regions of the United States has greatly increased. If I might connect a pleasant incident to American entomologists with this advance in their study, I should refer to Lord Walsingham's visit and the collections made by his lordship in the west as the commencement of our later progress towards a better knowledge of our fauna. Within the last few years the collections made by Mr. Morrison in Montana and Washington Territory, and again in 1882 in Arizona, together with the numerous fine species discovered by Mr. Dall in Arizona and Southern Colorado, have given us a good idea of the Lepidoptera of those regions, still difficult of access to the collector, whose journey thither from the east is an expensive one.

Two expeditions to New Mexico by Professor F. H. Snow, of the State University of Kansas, have resulted in the discovery of a proportionally large number of new species of moths. The material gathered at both times has been submitted to me; and the object of the present paper is to give a list of those species of moths collected in 1882. The specimens were taken near Las Vegas, at an elevation of about 7000 feet above the level of the sea. From his first trip Prof. Snow did not return without running some risk of a surprise by the Apaches, a tribe of Indians who are not so calculating as the brigands of Italy or Greece, but scalp and plunder the white traveller out of hand.

As might be expected, the species collected include tropical or subtropical forms; but what might not be expected is that they also offer representatives of European species not yet found near either our western or eastern sea-boards. In New Mexico and Arizona we find a mixture of species which throws some light upon the origin of our present fauna, and allows us to study the elements of which it is composed. First, we have a stronger admixture of tropical forms, as in the genus *Hyperchiria*, which no doubt is an intruder on our territory from the south. Whereas in the east we have only one species (*Io*) which, with more or less variation, extends from Maine to Texas, and penetrates to New Mexico and Colorado, we have three other species from Arizona, New Mexico, and Southern Texas respectively, viz. *pamina*, Neum., *zephyria*, Grote, and *Zelleri*, Grote and Robinson. There is next an

* Communicated by A. G. Butler.

element of Californian species, such as *Botis mustelinalis* and several Geometridæ. In Arizonian collections I have identified several species of *Phasiane* and *Semiothisa* described by Dr. Packard from California. In the present collection from New Mexico there are also eastern species, such as *Hyperchiria Io*, *Hadena fractilinea*, *Mamestra detracta*, *Heliophila commoides*, *Phibalapteryx intestinata*, &c. We have next species proper to New Mexico and Arizona, so far as we can judge, such as *Halesidota ingens* and *H. ambigua*, also *Heliophila bicolorata*, *Agrotis beata*, *A. grandipennis*, and *A. circumdata*, with *Marmopteryx sponsata*, *Aspilates viridirufaria* (one of the finest Geometridæ known to me), and several other species. Forms hitherto known to us from Texas, as *Idæa peralbata*, are also represented. But the species which offers the greatest interest is a Noctuid, *Copimamestra occidenta*. This species represents the European *Copimamestra brassicæ*—tibial claw, hairy eyes, style of marking and all. Following out the theory which I have strengthened in various papers, we must regard such species as the remains of a former circumpolar tertiary fauna. The modifications which have taken place in the two branches of the species, separated by the ice-period and the forcing of the faunas southward, are sufficient to enable us to recognize them today as distinct "species" under different names.

Before proceeding with the list of Prof. Snow's captures, I give a brief summary of the characters which I have used in erecting genera in the Noctuidæ. I have worked at this group, in the United-States fauna especially, during the last twenty-five years, and have found occasion to propose some ninety-five genera, chiefly in the main division of the family as it is represented in temperate regions, the Noctuinae or Nonfasciatæ. As affording absolute generic characters, admitting of no rational dispute, I regard the structure of the clypeus, the hairy or naked eyes, the peculiarities of the body-vestiture, the venation, the armed or unarmed tibiæ, and the structure of the front tibiæ. As comparative characters of less value, but which still may be relied on in default of better, I regard the relative length of the labial palpi and tongue, the presence or absence of ocelli, the antennal peculiarities, the relative length of the abdomen, and the shape of the wings. Genera established upon secondary sexual characters, such as *Heliochilus*, Gr., I am inclined to believe valid. Not only are they sanctioned by older authorities, but by neglecting them we lose sight of interesting facts, such as the occurrence of *Heliochilus*, for instance, in Asia as well as North America, whence I at first described it. The gradual unfolding of

our Noctuid fauna before me, from the time when there were not half a dozen species correctly named in our museums, a quarter of a century ago, to the present, when we have more than fifteen hundred species recorded and more or less well known, has necessitated a continual correction of my views. A few of my genera have been shown to be the same as European—as *Acerra*, which equals *Perigrapha*. Others I have discarded after the discovery of forms bridging over differences; and again, in my search for points of distinction, I have lost sight of characters of resemblance or agreement at the time of describing the new genus. A comparison of the Noctuidæ of North America and Europe will finally show that certain European species belong to genera established upon American types. I think that after the discovery of *C. occidenta* the genus *Copimamestra* must be accepted for *brassicæ* on the strength of the tibial claw. Superficial resemblances must not be confounded with coincident structure. When we examine the nervulation we must separate the American genus *Sparagmia*, with its twelve species, from the European *Erotyla*, with only one; here the narrower wing and modified clypeus also assist us. The American genera *Eucirrædia* and *Ripogenus* are probably valid on a careful study of *Cirrædia* and *Eutelia* of Europe, although the members of these genera look much alike. In the North-American Noctuid fauna the remarkable features are the number of species of *Agrotis*, *Onconemis*, and *Catocala*; and again, the number of genera, such as *Fishia*, *Homohadena*, *Trichorthosia*, *Homoglea*, *Trichocosmia*, &c., which are founded upon different combinations of characters offered by such old and accepted genera as *Agrotis*, *Hadena*, *Mamestra*, *Gleæ*, and *Orthosia*. The number of strongly-marked Heliothid genera is also well worthy of note.

In concluding this brief introduction, I wish to mention that Professor Snow's work in the different branches of zoology reflects credit upon the institution which he represents in this department of natural science.

List of Species.

<i>Smerinthus gemmatus</i> , Say.	<i>Triprocris</i> Smithsonianus, Clem.
<i>Sphinx</i> Oreodaphne, Hy. Edw.	<i>Nola</i> fuscula, Grote.
— lugens, Walk.	<i>Crocota</i> ferruginosa, Pack.
<i>Alypiodes</i> flavilinguis, Grote.	— quinnaria, Grote, var.
<i>Pygoctenucha</i> Harrisii, Boisd.	— brevicornis, Walk.
— funerea, Grote.	<i>Halesidota</i> ingens, Hy. Edw.
<i>Lycomorpha</i> constans, Hy. Edw.	— ambigua, Streck.
<i>Harrisina</i> americana, Har.	<i>Alexicles</i> aspera, Grote.
— coracina, Clem.	<i>Nadata</i> gibbosa, Abb. & Sm.

- Oedemasia perangulata*, Hy. Edw.
Telea Polyphemus, var. *oculea*, Neum.
Hyperchiria Io, Fabr., var.
 — *zephyria*, Grote.
Apalela extricata, Grote.
 — *noctivaga*, Grote, var.
 — *thoracica*, Grote.
Agrotis Conchis, Grote.
 — *planalis*, Grote.
 — *bimarginalis*, Grote.
 — *cupidissima*, Grote.
 — *orbis*, Grote.
 — *auxiliaris*, Grote, var.
 — *grandipennis*, Grote.
 — *circumdata*, Grote.
 — *beata*, Grote.
 — *saucia*, Hübn.
Copimamestra occidenta, Grote.
Mamestra discalis, Grote.
 — *detracta*, Walk.
 — *acutipennis*, Grote.
 — *gnata*, Grote (♀).
Hadena auranticolor, Grote.
 — *perpensa*, Grote.
 — *hausta*, Grote.
 — *fractilinea*, Grote.
Perigea loculosa, Grote.
 — *albolabes*, Grote.
Homohadena epipaschia, Grote.
Polia illepidia, Grote.
Tricholita semiaperta, Morr.
Heliophila bicolorata, Grote.
 — *albilinea*, Hübn.
 — *commoides*, Guén.
Trichorthosia parallela, Grote.
Tæniocampa agrotiformis, Grote.
 — *thecata*, Morr.
Lithophane signosa, Walk.
Ingura præpilata, Grote.
Adipsophanes miscellus, Grote.
Caradrina meralis, Morr.
Rhodosea Julia, Grote.
Grotella Dis, Grote.
Euclidia intercalaris, Grote.
Cirrhopolina mexicana, Behr.
Catocala violenta, Hy. Edw.
Toxocampa victoria, Grote.
Homopyralis discalis, Grote.
 — *miserulata*, Grote.
Spargaloma sexpunctata, Grote.
Pseudanthracia coracias, Guén.
Epizeuxis americanus, Guén.
Prochoerodes catenulata, Grote.
Tetracis Grotearia, Packard.
 — *simpliciaris*, Grote.
Caberodes marjoraria, Guén.
Metrocampa margaritata, Linn.
Ellopiia vitraria, Grote.
Idæa peralbata, Pack.
Deilinia erythemaria, Guén.
Phasiane cruciata, Grote.
Marmopteryx sponsata, Grote.
Thamnomoma perpallidaria, Grote.
Fidonia peralternaria, Grote.
Caripeta æqualiaria, Grote.
Aspilates viridirufaria, Neum.
Eubyja mexicanaria, Grote.
Lobophora inæqualiata, Pack.
Baptria ? *albofasciata*, Grote.
Phibalapteryx intestinata, Guén.
Eupithecia cretaceata, Pack.
Parædis obliquialis, Grote.
Asopia olinalis, Guén.
 — *cohortalis*, Grote.
 — *planalis*, Grote.
Botis mustelinalis, Pack.
Blepharomastix renalis, Guén.
Nephopteryx auranticella, Grote.
Crambus dimidiatellus, Grote.

Descriptions of Species.

Hyperchiria zephyria, Grote.

This fine species has deep-fuscous or blackish fore wings and thorax, the former with an oblique white stripe or band, vividly contrasting, running from costa at apex to internal margin near the middle. The white spots at base of primaries are distinct. Hind wings with the disk yellow and the ocellus as in *Io*; beyond the wing is pale fuscous, with clouded shading. Abdomen shaded with red, as with *pamina*; more wholly red above in the male.

Telea Polyphemus, var. *oculea*.

Mr. Neumoegen has described this variety from Arizona. The ocellus on fore wings is ringed with blue behind, and set in a cloud of black as on hind wings in the usual form. The specimen collected by Prof. Snow has the black cloud reduced as compared with Mr. Neumoegen's Arizonian types.

Agrotis bimarginalis, n. s.

Allied to *variata* and *observabilis*. Head and thorax rich orange-brown; a broad pale leather-brown or fawn-coloured costal stripe to terminal posterior line; terminal space frosted with white. Rest of the wing deep brown, shaded with black. Terminal posterior line even; stigmata obscured by the blackish shading; subterminal space black on costa. Hind wings pale fuscous; abdomen brownish terminally. Beneath with dots and a common even exterior shade band. No. 924. *Expanse* 36 millim.

Agrotis circumdata, n. s.

Belongs to the *gravis* group, the handsomest species yet found of this group. Terminal space light leather-brown, and joining an equally broad similar band along internal margin, which is edged above and below by two deep velvety black curved longitudinal stripes at base of wing. These bands vividly contrast with the black subterminal space and brownish-black surface of the wing. The dentate terminal anterior line and even terminal posterior line partly visible. Stigmata contrasting; orbicular small, pale, with dark central dot; reniform small, pale, upright, not constricted, with brown line. Head and collar rich ochre-brown; thorax blackish. Hind wings fuscous, with reddish fringes. Beneath powdered with reddish brown, common band and discal dots distinct on secondaries. No. 925. *Expanse* 35 millim.

Agrotis planalis, n. s.

♂. Allied to the *Normaniana-esurialis* species. Fore wings and thorax concolorous dark chestnut-brown; subterminal line narrow, commenced in black, with a subcostal tooth pointing inwardly, thence straightly, indistinctly scalloped to inner margin. Lines double, marked on costa; terminal posterior line faint, not much bent; stigmata small, concolorous, set in a black discal shade. Thorax a little darker than primaries above. Beneath distinctly marked. Fore wings blackish to subterminal line, beyond which the terminal space is pale; outer mesial line marked on costa; hind wings pale, with dis-

tinged extramesial line and discal dot. Abdomen brownish. Hind wings above without well-defined lines, paler at base, shaded broadly with fuscous outwardly. Antennæ slightly pectinate. No. 1043.

Agrotis grandipennis, n. s.

One of the largest species, the female expands 52 millim. Rich purplish red-brown, veins marked incompletely with black, terminal black marks distinct. Terminal anterior line dentate, a large submedian tooth, double lines fine, black. Orbicular small, round, pale, with dark dot; a dash connects it with the shadowy reniform. Terminal posterior line marked by double costal black dots, else obsolete. Hind wings pale fuscous, veins marked. Abdomen shaded with reddish; thorax like fore wings. Beneath whitish with well-defined dots. Nos. 948 and 949. All the tibiæ spinose. Allied to *piscipellis*.

Agrotis beata, n. s.

Delicate dark mouse- or pigeon-grey; belongs to the *anicta* group. A black velvety band or collar in front. Lines single, faint and narrow. Terminal posterior line forming a single angle. Subterminal line pale, preceded above by a black shading, and followed by a narrow black shade. Median shade diffuse, black. Fringes pink. Hind wings nearly white, smoky outwardly. Beneath without lines or dots. Head and thorax grey, like primaries. Abdomen pale grey, somewhat reddish at tip and beneath. No. 929. A lovely species. *Expanse* 36 millim.

COPIMAMESTRA, n. gen.

This agrees with *Mamestra*, except that the fore tibiæ are armed with a distinct large claw. Eyes hairy. Abdomen tufted. Tibiæ unarmed. The types are the European *C. brassicæ* and the following new species:—

Copimamestra occidenta, n. s.

Darker and more blackish than *brassicæ*. A greenish white broad band before the subterminal line, continuous. Reniform greenish white. A patch of the same colour on sub-basal field. Orbicular not well defined. Median lines black. Tegulæ lined with black. Hind wings pale, shaded outwardly with blackish. Beneath, the discal spot on fore wings is pale with central dot. The whitish secondaries show a well-defined dot. *Expanse* 42 millim. No. 943.

Grotella Dis, n. s.

This species seems a little larger than *7-punctata*, with the dots obliterated on the white primaries. Unlike the latter, the hind wings are black with white fringes. Beneath also black, the white fringes on both wings strongly contrasting. I have been disposed hitherto to regard this as a variety. One specimen also in Mr. Neumoegen's collection from Arizona. *Expanse* 26 millim. New Mexico. No. 1018.

The contrast between the white primaries and blackish secondaries on the upper surface is peculiar. If only a variety, it is one worthy of a separate designation.

PROCHÆRODES, Gr., = *Eutrapela*, Packard.

According to Mr. Butler, the genus *Chærodes* is preoccupied in Coleoptera. I have shown, in the 'Canadian Entomologist,' that *Eutrapela* is used by Hübner first for a species of *Selenia*; and, in including *clemataria*, Hübner may have thought the moth congeneric. A new name is therefore necessary for our genus, with *transversata*, Drury, as type. Guénée's limitation of *Eutrapela* to *clemataria* is not followed by Dr. Packard, whose genus *Eutrapela* corresponds with *Chærodes* of Guénée plus the *Eutrapela clemataria* of the 'Species Général.'

Prochærodes catenulata, n. s.

♀. Allied to *nubilata*, but differing by the wings beneath being pale and having a continuous, even, dark outer line dotted or accented on the veins, equally distinct on both wings. All the wings show the black discal dots equally distinct above and below. Base of primaries greyish ochry, defined by an irregular brown line, bent outward on cell. Median space fawn-brown, freer from strigæ than wing elsewhere. Outer line brown, angled to costa, followed by a diffuse blackish subterminal shade, continued more faintly on secondaries. Outside the terminal posterior line, both wings greyish, as at base, and the strigæ are, here as there, again prominent. Apex acute; outer margin with a rounded angle, less defined than Packard's figure (61); hind wings with smaller angle and with the tips of the veins determinate. A larger insect apparently than the Californian species. *Expanse* 45 millim. The black subterminal clouding is continuous and reaches apex.

Phasiane cruciata, n. s.

Grey; inner line black, slightly outwardly bent at middle;

the close and parallel median shade runs straightly down, and at the bend touches it; a curved shade line before the black inner line; so that here we have three lines close together and partially fused, differing in distinctness. Outer line black, sinuous, bent outwardly on costal region, the subterminal, fainter, runs close to it, and they nearly touch opposite the cell; at the place of the subterminal line the wing is whiter, free from speckles or strigæ, also on median space. Hind wings grey, finely irrorate; two mesial lines indicated on internal margin. Beneath whitish grey, irrorate; fore wings reflecting lines. No. 1002. *Expanse* 27 millim. Easily known by the terminal anterior line forming two forks from its middle junction with the median shade. Discal dots very small.

Caripeta æqualiaria, n. s.

♀. Close to *angustiorata*. Fore wings rich rosy brown and ochry brown, the paler shadings being whitish yellow. Terminal anterior line upright, dark brownish, the cells before it to base being diffusely filled with yellowish white. This line in its ally forms a wide tooth, narrowing the median space which is here wanting, the median lines being subparallel and the median field of the same width. Two indistinct pale spots on the cell. Outer line followed by a narrow diffuse yellow-white shade, like anterior line, toothed at extremity of median vein. Subterminal line a succession of dark brownish blocks on interspaces, followed to the edge by yellow-white triangular marks. Hind wings whitish, shaded on veins with yellow. Thorax fawn. Beneath reflecting markings; hind wings with a broken ochre line. *Expanse* 38 millim. New Mexico. No. 995.

Parædis obliquialis, n. s.

Front flat; maxillary palpi stout and scaled, as long as the labial, appearing between them and the front. Allied to *funalis*, and similarly sized. Grey, shaded with smoky and brown. Inner line single, oblique, very faint, apparently angulate on cell. Outer line parallel with this, *even* and oblique, preceded by a faint white shade. Subterminal line black, denticulate, running from apex inwardly to a point below the middle, whence it runs close and parallel to the outer line to the internal margin; it is touched with white below the middle, after which it is even and black. There is a wide brown clouding across the wing from the outer line to the external margin opposite the cell; above internal angle a large free grey space. Fringes dark. Reniform a faint,

quadrate, upright, blackish, shaded spot. Hind wings pale fuscous, with two subterminal lines: the outer is flecked with white before anal angle; and opposite this flecking the fringes are touched at their tips with black. There is a dotted line on secondaries beneath; and on fore wings the reniform is very distinct, blackish, and square. As compared with the figure of *Parædis funalis*, N. Am. Ent. i. pl. v. fig. 4 (fore wing, sub *Ædis*, changed to *Parædis* in "New Check List"), the even outer median line will distinguish *obliquialis*. Attention must be paid to the structure of the head in this and allied genera to locate the species. No. 1019.

I describe here a form from Washington Territory:—

Prorasea indentalis, n. s.

Frontal bulging less prominent than in *simalis* (N. Am. Ent. i. pl. v. fig. 2, enlarged head). A raised rim arises above clypeal plate. Grey, shaded with white at inauguration of the dark dentate outer median line, which forms a prominent tooth on submedian fold; and here again the wing is shaded with white. Outer line followed by a white shade. A white shade along submedian fold. A white square spot on cell between the stigmata. Hind wings pale fuscous, with an extra mesial line indented submedianly. A fuscous submarginal shade band. Fringes pale, with a dotted basal line, expiring before anal angle. Beneath yellowish fuscous, with two spots on cell of fore wings, the first small, elongate, the outer subequal, transverse; a common line; body white beneath. *Expanse* 34 millim. Washington Territory. Coll. A. R. Grote.

Crambus dimidiatellus, n. s.

♀. Size large. Costal region broadly olivaceous, edged by a darker linear shade below. Rest of the wing with the veins striped with white, and covered medially by a broad white shade, widening at external margin; below this the ground-colour is again somewhat olive. Hind wings and fringes pale silky fuscous. Fringes and fore wings white, faintly dotted. *Expanse* 36 millim. No. 968. Labial palpi long; approaches the *propeexus* group. I do not know the male.

Nephoteryx auranticella, n. s.

♀. Although I have but a single specimen, very bright, the extraordinary colour and size will enable the species to be at once recognized, and perhaps better placed when the male

is known. Fore wings bright orange-red, colour of *caripeta*. A white somewhat diffuse longitudinal stripe from base to end of median vein, followed by a slight oblique white clouding. Subterminal line white, contrasting with the red wing, running inwards a little on costal and internal margins. The wing is more yellowish or orange at base, redder outwardly. Tegulae and sides of collar orange. Head above and collar centrally white. Legs red outwardly; palpi red, white at base. Thorax beneath white. Hind wings pale translucent fuscous, with a fine terminal line and white fringes, interlined at base. Beneath yellowish fuscous, with a red mark on primaries at costal inception of transverse line. *Expanse* 30 millim. New Mexico. No. 1021.

This brilliant species wants the usual inner transverse line on fore wings above.

VIII.—*Report on a Journey for the Investigation of the Torpedinei extant in the Museums of England and Holland.*
By Prof. GUSTAV FRITSCH*.

I TAKE the liberty of laying before the Royal Academy of Sciences the following report upon the investigations carried on by me during the month of August of the present year in England and Holland †.

As there could be no doubt that the collections of the British Museum in London would offer the greatest chance of furthering my undertaking, I travelled direct to London on Saturday, August 5, and on the following Monday I had already in my hands the desired material, as Dr. Günther had had it got ready for me, in kind compliance with my wishes expressed in writing.

Among the *Torpedinei* there was the typical specimen of *Torpedo hebetans*, Lowe, the characters of which made me think it probable that it was allied to *T. occidentalis*, Storer, as well as to *T. californica*, and thus led to a convic-

* From the 'Sitzungsberichte der königl. preuss. Akademie der Wissenschaften zu Berlin,' November 23, 1882, p. 1007.

† *Note by Prof. E. Du Bois-Raymond.*—Prof. Fritsch's journey had for its object to test, upon more species of *Torpedinei* than Prof. Peters could place at his disposal in the museum here, the correctness of the conclusion that I had deduced from what I call the Delle Chiaje-Babuchinic proposition, namely that every good species of *Torpedinei* possesses as a diagnostic character a certain average number of columns. See my "Vorläufige Bericht über die von Prof. Gustav Fritsch in Ägypten und am Mittelmeer angestellten neuen Untersuchungen an electrischen Fischen," Sitzungsab. Akad. Wiss. Berl. 1882, pp. 487 *et seqq.*