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NEW NOCTUIDÆ FROM BRITISH COLUMBIA.

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Apatela mæsta, n. var.

A very distinct form of the European *leporina*, Linn.; dark gray, fully as dark as *Canadensis*, Smith & Dyar, which it much resembles; but the basal line is broken and the transverse posterior line is dentate as in *leporina*.

Described from 6 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7322.

Apatela griseor, n. var.

A western variety of *innotata*, Guen., slightly larger, the white ground colour more distinctly strewn with black scales and the black marks bordering the usual lines sharper and more pronounced, especially noticeable in the transverse anterior line. In *innotata* this line is almost lost; in *griseor* it is often nearly as obvious as the transverse posterior line.

Described from 16 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7323.

Apatela dolorosa, n. var.

A western form of *distans*, Grote; darker than its eastern ally, both in the tone of the gray ground and the amount of black shadings. It closely resembles *emaculata*, Smith, from the same region, but is a less smoothly gray and has more marked contrasts between the light and dark shades; the transverse posterior line is more distinctly dentate, and there are other slight differences, so that I think we have to do with distinct, although closely allied species.

Described from 3 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7324.

Platyperigea anotha, n. sp.

Luteous, strewn with dark scales. Head and palpi black-brown, thorax and abdomen luteous grayish. Fore wings shining luteous, basal line rather distinct, broken, the costal half supplemented by an outwardly placed shade on inner margin; t.-a. line distinct, single, brown-black,

marked by a spot on costa, with an outward subcostal angle and an inward one on vein 1. Orbicular round, small, black; reniform a large, diffuse, black cloud. Median shade close to t.-p. line, broad, diffuse, obsolete above. T.-p. line crenulate, inflexed at costa to a spot above reniform and bent inward below cell evenly. A light space beyond it is succeeded by a broad smoky marginal shade, which a faint, pale, subterminal line bisects. The shade is gathered to an ill-defined dark patch on anal angle. Hind wings whitish at base, brownish outwardly, subpellucid. Expanse 20 mm. The wings are not very broad.

Described from one specimen, ♂, Revelstoke, B. C.

U. S. National Museum, type No. 7325.

Caradrina nitens, n. sp.

Large, slender, close to *miranda*, Grote, but much blacker. Head and thorax black, not lighter in front; fore wings shining brown-black, orbicular a black dot, reniform a white lunate spot preceded by a black dot; other marks lost, the lines barely traceable in the best specimen. Hind wings silky whitish, smoky along costa and outer edge. Expanse 30 mm.

Described from 8 specimens, Kaslo, B. C., and Turtle Mts., North Dakota (A. H. Verrill).

U. S. National Museum, type No. 7336.

Hadena maida, n. sp.

Close to *dubitans*, Walk., in appearance. Thorax and fore wings of the same blackish brown as in the darkest *dubitans*, but more smooth and shining and the wings somewhat narrower; a light brown area at centre of inner margin. Lines lost; t.-p. line indicated by fine white venular dots, s.-t. by a white powdering preceded by black, which forms a rather distinct spot at anal angle. Fringe crenulate, containing white specks at the ends of the veins. Orbicular a linear black ellipse, broken above; claviform similarly distinctly outlined in black, the filling as dark as the ground colour; reniform black edged except superiorly, with a double curved white mark outwardly. A few white specks on costal edge. Hind wings gray, irregularly shaded. Fringe, abdomen and whole under surface suffused with pinkish purple. Expanse 36 to 40 mm.

Described from 9 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7326.

Homohadena fifia, n. var.

Differs from *badistriga*, Grote, in being darker gray, the ground

colour ashen, obscured by dark shades, without any of the testaceous tint of its eastern ally. The collar is gray, scarcely contrasting with the thorax. The markings are as in *badistriga*, and vary much in the extent of the black shades.

Described from 2 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7337.

Homohedena Cocklei, n. sp.

Brownish black, some of the scales hoary tipped. Fore wings dark, basal space dark gray, median space black, a little lighter than the limiting t.-a. and t.-p. lines, which are single, the t.-a. line with three slight waves, the t.-p. bent out over reniform, Stigmata obsolete, orbicular barely indicated, reniform a lighter shade. S.-t. space pale, the veins a little darker. S.-t. line a diffuse black shade, grayish outwardly on its lower half, this colour forming an ill-defined spot at anal angle; fringes dark. Hind wing solidly black, fringe white. Below black, a faint white discal dot on fore wings and a distinct lunate one on hind wings. Fringes as above. Expanse 27 mm.

Described from one specimen, ♂, Ainsworth, B. C.

Rhynchagrotis scopeops, n. sp.

Allied to *variata* and *alternata*. Dark violaceous brown, shading to dull clay colour at bases of wings and on thorax. Lines geminate, crenulate, as in *alternata*, but distinct; orbicular and reniform distinctly bordered with whitish rings, filled with the ground colour. Terminal space bluish ashen, contrasted; margin narrowly and fringe dark.

Described from 6 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7327.

Peridroma subjugata, n. var.

Differs from *stricta*, Morr., in being uniformly darker, the brown colour more or less reduced, visible only for a short space inside the t.-p. line, never wholly absent, though sometimes very nearly so. Discal spots much grayer, almost white at the edges, darker filled. Terminal space sparsely gray powdered. The discal spots are sometimes joined by a spur from the reniform along the median vein. The form stands between *stricta*, Morr., and *nigra*, Smith, but does not connect them.

Described from 61 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7328.

Noctua umbrosa, n. var.

Judging by the ♂ genitalia, which agree with Smith's figure, this is

a form of *cynica*, Smith, rather than of *rubifera*, Grote. The markings are the same, but the colour is much darker, a grayish brown, giving a very distinct appearance.

Described from 117 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7329.

Mamestra crydina, n. var.

A racial form between *purpurissata*, Grt., and *juncimacula*, Smith. Darkly coloured and variable; some of the specimens are nearly indistinguishable from the Eastern *purpurissata*, though in most the t.-p. line is more or less distinct, sometimes very distinct, scalloped, black, pale edged outwardly. The reniform frequently has a spur below, sometimes joining the spots as in *juncimacula*, Smith.

Described from 21 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7330.

Himella infidelis, n. sp.

Between *contrahens*, Walk., and *conar*, Streck., with the discal spots of the latter and the diversified ground colour of the former. Fore wing light brown, nearly ochreous, shaded with dark except along internal margin and beyond reniform. Lines black, t.-a. scalloped, t.-p. bent outward beyond reniform. Spots black, distinct, white ringed, orbicular small, reniform constricted with a slight spur below. Fringe dark, spotted with ochreous; thorax reddish.

Described from 5 specimens, Kaslo, B. C., and Turtle Mts., N. Dakota (A. H. Verrill).

U. S. National Museum, type No. 7331.

Teniocampa communis, n. sp.

Thoracic vestiture hairy, without scales; ♂ antennæ simple. Luteous, powdered with blackish scales. Lines geminate, blackish, interrupted; basal half line indistinct, t.-a. waved, t.-p. bent outward over reniform, s.-t. concolorous or a little paler, preceded by a dusky shade, often as distinct as the other lines. Stigmata concolorous or more or less dark filled, pale ringed. A row of terminal dark dots; fringe dusky. Hind wings luteous, fuscous shaded. Expanse 26 to 32 mm.

Described from 3,500 specimens, 3,495 of which are from Kaslo, B. C.; the other 5 from California and Colorado, without definite localities.

U. S. National Museum, type No. 7332.

Perigrapha achsha, n. sp.

Thorax robust, hairy, forming a slight anterior crest. Wings broad,

the apex of primaries acute, outer margin rounded, costa straight. Abdomen without dorsal tufts. Thorax dark mouse gray, collar lighter at the sides, no markings. Abdomen brownish gray. Fore wings bluish ash-gray sprinkled with dark mouse gray, forming nearly a solid area on the lower half of the median space and less solidly on lower half of basal space; costa and fringe dark. Lines obsolete, indicated by the limits of the darkened median space, appearing pale by the remnants of the pale filling of geminate lines. Terminal half of wing broadly of the pale bluish ash ground colour, not discolorously paler, but lacking the dark shadings. A double row of black venular dots, situated apparently between the positions of the obsolete t.-a. and s.-t. lines. Between the pairs of these dots the colour is faintly lighter, indicating whitish spots. Orbicular and reniform irregularly outlined in black, filled with a slightly darker shade, inconspicuous, moderate, well separated, upright; claviform lost. The colour on the lower half of the wing is a little darkened on the veins. Hind wings pinkish brown, darkened and smoky on the outer half. Below, the fore wings are pinkish along the costa, else smoky brown, a diffuse discal spot and outer line of blackish. Hind wings all pinkish, irrorate with darker, an outer row of venular spots. Expanse 38 mm.

Described from 1 specimen, ♂, Kaslo, B. C.

THE ORDER DIPTERA.

Diptera during the past century have gradually risen in public estimation, especially among men of science. The superiority of their organization has been recognized by systematists, and observers of living specimens have noticed peculiarities in their behaviour which prove a higher development of their faculties than of those of other orders.

Diptera, more than all other insects, show a distinct love of *freedom*, while Hymenoptera, with all their perfections, betray *drill*. Owing to their organization, Diptera have more control over their motions than any other insects, in consequence of which there is a remarkable stamp of *individuality* in their actions. They can suddenly arrest their flight, and poise in the air; they can not only swarm, but *dance* in cadence, or gambol in the air in the most extraordinary manner. It is principally the males who dance, play and frolic together; during courtship they perform most ludicrous antics. Schiller said: "The animal, the child, as well as man, *play*; the sense of strength and the higher sense of freedom derived from strength give rise to the joy of playing."—OSTEN SACKEN.

THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

St. Louis, Mo., Dec. 30 and 31, 1903.

One of the most enjoyable features of the St. Louis meeting of the A. A. A. S., from the entomologists' standpoint, was the informal sessions of the Entomological Club, held at the Southern Hotel on the evenings of Dec. 30-31. The duties of chairman were discharged by Dr. Jas. Fletcher in his inimitably felicitous manner, the proceedings being recorded by Messrs. Kirkland and Wilcox. Among those present were: Messrs. Howard, Marlatt, Lochhead, Corbett, Clifton, Symons, Cooley, Frost, Adams, Sanderson, Fairchild, Burgess, Fletcher, Gillette, Felt, Knab, Kirkland and others.

Mr. Marlatt gave a description of a recent trip in California, and described in detail the work of the introduced parasite, *Scutellista cyanea*, on the black scale (*Lecanium oleæ*). This insect has become well established in Californian orchards, and now practically controls the black scale. It will probably prove as valuable an ally of the fruit-grower as has *Vedalia cardinalis* in the case of the white scale (*Icerya purchasi*).

The black scale is a general feeder, breeding on orange, pepper tree, erigeron, cockle-burr, sunflower, Chili pepper, etc. It results that these food plants keep up the stock of scale in which the *Scutellista* breeds, and it in turn attacks the scale in the orchards. So valuable has the *Scutellista* proved, and so general is the appreciation of its services, that it is not unusual for orchardists suffering from the scale attack to surreptitiously remove infested scales from the orchards of their more fortunate neighbors and thus colonize the parasite among their own trees.

Dr. Howard discussed the first importation of *Scutellista* to Baton Rouge, La., several years ago, to which place he sent the parasite, hoping it would prove effective against certain *Ceroplastes* common there. This introduction, according to Prof. Morgan, was a failure. When Lounsbury bred the *Scutellista* on the black scale in S. Africa, Dr. Howard at once arranged for an importation of the parasite to California, where, through the work of the agents of the Department of Agriculture, and Mr. Craw, the insect has now become well established, with results as previously described by Mr. Marlatt.

The *Scutellista* was probably sent to South Africa originally on plants from English colonists at Ceylon, where it is a native species. It is the first known *Chalcid* that destroys *all* the eggs of its host. In the case of

Aphelinus mytilaspidis, which breeds in the common oyster-shell and scurfy bark lice, at least 10 or 15 eggs remain under the scale unharmed after the parasite has ceased feeding, as determined by actual count.

Dr. Howard also called attention to the improved status in public opinion now enjoyed by the pepper-tree in Southern California. Heretofore this common tree has been under a ban because of harbouring the black scale. Now it is regarded in a better light, because, while breeding the scale, it also serves as a constant source of supply of the highly-prized *Scutellista*.

Mr. Symons described the serious injury caused by the cigarette beetle in the tobacco warehouses and factories of Maryland. This insect has increased to such an extent as to render a law for compulsory fumigation advisable. *Diatrea saccharalis* appeared in notable numbers in Maryland this year.

Dr. Howard stated that this borer breeds in sugar-cane, sorghum, rank grasses, etc., as well as in corn, and was probably introduced here in sugar-cane.

Mr. Cooley described the rich entomological fauna of Montana, and spoke with enthusiasm of the field there offered to the collector. Among the interesting specimens he had recently taken was a small *Buprestid*, which flew freely, in spite of the fact that its elytra were closely fused together.

Mr. Adams expressed in fitting phrase what all had felt, the delightful spirit of good-fellowship that characterized such meetings of the entomological fraternity. Various experiences on collecting trips in Arizona were described in a pleasing manner, and certain interesting finds of *Trypetidae* described.

Mr. Frost described the successful fumigation of a tomato house infested with *Aleyrodes*. Cyanide at the rate of $\frac{3}{4}$ ounce to 2,000 cubic feet, 3 hours' night exposure was completely successful in destroying the insects without damage to the plants. In another house 4.5 oz. cyanide to 2,000 cubic feet, all night exposure, resulted in slight, but not serious, injury to the plants.

Mr. Kirkland described the increase of the Gypsy moth in Mass. now that the State has abandoned its warfare against the pest, and stated that the Brown-tail moth has become well established in the oak woodlands of Eastern Mass., which thereby become a constant source of infestation.

He recorded the breeding of very large numbers of *Diglochis omnivorus* from pupæ of the latter moth.

Dr. Howard expressed the opinion that these parasites were secondary, and that the primary parasite was probably a *Pimpla*.

Mr. Lochhead described in a most interesting manner a collecting trip into the Abbitibi region, where remote from all cultivated areas large numbers of *Pieris rapæ* imagoes were taken.

Mr. Corbett has recently devoted considerable attention to spraying outfits, and has succeeded in perfecting a duplex nozzle for applying the mechanical mixture of kerosene and water. He hoped in time to devise some form of compressed air outfit which should prove satisfactory in applying this and other sprays.

The best of the "wine" came at the "last of the feast." Although the hour was late, no feature of the meeting was more enjoyed than the remarks of Dr. Fletcher, who vividly described a long collecting and lecturing tour made through the west of the Canadian Dominion last summer. The breeding of certain Trypetas in Canada thistle, with their parasite *Solenotus*, and another in sunflower stems, were described, together with an interesting outbreak of *Loxostege sticticalis* in Manitoba and the N.-W. Territories. Here the insects, after devouring their chosen food-plant, *Chenopodium*, attacked various other forms of herbage, and even, rarely, wheat plants. The marching of the larval swarms in June and September attracted much attention and aroused unnecessary alarm. An experiment with the South African fungus *vs.* locusts in Manitoba was unsuccessful. Dr. Fletcher has this year succeeded in procuring eggs and breeding certain rare lepidoptera, viz.: *Leucobrephos Middendorffii* and *Apocheima rachelæ*, and has now the life-history of these two species worked out in full.

In closing, Dr. Fletcher spoke feelingly of the assistance he and other Canadian Entomologists had constantly received from his confreres on the other side of the line, particularly from Messrs. Howard and Marlatt, while the sentiment of his audience was that the acquaintance and friendship of workers like Messrs. Fletcher, Bethune, Lochhead and others on the Canadian side was sufficient reason to make all desire the immediate annexation of the Dominion.

The meeting adjourned to meet again the following evening.

A. H. KIRKLAND, Secretary.

SYNOPSIS OF ANTHOPHILA.

BY CHARLES ROBERTSON, CARLINVILLE, ILLINOIS.

This is one of a series of papers—Andreninae, Tr. Am. Ent., Soc. 28: 187; Halictinae, CAN. ENT. 34: 245, 1902; Sphecodinae, Ent. News 14: 103; Megachilidae and Bombinae, Tr. Am. Ent. Soc. 29: 163; Nomadinae, CAN. ENT. 35: 172; Epeolinae, CAN. ENT. 35: 284, 1903—intended to bring together the results of studies of the bees of the neighbourhood of Carlinville, Illinois.

The synopses are intended primarily to enable the student to distinguish the local species, and are based exclusively upon them, so that the characters assigned may not always be true of related things from beyond the district. In a given category I may mention certain characters which are common to all of the local representatives of a group, and may not mention those characters in the alternate category. Thus I say the Andrenidae have the mandibles bidentate, not mentioning them in Halictidae because they are various.

When a family, or superfamily, is named from a given genus, I hold that genus is the type of the family, and fixes the application of the family name as the one to which that genus belongs. The name Apidae has been used in three senses, and I use it in a fourth, but Apis always belongs to it.

The group of Apygidialia is placed first because it contains the lowest bees. It appears to be an older, more broken series, there being wide gaps between the different subdivisions.

In the superfamily Trypetoidea, Stelididae is defined to contain Trachusa, and no doubt Zacesta, in subfamily Trachusinae, and Anthidiinae as a second subfamily, with the tribes Anthidiini and Stelidini. The basal tooth of the claws of certain Megachilinae is not homologous with the inner tooth of Trachusa and Anthidiinae.

In Ceratinoidea I would include Exoneura in a separate family, Exoneuridae. I have seen *E. libanensis*, Friese. The most remarkable thing about the case of this insect is that any one should regard it as an inquiline. Allopade is evidently related here. There still remains a wide gap between these things and Xylöcopidae.

I would not separate Bombus and Psithyrus from Apidae. It seems that a similar treatment would result in endless families. Psithyridae is a relic of Schmiedeknecht's third section. Since he referred the inquilines to this third section, which had the rank of a superfamily, he was obliged to

erect a separate family for it. If this third section is rejected, there is no ground for the retention of Psithyridæ. The family Stelididæ of Schmiedeknecht is in the same case.

The presence of a distinct malar space is a common thing in the Apygidialia, occurring in all of the principal groups. It is rare in the Pygidialia.

The Pygidialia form a more recent, continuous series. I would separate the Halictidæ from the Andrenidæ on account of their structural differences, their different flight, and the fact that they have produced their own inquilines. The structural characters of *Paranomia*, etc., seem to justify their separation as a family. *Macropis* is separated in the same way. I do not think it is closely related either to Panurgidæ or to *Melitta*. *Halictoides* is referred to Dufouroidæ. This family differs from Panurgidæ by the cell III₁₊₂ being pointed on costa; the mandibles bidentate; labrum without basal space or process; the scopa femorilegid, the females collecting loose pollen; the face without coloured marks and without foveæ. Both families show considerable variation in the structure of the mouthparts. Indeed, *Rhophites*, in Dufouroidæ, has the labial palpi more highly specialized than in any other bee I have seen, joints 1-3 being flattened and 4 being simple and lateral. *Protandrena* I would refer to Protandreninæ, a sub-family of Panurgidæ. *Panurgus* is one of the exceptions among the Andrenoidea in having crurilegid scopæ and collecting loose pollen. The scopa is consequently less localized than in the local Panurgidæ, all of which mix the pollen with honey.

In Melectidæ I would include a number of genera referred by Ashmead to Stelididæ—*Ammobatoides*, *Biastes*, *Pasites*, *Neopasites*. In *Ammobatoides punctatus* the female does not show a distinct pygidial area, but the male shows a distinct pygidial process. The postscutel in *Ammobatoides* and *Biastes* differs from that of local species in being more protuberant and surpassing the scutel.

The Euceridæ and Emphoridæ are separated in families which seem sufficiently distinct from Anthophoridæ.

Finally, there remains a possibility that the Pygidialia and Apygidialia had an independent origin from the pygidial and apygidial Sphecoidea. In that case, the Anthophila would not form a natural group.

In the description of the venation the nomenclature of Comstock and Needham, *Am. Nat.* 32: 414, 423, has been followed, except that III, IV and V are used for R, M and Cu; V₁ for M₄; V₂ for Cu₁;

VI (1st Anal) for Cu_2 ; vein a for $m-cu$, which 1 hold is the cross-vein element of the arculus (basal nervure); IV_3 in my table is the first recurrent nervure; cell 1st IV for M; 2nd IV for M_4 ; V_1 for M_1 ; V for Cu_1 ; VI for Cu. * Section 1 of vein IV = the vein separating cells III and 1st IV; when not otherwise indicated segment = dorsal segment of abdomen. Scopa relates to the ventral surface of the abdomen of females of Trypetoidea, and to the hind legs of other bees; it is the brush in which females place and carry their pollen, and is not applied to other parts or to bees which do not collect pollen; m. p. 6 = maxillary palpi 6 jointed; m. p. 1 longer than 2 = basal joint of maxillary palpi longer than the second; l. p. 1 = basal joint of labial palpi. Joints 3-4 are usually simple and subequal; 1-2, however, may be either one or both flattened, or may be both simple and, in either case, may vary greatly in length. I have adopted a formula giving the measurements of these two joints in $1/10$ mm. Thus in Xylocopidae l. p. 17:5 means that the basal joint is $17/10$ mm, and the next $5/10$ mm, and also indicates that 1 is more than three times as long as 2.

This synopsis is based upon the females, but the characters of the males have influenced me in some cases where changes were made. Usually the males of Pygidialia have a distinct pygidial area on segment 7, often on a distinct process, but some of them show no sign of it.

ANTHOPHILA.

Females.

Segment 6 exerted or retracted, with a pygidial area 11.

Segment 6 exerted, without a pygidial area 1.

I. Apygidialia.

Vein IV_2 never strongly bent or directed outward before joining m ; no facial foveæ; glossa filiform; m. p. shorter than galea 1.

Vein IV_2 strongly bent or directed outward before joining m ; glossa flat, bilobed; l. p. simple, at most 1 = 2-3; m. p. 6, longer than galea; facial foveæ present; mandibles bidentate; cell III_{1+2} acuminate beyond vein III_4 a.

a. Colletoidea

Submarginal cells 2, III. + III_3 and III_4 , the first much longer; stigma large; cell III_{1+2} pointed near costa; vein IV_3 before or opposite

*Macroxyela seems to me more typical than the composite type of the authors, because the arculus is nearer the base of the wing, where it might be expected in a primitive case. To be sure, it does not show vein VI., but the position of that vein is indicated by an angle. See Comstock, Manual, 606.

III₅; *a* arcuate, about four times as long as section 1 of IV; *m* about as long as V₁; facial foveæ linear; black, at least the bases of tibiæ yellow; nearly bare; no scopa;

Prosopis in (1) Prosopididæ.

Submarginal cells 3, III as long as III₄ + III₅; stigma middle-sized; cell III₁₊₂ with apex bent away from costa; vein IV₃ about middle of cell III₅; *a* only a little longer than section 1 of IV; *m* longer than V₁; facial foveæ clavate or oblong; black, abdomen with pubescent fasciæ; pubescence ordinary; femorilegid, scopa plumose, on trochanter, femur and lower border of tibia;

Colletes in (2) Colletidæ.

1. Submarginal cells 3; labrum wider than long, not concealed by mandibles, except sometimes at apex; l. p. 1-2 flat. 2.

Submarginal cells 2, III and III₄₊₅, subequal; labrum longer than wide, base usually concealed by mandibles, apex often showing beyond them; mandibles at least bidentate; l. p. 1 usually shorter than 2. b.

b. Trypetoidea.

Claws cleft, inner tooth subapical; vein *a* usually before V₂; IV₂ rarely before III₄; scutel surpassing postscutel; abdomen with coloured ornaments; *Anthidiina* in (3) Stelididæ.

Claws simple, sometimes with a basal tooth; vein *a* usually beyond V₂; IV₂ always before III₄; scutel rarely surpassing postscutel; abdomen usually with pubescent fasciæ. (4) Megachilidæ.

2. Apex of segment 6 obtuse, without a spine or mucro. d.

Apex of segment 6 with a spine or mucro, a little concave before the point; m. p. 6. c.

c. Ceratinoidea.

Cell III longer than III₅, equals III₄; stigma large; cell III₅ strongly narrowed above; vein *a* arcuate; IV₃ near apex of cell III₅; apex of segment 6 mucronate; no malar space; mandibles tridentate; blue-green, clypeus, tubercles and knees each with a white spot; nearly bare; femorilegid, scopa simple, on anterior faces of femur and tibia, thin on femur; l. p. 8:7; 5-9 mm; *Ceratina dupla* in (5) Ceratinidæ.

Cell III shorter than III₅; stigma obsolete; cell III₁₊₂ longer than 2nd IV; III₄ as large as III + III₅; III₅ narrowed to a point above; vein *m* longer than V₁; IV₃ opposite III₅; IV₂ beyond middle of cell III₄; ocelli large, in a triangle on the front; *a*

carina between antennæ; clypeus flat; labrum small, with a basal tubercle; malar space distinct; mandibles bidentate; m. p. longer than stipes, 1 about one-half as long as 2, 2 = 3, 3 = 4-6; galea enormous, broad, acuminate, rigid; l. p. moderately flattened, 17: 5, 3-4 minute; segment 6 with strong apical spine and two converging rows; hind metatarsus nearly twice as long as tibia, the latter with an excavated process; scopa simple, almost limited to metatarsus; black, with metallic reflections; thorax above with ochraceous pubescence; 21-25 mm. *Xylocopa*

virginica in (6) Xylocopidæ.

d. Apoidea.

Cell III shorter than III₆; stigma small; vein IV₃ before middle of cell III₅; malar space distinct; mandibles broad at apex; hind metatarsus shorter than tibia (7) Apidæ.

II. Pygidialia.

Clypeus protuberant or mandibles beveled so as to show all of labrum or a great portion of it; labrum large, without basal process; posterior angle of mandible before posterior line of eye; thorax in profile declining beyond scutel, postscutel on posterior face, metathorax at most a little convex; stigma small or middle-sized, rarely large; glossa filiform; l. p. 1-2 flat; the hosts collect loose pollen and are crurilegid.* b.

Clypeus hardly protuberant and mandibles not beveled; usually the labrum is small, concealed, except at base, and with a basal process; posterior angle of mandible not before posterior line of eye; metathorax produced beyond postscutel, in profile at least strongly convex, usually with a posterior and a discal space; stigma large, rarely middle-sized; vein *m* at most hardly longer than V₁; segment 6 usually retracted, the pygidial area then concealed under 5; glossa acute, flat, rarely filiform; l. p. 1 various, 2-4 simple; scopa femorilegid, on trochanter and anterior faces of femur and tibia, in those which collect loose pollen, crurilegid in those which mix the pollen with honey* a.

a. Andrenoidea.

Tegulæ very large; segments 2-4 with greenish, somewhat opalescent apical fasciæ; cell III₁₊₂ longer than 2nd IV, not acuminate beyond vein III₄; 3 submarginal cells, III about as long as

*Scopa wanting in inquilines.

III₄, III₅ shorter, subquadrate, with vein IV₃ beyond its middle ; m. p. 6, a little longer than galea ; l. p. simple, 5:1 ; glossa lance-linear, acuminate, shorter than mentum ; mandibles bidentate ; femorilegid, scopa plumose, a simple curl on base of femur ; 17 mm ; *Paranomia Nortonii* in (3) Nomiidæ.

Tegulæ ordinary 1.

1. Labrum free from mandibles, as large as clypeus, shorter than wide, transversely striate, without basal process ; cell III₁₊₂ pointed on costa ; 2 submarginal cells, subequal ; femorilegid, scopa simple, a thin floccus on trochanter plumose ; mandibles bidentate ; m. p. 6, longer than galea or stipes ; l. p. simple, 6:4, longer than mentum ; glossa lance-linear, acuminate, longer than mentum ; nervures pale ; thorax with dull ochraceous pubescence ; segments with apical margins pale testaceous ; 7-8 mm ; *Halictoides marginatus* in (4) Dufouroidæ.

Labrum ordinary 2.

2. Hind tibia and metatarsus broad, with dense simple hairs, white on former, black on latter ; pollen mixed with honey carried mainly on anterior faces of both joints ; cell III₁₊₂ pointed on costa ; 2 submarginal cells, III and III₄₊₅, subequal ; vein *m* about equal V₁ ; mandibles bidentate ; m. p. 6, shorter than galea l. p. simple, 2:1 ; abdomen closely and coarsely punctured ; 9 mm ; *Macropis steironematis* in (5) Macropididæ.

Hind tibia and metatarsus ordinary 3

3. Cell III₁₊₂ truncate ; 2 submarginal cells ; facial foveæ present, narrow, glabrous ; mandibles simple ; labrum with a median area ; crurilegid, pollen mixed with honey carried mainly on anterior face of tibia (6) Panurgidæ.

Cell III₁₊₂ pointed on or near costa, acuminate beyond vein III₄ ; usually 3 submarginal cells, III = III₄ + III₅, or nearly ; vein *m* shorter than V₁ ; femorilegid ; m. p. 6 ; l. p. simple, at most 1 = 2-4 ; glossa shorter than mentum ; vein *a* rarely a little before V₂ . . . 4.

4. Vein *a* strongly bent or arcuate ; *m* quite oblique to line of V₁ ; IV₃ beyond middle of cell III₅ ; no facial foveæ ; scopa plumose, femur with long hairs posteriorly* ; m. p. longer than galea, shorter than stipes ; glossa lanceolate or lance-linear, acuminate (1) Halictidæ

*Scopa wanting in inquilines.

Vein *a* slightly arcuate; *m* nearly parallel to line of V_1 ; facial foveæ large, pubescent; mandibles bidentate; labrum with a basal process; scopa various, curl on trochanter and tuft on side of metathorax plumose; l. p. 1 arcuate.....(2) Andrenidæ.

b. Anthophoroidea.

Vein *m* shorter than V_1 ; labrum free from mandibles, except when much longer than wide; mandibles usually before middle of eye, the eye usually bulging behind them; pygidial area usually concealed by segment 5; pubescence rarely long and dense; scopa absent.....(7) Melectidæ.

Vein *m* distinctly longer than V_1 ; 3 submarginal cells, III shorter than $III_4 + III_5$, segment 6 exerted, showing pygidial area.... 1.

1. Cell III_{1+2} oblanceolate, shorter than 2nd IV, apex rounded, not bent away from costa nor separated for any great distance; stigma obsolete, or nearly; vein *a* straight; V_1 in line with IV_3 , the latter parallel with *m*; metathorax truncate in profile; mandibles bidentate, not clasping labrum; scopa simple, on anterior face of tibia, a little pollen extending on base of metatarsus; m. p. 6, 1 hardly more robust than 2, at most hardly more than one-half as long; l. p. 1 at least three times as long as 2, much longer than paraglossæ.....(9) Anthophoridæ.

Cell III_{1+2} lanceolate, usually longer than 2nd IV, apex acute, bent away from costa and separated for some distance; cell III_4 strongly narrowed above; vein *a* beyond V_2 ; metathorax usually more convex in profile; mandibles simple or with an apical notch; scopa on tibia and metatarsus..... 2.

2. Vertex crested, usually a little concave on each side, ocelli near its edge; middle joints of antennæ at least as long as wide; edge of labrum thin, hairy, clasped by closed mandibles; m. p. 1 twice as thick and at least about twice as long as 2; l. p. 1 longer than 2; paraglossæ at least as long as l. p. 1-2; scopa mainly on anterior faces of tibia and metatarsus, a little more copious on tibia; metatarsus broad, with a posterior apical appendage.....(10) Euceridæ.

Vertex not crested, strongly convex from side to side, ocelli more remote from its edge; m. p. 6, 1 hardly more robust than 2; l. p. 1 at most little longer than 2; paraglossæ shorter than l. p. 1-2; scopa black, thinly plumose, more strongly developed on outer border of tibia and posterior outer face of metatarsus; metatarsus narrow, poster apical appendage obsolete, or nearly....(11) Emphoridæ.

MISCELLANEOUS NOTES ON APHROPHORA PARALLELA,
SAY.

BY A. ARSENE GIRAULT, BALTIMORE, MD.

This Spittle insect of the Pine was abundant on two trees on the campus at Blacksburg, Virginia, last summer, and an attempt was made to observe its oviposition and to work out its complete life-history.

Owing to lack of time this was not successful, but the following notes may be of some interest :

The Protective Secretion.—The material under which the nymphs live consists of a clear albuminous liquid, exuded by the insect, mixed intimately with bubbles of air introduced by the nymph after secretion ; it is tasteless, or slightly salty.

The mass is situated on either side of the twig, immediately back of the new growth as a rule. In 80 cases observed 76 were thus placed, the remaining four were several inches below the new growth. Only a single mass of secretion was usually found on a twig. As the insects increase in size and grow older, they become somewhat erratic and settle almost anywhere ; in the pupal stage they move in towards the trunk of the tree. The number of nymphs in a mass varies, generally there is only one, but as many as six or seven have been found. Those containing but a single nymph are easily distinguished from those including several by their relative size. A recently secreted mass is characterized by the imperfect state of its emulsion, the bubbles being large and the fluid consequently more or less clear ; in an old mass, the nymphs having been settled for some time, the bubbles are minute and the fluid is opaque.

Habits of the Nymph.—The nymphs move about at will, and wherever they settle cover themselves with the protective fluid, but as a rule they seldom move unless disturbed. As an experiment a nymph was removed from its position at 3.35 p.m. on May 13th, it crawled four inches down the twig and then back, occupying twenty minutes ; then it wandered about for nearly three-quarters of an hour, apparently sucking at times ; at 4.33 p.m. it climbed up about one-third of the length of a leaf and inserted its beak, the setæ only entering ; at 4.45 secretion had begun, and a shiny, colourless fluid was exuded from the anal opening and distributed along the body by the legs, this also served to mix the air with it. At 5 the insect had a cushion of air-bubbles under it, and five minutes later it moved on with part of the cushion towards the end of the twig. For nearly half an hour it wandered about, sucking at intervals,

and at 5.31 settled on another leaf nearer the end of the twig. Here the setæ were inserted and secretion was renewed. At 5.45 it moved again and crawled back nearer the end of the old wood and took up its final position lengthwise between the bases of two leaves. At 7.30 it had shifted its position to the other side, and there was no noticeable secretion. At 5.45 the next morning (May 14th) it was still in the same place and entirely covered with its secretion.

During the process of secretion the fluid flows slowly along the venter from a point near the anal opening, and gathers between the legs, where, by their alternate agitation, it becomes mechanically mixed with air and forms the cushion of air-bubbles.

Another nymph was taken at 3 p.m. on the 14th from its position beneath the protective mass and placed at an inch from the end of a limb; it crawled about two inches further down and settled with its head close to the base of a leaf, where it immediately inserted its setæ; secretion began at once, but was hardly perceptible until about 3.15, when a cushion of air-bubbles was noticed under the thorax and abdomen, especially surrounding the lower half of the latter. The insect then lowered the tip of the abdomen until the anal opening was under the fluid, when it began to generate bubbles of air, each bubble being followed by a dip in and out of the tip. This dipping in and out of the fluid was followed at short intervals by extensions of the abdomen, apparently to take in air, and then was renewed. The following count was made: 77 continuous dips producing 77 bubbles, then an extension, followed by 60 continuous dips.

By thus blowing out the fluid, it gradually submerged the abdomen and the rest of the body (3.37 p.m.). After the nymph was covered, the secretion of fluid and exudation of air continued until the body was completely hidden; the secretion was afterwards steadily maintained, for if it were not it would soon dry up. It is evident that the air is taken in at each upward and outward dip of the abdomen, and let out in the form of a single bubble at each inward and downward dip into the fluid. During this dipping process the ventral anal plates are in transverse motion like jaws, and it is probable that the secretory glands are between them.

The nymphs have the habit of extending the abdomen at regular intervals beyond the frothy mass; this is also done when they are walking. Their locomotion is slow, tedious and deliberate, but they can move quite fast, in a rambling fashion, when they are disturbed. Their position in

the mass is one of convenience, the tip of the abdomen being near the surface, and when disturbed they move to the other side.

The following dates were recorded: May 11-12, 2nd moult; May 15-18, 3rd moult; May 26, 4th moult, pupæ; June 11, 5th moult, adults, several pupæ still present; July 5, adults to be found, but gradually disappearing.

Description of the Nymph.—The colours in the larval state are the same throughout, with minor variations for successive stages. As the nymphs become older and larger the colours are more pronounced, the eyes becoming wholly red and annulate with ochreous. The stages are not simultaneous throughout the colony; the difference in size between the different stages is noticeable. The wing-pads are faintly seen in the 4th stage.

Third stage, 2nd moult (see figure).—Head, thorax, antennæ, beak, legs, eyes, supra- and infra-anal plates, overlapping lips of tergites on

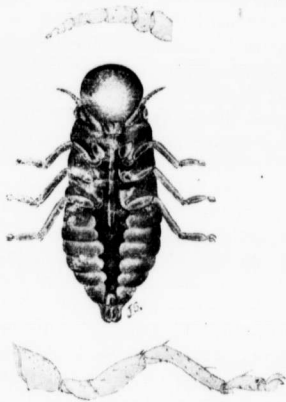


Fig 1.

ventral segments, glabrous black; abdomen, median line of head and thorax, edges of prothorax, knees, and two basal articulations of legs, most of thoracic sternum, dorsal thoracic articulations, ochreous yellow; abdominal sternum blood-red, gradually shading into ochreous latero-dorsad. General shape that of an alligator; head prominent, constricted, large, distal two-thirds broadly rounded, blunt and subquadrate on dorsal aspect, blunt and subquadrate on cephalic aspect, basal third as wide as thorax; antennæ short; setiform, not as long as head, 9-jointed, first joint rectangular, flat above, 2nd globular, 3rd cylindrical, as long as the next two combined, 4th and 5th and next three sub-equal respectively, terminal joint minute, ending in a hair; the antennæ are inserted on the side of the head at the constriction, just cephalad of the eyes; eyes prominent, bulging, comparatively large, situated on basal third of the head, on the lateral

aspect, suffused red and black; thoracic segments normal; legs comparatively large; tarsal joints two, the distal twice as long as the basal, bearing two large claws; distal end of tibia bearing a semicircle of stout long spines beneath; femur ochreous beneath; beak long, 3-jointed, reaching to 4th abdominal segment, black marked with ochreous; abdomen longer than head and thorax combined, broad at base, tapering, 9-jointed, the tergites extending well beneath to the ventrum, and each ending in a leaf-like plate, coloured black and ochreous (two terminal ones black), forming a broad channel along the median line, the bed of which is formed by the sternites; 3rd sternite bearing a peculiar nipple-like red fleshy process, hidden by the overlapping tergites, minute, analogous to that in the locusts (*Acrididæ*) between the bases of the cephalic coxæ. Length, full-grown, 6.25 mm.

After a moult the nymphs are softer and pale, the thorax and head lemon-yellow, the abdomen dark along the mesero-, yellow at the latero-cephalic angles and at tip; reddish beneath and along the sides. Eyes black, annulate. Legs and beak pale yellow, the latter with a median line of red. The normal colours are acquired in about an hour and a half.

Pupa (5th stage).—General shape and colour of the preceding stages. Body pale ochreous yellow, mottled on head, thorax and wing-pads with more or less diffuse brown; tip of abdomen verging to black; eyes red, with some black; antennæ black, glabrous; legs concoloured with head and thorax. General colour varies from pale ochreous brown to brownish-black with pale mottled streaks. Underneath ochreous, with red on sides of abdominal segments and black down the median line. Head distinctly striate on ventral and lateral aspect. Wing-pads not large, but easily noticeable; process between abdominal tergites on ventrum absent. Length 6.25–8 mm.

Adult.—June 11th to 21st, adults found and watched continuously, June 22nd, found adults crawling slowly about on the branches, with a movement similar to that of the nymphs; found at rest generally where the young nymphs locate; not easily disturbed, and rather sluggish, but when touched they jump awkwardly to some distance, making a sound similar to that of a steel spring when suddenly loosened; the jump is made with much force. They are easily observed and seem to spend their whole time in feeding, remaining quietly in a position similar to that of the young nymphs. When once settled they very seldom move, but remain quiet like a piece of the tree itself; the only evidence of life is given by the forcible ejection of small, colourless, tasteless drops of a

watery secretion at regular intervals, three or four drops are emitted every two or three seconds; three drops every two seconds is a usual amount. On June 23rd, after watching for two days at a time, during all hours of day and night, two were at last found *in coitu*. They were end to end, and remained united for twenty hours. Although during several days following, pairs were found connected and were watched constantly, and after separation the female was in some few cases isolated, and in others left free and undisturbed, no signs of oviposition were ever indicated. They were always quietly feeding or wandering from place to place, with, apparently, no care but that of feeding, no aim but to rest. Gradually they disappeared; there is probably but a single brood in this locality.

A NEW BEE IN THE GENUS *DIPHAGLOSSA*.

BY J. C. CRAWFORD, JR., WEST POINT, NEBR., AND E. S. G. TITUS,
WASHINGTON, D. C.

Spinola in 1851 described and figured *Diphaglossa Gayi* as a new species and new genus closely related to *Anthophora*. It was founded on males and females collected in northern Chili, "Santa Rosa, Coquimbo, etc." He figures the insect (natural size), face view of head and mouth-parts, wing, antennæ and leg.

F. Smith in 1854 gave a partial description of the genus, probably not from specimens, reporting the male only as known. He placed the genus immediately after *Anthophora* in his catalogue, and Dalle Torre in his catalogue in 1896 has followed Spinola and Smith in placing the genus in the *Anthophoridae*.

In 1898, in a monograph of several closely related genera of bees (*Megacilissa*, *Caupolicana*, *Diphaglossa* and *Oxæa*), Dr. H. Friese regarded *Diphaglossa* as an offshoot of *Megacilissa*, which, according to his view, had been derived from *Colletes* through *Caupolicana*. He had examined males and females from "Santiago and Valdivia (Lossberg)," and 6 females and 1 male from "Chili (Phillippi)," in the Vienna Museum.

In his "Classification of the Bees," in 1899, Dr. Wm H. Ashmead placed the genus in the family *Colletidae*, citing most of its principal characters in the generic table for the family.

Diphaglossa, Spinola, 1851, and *Diphaglossa Gayi*, Spinola, 1851.

Spinola, 1851, Gay: Hist. Fisc. de Chili, Zoology, VI., pp. 168-170, plate 1, fig. 1, ♂ ♀.

F. Smith, 1854, Catalogue Hymen. Brit. Mus., II., p. 343-344, ♂.

Dalle Torre, 1896, Catalogue of the Hymenoptera, X., p. 297, ♂.

Friese, 1898, Ann. Naturhist. Hofm. Wien., XIII., p. 61, 72, 76, 77, ♂ ♀.

Ashmead, 1899, Trans. Amer. Entom. Soc., XXVI., p. 94.

Diphaglossa is characterized by the peculiarly elongate, triangular head, the face being three times as wide at the vertex, from eye to eye, as at the base of the mandibles along the clypeal margin; clypeus elongated, twice as long as broad, longitudinally striate; mandibular space much elongated, punctured, longitudinally striate; antennæ reaching beyond tegulæ; mandibles bifid at tip; labial palpi 4-jointed, three basal joints subclavate, fourth joint longest, more slender and slightly tapering; maxillary palpi 6-jointed, joints subclavate, except the last, which is slender, slightly tapering, fourth and sixth joints almost equal, second shortest, first longest; wings with marginal cell slightly appendiculate, first cubital cell longest, but not as long as second and third united, third smallest, narrowed above, first recurrent nervure entering second cubital cell at the middle, second recurrent nervure more or less curved, entering the third cubital beyond the middle; transverse median nervure entering before radial nervure and weakly angulated; first joint of tarsi flattened, elongate, claws bifid and with a pulvillus; metathoracic truncation narrow, almost perpendicular, no row of pits present; abdomen with distinct dorsal and ventral hair bands.

Spinola has figured the tongue as emarginate and with two pairs of slender "filaments," the apical pair very long. While the tongue is undoubtedly emarginate, the "filaments" are missing in all of the specimens we have examined. However, Dr. Friese states that the paraglossæ are slender and threadlike, extending beyond the tip of the tongue. Spinola states that the mandibles have three teeth, but his figure shows but two, and he also gives the hind tibiæ as unispinose. Dr. Friese has corrected this, stating that they are spined as usual, and in all the specimens we have examined they have two spines.

Diphaglossa Gayi, Spinola, the type of the genus, is described as black, with a long-haired red abdomen, and Dr. Friese notes that it resembles in habitus the red-haired *Bombus pascuorum*. The wings are thickly set with fine short hairs.

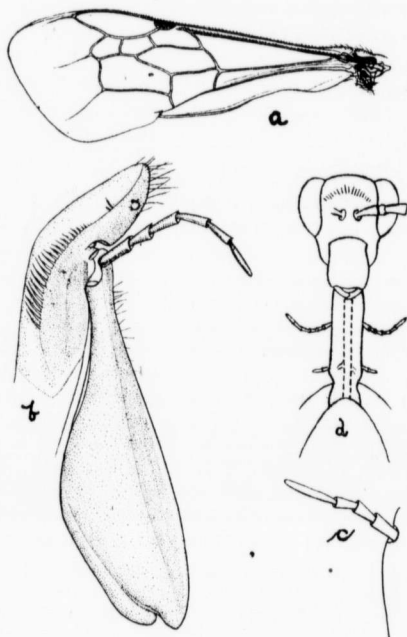


FIG. 2.

Diphaglossa Spinola: a, wing; b, maxilla and maxillary palpus; c, labial palpus.
Diphaglossa Gayi, Spin.: d, face and mouth-parts. (Copied from Spinola's Fig. 1a.)

Diphaglossa Spinola, n. sp. (Figure 2.)

♂.—Length 10 mm. Black, head, thorax and first two dorsal and ventral abdominal segments clothed with golden-yellow pubescence, very dense on face, cheeks and thorax; clypeus remarkably long, obsoletely crenulate at apical margin, mandibular space with large sparse setigerous punctures, often so large as to cross several of the longitudinal striæ; labrum black, polished, with several minute tubercles, the central one the

largest; mandibles black at base, red at tips, the outer tooth longest and pointed; there are two grooves running from the tips to the base of the mandibles; antennæ brownish black, second joint small, globular, third joint very slender at base; tegulæ shining, reddish, wings with dark veins, second recurrent nervure weakly curved, entering third submarginal cell about two-fifths of its length from its apex; wings set with fine short hairs; legs black, with long, thick, gray hair, tarsi reddish, pubescence inclining to fuscous, tips of claws very dark; punctures of head and abdomen medium and quite close, of the mesothorax sparse, the metathorax smooth; abdomen with dorsal and ventral segments 1-6 having apical appressed hair bands, varying from gray to yellow; some short yellowish pubescence on dorsal segments 3-7, and still more short pubescence on ventral segments.

Habitat: La Paz, Bolivia, 14th November, 1898. 7 ♂ specimens.

One ♂ placed in U. S. Nat. Mus., type No. 6854.

In one specimen the pubescence is quite gray, perhaps only faded.

The drawings for the figures, excepting the copy of Spinola's figure, were made by Mr. Otto Heidemann, of the Division of Entom., U. S. Dept. of Agriculture.

The authors desire to express their thanks to Prof. Lawrence Bruner for his kindness in loaning three specimens of this species from the collection of the University of Nebraska.

THYREOPUS LATIPES, SM.

♀ and ♂ new to Vancouver. Hitherto only the male of this fossorial wasp had been known. The males recorded in the literature came from Nova Scotia, Canada; Montana, Colorado, Arizona, Oregon and Washington. The female is related to *T. medius*, Fox, but differs in size, sculpture and ornamentation, particularly in the contrast between the deep median sulcus on the metanotum and the regular subdued sculpture adjoining. In *medius* the sulcus is not sharply outlined, nor is there a strong contrast between it and the sculpture of the adjoining area which is rough. The female of *T. latipes* is much like the male, and is readily referred to its fully described sex. Prof. Harvey sent one female taken 21st June, 1903, and one male 19th June, 1903, to Dr. Henry Skinner, who referred them to me for identification.

HENRY L. VIERECK, New Haven, Conn.

MISCELLANEOUS NOTES.

As the Editor expresses willingness to receive notes on any entomological subject, I give my experience with "vertical" inflation of caterpillars. I have done a great deal of inflating, and find three bad faults with the common horizontal ovens.

1st. The air pressure necessary to extend the caterpillar often is enough to force the skin out of shape.

2nd. By beginning the drying at the tail-end one sometimes discolours the rear segments when it comes to using heat sufficient for stewing the juices out of the head.

3rd. The caterpillar has to be twirled around, and as the hand becomes tired pencils and hairs are likely to be rubbed off.

At the end of 1902 I took my lamp-chimney oven, cut a few notches at the bottom for ventilation and turned it upright on a sand bath heated from below. In this my specimens dried like a charm. Gravity helping, almost no air was needed, there was no twirling, and the heads received the first and greatest heat. I got good results with such caterpillars as full-grown *Acronycta Americana*, almost impossible to inflate by the usual method. Being hurried, I, in one or two instances, finished up the tail ends of the fleshy specimens in the ordinary oven, and I hardly did work enough to conclusively prove the experiment. Still, it is full of possibilities, and it is perfectly obvious that with twirling given up one can use a water column for air pressure and attend to several ovens at the same time.

With the exception of Mr. Merrick's "Haploas," photographed in the January number of the Entomological News, the writer never saw a drawer of specimens that were even approximately in line. I know my own all veer to the right. This winter I sawed off a wooden T-square, and now by running it along the front edge every pin goes in mathematically correct.

Mr. Lyman's statement about the ease of raising *Papilio brevicauda* is fully endorsed. I once had a dozen or thirteen of these caterpillars; fed them first on parsley, then on parsnip tops, and finally on their native food-plants, obtained from the Lower Provinces by the kindness of Mr. Winn. They all went into pupa, were brought into the kitchen about Christmas time, and all but one hatched,

DWIGHT BRAINERD.

NOTES ON NORTH AMERICAN STRATIOMYIDÆ.

BY A. L. MELANDER, CHICAGO.

(Continued from page 24.)

List of the species of *Odontomyia* studied.

1. *O. binotata*, Loew.
Chicago, Ill. (July); Austin, Tex. (May); Colo.
2. *O. cincta*, Olivier.
Chicago and Algonquin, Ill. (June).
3. *O. dorsalis*, Fabricius.
Hayti.
4. *O. arcuata*, Loew.
Chicago, Ill. (July); Colo.
5. *O. nigrirostris*, Loew.
Chicago, Ill.; Austin, Tex.; Colo.; Lusk, Wyo. (August).
6. *O. nigerrima*, Loew.
Chicago, Ill. (May).
7. *O. pilosus*, Day.
Vancouver Isl. (June).
8. *O. trivittata*, Say.
Chicago, Ill. (July); Mexico.
9. *O. vertebrata*, Say.
Chicago, McHenry, Ill. (June, July).
10. *O. hydroleonoides*, Johnson.
McHenry, Ill. (June).
11. *O. Aldrichi*, Johnson.
Galveston, Tex. (June).
12. *O. virgo*, Wiedemann.
Virginia; Maryland; Toronto, Ont.; McHenry, Ill. (June, July).
13. *O. pilimana*, Loew.
McHenry, Chicago, Ill. (June, July).
14. *O. microstoma*, Loew.
Woods Hole, Mass. (July).
15. *O. pubescens*, Day.
Chicago, Ill. (May).
16. *O. interrupta*, Olivier.
Chicago, McHenry, Ill. (May, July).
17. *O. hieroglyphica*, Oliv.
Chicago, Ill. (August); Austin, Tex. (May).
18. *O. flavicornis*, Olivier.
Austin, Tex. (April).

In addition to the species here mentioned, there are three undetermined specimens. One of these represents an undescribed genus, but is mutilated. The other two belong to *Cyphomyia*; of these one is from Austin, Texas, the only recorded instance of this genus being taken within the United States. As the descriptions of *Cyphomyia* are not accessible to me, these species must be omitted.

CATOCALÆ IN DR. HOLLAND'S MOTH BOOK.

BY G. H. FRENCH, CARBONDALE, ILL.

Within the last few years three books have taken their place in the scientific literature of this country that should make a great advance in the study of natural history in our high schools. The first was "The Butterfly Book," by Dr. W. J. Holland; the second, "The Insect Book," by Dr. L. O. Howard, and the third, recently out, "The Moth Book," by the author of the first. The cheapness of these three volumes places them within the means of any high school that makes any pretense to having a reference library, while the excellent plates, photographed from the specimens, make them of great value to the young who desire means for identifying their captives.

Without taking further space to speak of the general merits of "The Moth Book," I wish to point out a few errors in the names of the plates of Catocalæ. Plate 31, figure 14, is given as *C. obscura*, Strecker. This is evidently *C. residua*, Grote. The fringes of the hind wings of *C. obscura* are white, or white with only the fringe at the ends of the veins black. In *C. residua* there is only a very little white at the apex of the hind wings, as in this figure.

Plate 35, figure 13, is given as *C. Stretchii*, Behr. This is probably *C. Mariana*, Hy. Edw. I have bred *C. Stretchii* from eggs, and find the fore wings quite variable within certain bounds, but in none of them is there the colouring of *C. Mariana*. The hind wings have two characteristic marks; the median band very narrow and terminating in a distinct hook, and a patch of red at the apex outside the black band, but inside the white fringe. Below the apex there are smaller red patches between the black veins. The fringes are white except where the black of the veins extends into the fringe.

I am glad to see *C. amasia*, A.-S., as figure 1, plate 35. I would have furnished Dr. Holland with a specimen of its companion, *C. Cordelia*, Hy. Edw., having the same range of locality, if I had known he desired it.

NEW SPECIES OF NORTH AMERICAN TABANIDÆ.

BY JAMES S. HINE, COLUMBUS, OHIO.

Chrysops fulvistigma, n. sp.—Female. Palpi yellowish, antennæ slender, first segment yellowish, slightly darker at apex, second and third segments brown, annulate portion nearly black. Face shining black, covered next the eyes and on the anterior parts of the cheeks with yellowish-gray pollen. Front yellowish-gray pollinose, callosity and region surrounding the ocelli shining black. Thorax dark, nearly black, with grayish pollen above, giving the impression of stripes before the suture; coxa, basal two-thirds of femur and base of tibia of anterior leg, and nearly the whole tibia and base of tarsus of middle leg, yellow; remainder of legs dark, nearly black. Wing almost hyaline, costal margin from base to apex, and a narrow cross-band abbreviated behind pale brownish, stigma conspicuously brownish-yellow. Abdomen yellow at base, black at apex. Dorsally, a large, nearly square, black spot beneath the scutellum reaching the posterior margin of the first segment. Second segment with two contiguous, black triangles, their bases on the posterior margin of the segment and their apexes not attaining the anterior margin; otherwise the first two segments are yellow; remainder of the abdomen black, with the exception of a small, pale yellowish triangle on the third segment. Ventrally the first two segments are yellow, with the exception of a linear, black spot on each lateral margin, and a suggestion of the same colour at middle. The yellow also extends back on to the third segment on each side of the midventral line.

Length slightly more than 7 millimeters. Two females taken at Raleigh, N. C., by C. S. Brimley, July 15 and 17.

A very distinct and interesting species. It has somewhat the aspect of *lugens*, Wied., *univittatus*, Macq., and *obsoletus*, Wied., but the nearly hyaline wings and black face are characteristic. As a pale brownish colouring follows the costa to the apex of the wing, the species may be said to belong to the group with an apical spot, and is the second North American species of the group with an entirely black face, but this one lacks the yellow pollinose stripe from base of antennæ to margin of mouth, a character very evident in *frigidus*, O. S.

The species is larger than *nigribimbo*, Whitney, and not to be confused with it except in coloration of wings.

Chrysops Brimleyi, n. sp.—Female. Palpi and proboscis black, antennæ about normal in length and thickness, first segment yellow,

remainder black, facial callosities and posterior cheeks shining black, middle of face yellow, next the eyes and a band from eye to margin of mouth below the facial callosity golden-yellow pollinose; front gray pollinose, frontal callosity and region of the ocelli shining black. Thorax clothed with white pile and grayish pollen, so that no stripes are evident even in the best preserved specimens, legs black with suggestions of yellow on metatarsi, and bases of tibiae of the middle and posterior pairs. Wings with anterior border, cross-band, apical-spot and spot at the bifurcation of the third vein black; the anterior border includes the costal cells, and nearly the whole of the first basal, the outer border of the cross-band proceeds backward from near the apex of the first vein, and reaches the anterior branch of the fifth vein near its outer third. The cross-band is abbreviated behind, leaving nearly half of the fourth posterior and the whole of the fifth posterior cells hyaline. The apical-spot is rather narrow and confined to the tips of the marginal and first and second submarginal cells. The abdomen is black in ground colour, with the posterior margins of all the segments thinly gray pollinose; in well-preserved specimens the first and second segments are gray pollinose all over, except a small dorsal spot on each, and on the second and third segments especially, the posterior margins expand into quite prominent triangles at the middle. The venter is shining black with narrow posterior margin of each segment pollinose.

Length 7 millimeters, some specimens slightly longer. A number of specimens taken at Raleigh, North Carolina, during the latter part of April and the first part of May by C. S. Brimley, after whom the species is named.

The species is more like *C. niger*, Macquart, than any of our species, but the colour of the thorax and abdomen, and the presence of the apical-spot of the wings are very distinctive.

It is a matter of regret that we were not able to procure the males of either of the two species here described, since oftentimes the best characters are to be found in that sex.

HYPOLIMNAS MISIPPUS, LINN.

Referring to the note on this butterfly, in the October, 1903, number (page 292), Mr. Austin H. Clark writes from St. Vincent, West Indies, that during the first week of November last he saw three specimens in that island, two females and one male, all in different localities.