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POPULAR AND ECONOMIC ENTOMOLOGY.

SOME CURIOUS OLD BELIEFS ABOUT INSECTS.

BY HARRY B. WEISS, NEW BRUNSWICK, N. J.

"Oft from the putrid gore of cattle slain
Bees have been bred A narrow place,
And for that use contracted, first they choose,
Then more contract it, in a narrower room,
Wall'd round, and covered with a low built roof,
And add four windows, of a slanting light
From the four winds. A bullock then is sought,
His horns just bending in their second year;
Him, much reluctant, with o'erpowering force,
They bind; his mouth and nostrils stop, and all
The avenues of respiration close:
And buffet him to death: his hide no wound
Receives; his battered entrails burst within,
Thus spent they leave him, and beneath his sides
Lay shreds of boughs, fresh lavender and thyme.
This, when soft zephyr's breeze first curls the wave,
And prattling swallows hang their nests on high.
Meanwhile the juices in the tender bones
Heated, ferment; and wondrous to behold,
Small animals in clusters, thick are seen,
Short of their legs at first; on filmy wings,
Humming at length they rise; and more and more
Fan the thin air; 't ll numberless as drops
Pour'd down in rain from summer clouds, they fly."

Such is the fabulous, poetic method given by Virgil in his *Georgics* for generating a swarm of bees. These erroneous ideas of ancient naturalists, philosophers and poets were not by any means confined to insects. For instance, Kircher, a learned man

of the 17th Century gave the following recipe for the manufacture of snakes: "Take some snakes, roast them and cut them in small pieces—then sow those pieces in an oleaginous soil; then from day to day sprinkle them lightly with water from a watering pot, taking care that the piece of ground be exposed to the spring sun, and in eight days you will see the earth strewn with little worms, which, being nourished with milk diluted with water, will gradually increase in size till they take the form of perfect serpents."

Other investigators who tried this method succeeded, of course, only in raising large broods of flies. Kircher noted flies also, but explained their presence by saying that they were "engendered from that substance which constituted the aliment of the snakes."

For restoring dead bees to life, Columella, a Roman writer, recommended that the dead bees be kept until spring and then exposed to the sun among the ashes of the fig tree properly pulverized. Another fanciful statement concerning bees is that of Aristotle, who said that the olive, the cerinthus, and other plants, had the property of generating young bees from their purest juices. Quoting Virgil again on bees, we have these lines:

"From herbs and fragrant flowers, with their mouths
They cull their young."

The peculiar stalked eggs of the lace-winged fly (*Chrysopa* sp.) were at one time described as fungi, but this, however, is not surprising when one considers their peculiar appearance. "Minute insects flying in the air" were supposed to have some connection with intestinal worms in man, and a blight was at one time described as "an easterly wind attended by a blue mist." the easterly wind being loaded with aphids and the eggs of various destructive insects. Electric changes in the air were thought by some to be responsible for honey dew, and Linnaeus thought that the honey dew on hop leaves was due to the caterpillar of the ghost moth (*Hepialus humuli*) attacking the roots.

Coming to insect transformations, Heroldt explained this in a novel way. He stated that "the blood of caterpillars is the only original portion of them, which, being endowed with a formative power, produces an envelope for itself of mucous net-work, and this again by means of a similar power is successively transmuted into the caterpillar, the pupa and the perfect insect."

According to Swammerdam, the hairs on the tip of the breathing tube and end of the body of a mosquito larva are anointed with oil so as to repel water. He also remarks that this oil is removed when the larva is roughly handled. Harvey, who discovered the circulation of the blood, made the statement that "bees, wasps, hornets, or butterflies, and whatever other animals are generated by metamorphosis from a creeping insect, are offspring of chance, and therefore never to keep up their species."

Baster thought that the spiracles of insects were their organs of smell, and this opinion was also held by Cuvier, Dumeril and Lehmann, Cuvier believing that the lining of the tracheæ were constructed to receive stimuli. The old superstitions connected with certain wood-boring beetles and theirappings, known as the "death watch," prompted Swift to write the following lines:

"A wood worm

That lies in old wood, like a hare in her form,
With teeth or with claws it will bite, it will scratch;
And chambermaids christen this worm a death watch;
Because like a watch it always cries click.
Then woe be to those in the house that are sick,
For sure as a gun, they will give up the ghost,
If the maggot cries click when it scratches the post.
But a kettle of scalding hot water injected,
Infallibly cures the timber affected;
The omen is broken, the danger is over,
The maggot will die and the sick will recover."

In 1730, during a severe outbreak of the Brown-tail Moth in the vicinity of Paris, the French journalists stated that part of the caterpillars were produced by spiders, and that these spiders, and not the caterpillars, produced the webs from the slime of snails, which they were said to have been seen collecting for that purpose. A more garbled idea than this it would be hard to invent. The outbreak was so severe at that time that the city officials of Paris issued an order compelling the people to "uncaterpillar" (decheniller) their trees. Cold rains, however, produced so much mortality among the larvæ that it was not necessary to enforce the order.

And so on, through all of the pages of early entomology, run these curious beliefs and fascinating old accounts of insects.

SUNFLOWER INSECTS.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

I am much indebted to Mr. R. L. Thompson for the following information regarding sunflower insects observed at Salisbury, Rhodesia:

"As yet we have no record of any serious pest attacking sunflowers in Southern Rhodesia, and the nearest approach to injury that has come under my notice was a partial defoliation of a few plants at the Experimental Station, Salisbury, by the larva of *Plusia orichalcea*. In this case the plants rapidly recovered, and no injury to the flower heads was apparent. The only other injury I have seen was the work of a species of finch, which stripped the heads of some garden varieties of *Helianthus*. I regret that it is rather too late to collect insects which visit the flowers. Such are very numerous, and, from memory, I should say that our wild and domesticated races of *Apis mellifica* (var. *caffra* and var. *unicolor adansoni*) rank first, while other insects attracted include large numbers of Diptera, mainly Muscids or Syrphids, and smaller numbers of Aculeate Hymenoptera, especially Scoliids and Sphegids. *Chloridea obsoleta* occurred in some numbers at the flowers this season, but otherwise I should say that diurnal Lepidoptera are only casual visitors. Among the Syrphids the most conspicuous visitor is an undetermined species rather similar in appearance to the European *Eristalis tenax*, and of similar habits." (April 6, 1915.)

This account is interesting because, although from a region so remote from the original home of *Helianthus*, it describes a situation singularly like that in other parts of the world where sunflowers are grown. Here in Colorado finches attack the heads, so that we have to bag them in order to save seed. Here at Boulder, *Chloridea* (or *Heliothis*) *obsoleta* Fabr.—the very moth observed in Rhodesia—visits the flowers of annual *Helianthus*, as well as those of the perennial *H. coloradensis* Ckll. In Rhodesia, as in America and Europe, there is the same general absence of butterflies as sunflower visitors. The particular *Plusia* feeding on sunflower in Rhodesia does not occur with us, but J. R. Parker (Journ. Econ. Ent., 1915, p. 288) records that *Plusia* (or *Autographa*) *gamma californica* Speyer feeds on sunflower

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Mr. A. W. Hanham (Canad. Entom., 1914, p. 145) has shown that in British Columbia sunflowers are especially visited by species of *Plusia* and related genera. Records from other localities suggest that much the same thing may be observed elsewhere, though no other collector has taken the trouble to make a careful list. At Boulder, Colorado, Sept. 2, 1914, in bright sunshine, I found *Caloplusia ignea* (Grote) visiting the flowers of *Helianthus lenticularis*. Also at Boulder, July 31, I collected *Plusia* (or *Syngrapha*) *falcifera* Kirby (*simplex* Gn.) at flowers of annual garden *Helianthus*. Three specimens were taken. -

During the season of 1914, the one really serious pest of our red sunflowers (varieties of *Helianthus annuus*) was the common *Nysius*. These insects assembled in numbers on the flower-stalks, and caused the heads to wilt and die. They seemed to be principally injurious on plants the heads of which had been bagged for cross-pollination, multitudes of them collecting just below the bag, and by their combined attack destroying the head. Although this is a very common insect, its name is not settled beyond doubt. Formerly, following Van Duzee and others, it was labelled *N. angustatus*; but according to Horvath this is a synonym of *N. erica* Schill. Professor C. P. Gillette writes, however, that the common Colorado species is now to be referred to *N. minutus* Uhler. He even doubts whether true *angustatus* occurs in Colorado. Dr. Van Duzee writes that formerly he considered *minutus* a synonym of *angustatus*, but he now treats it as a distinct variety of *erica* or *angustatus*. At La Jolla, California, he finds that all the specimens are *minutus*; but in Kansas and elsewhere in the Mississippi Valley he found *angustatus* the commoner form. It appears, from all this, that we should call our Boulder pest *Nysius erica minutus*.

Dr. S. A. Forbes, in Rept. Ill. State Entomologist for 1913 and 1914 (1915), p. 4, refers to the sunflower weevil, "an insect new to agriculture which has led to the virtual abandonment of the growing of sunflower seed for oil." Dr. Forbes does not mention the scientific name of the weevil, but in a letter he kindly informs me that it is *Smicronyx fulvus*. Now, this *S.* (or *Desmoris*) *fulvus* Lec. is very common on the sunflowers at Boulder, but we have not found it a serious pest. There are two Torymine Chalcids,

kindly determined by Mr. J. C. Crawford as *Callimome* sp. and *Zaglyptonotus schwarzi* Cwfd., which we find hovering over and alighting on the sunflower heads, and from their actions it is suspected that they may be parasitic on the weevils. An effort will be made this year to determine whether this is the case, and whether they can be of any use if introduced in Illinois. A third Chalcid common on the sunflower heads is *Perilampus hyalinus* Say.

Some years ago Mr. Busck reported of the Gelechiid *Paltodora similiella* (Chamb.) that he had received specimens in poor condition, but apparently this species, reared from sunflower heads by E. E. Bogue in Oklahoma. At Longmount, Colorado, Aug. 30, 1914, I found a number of small moths at flowers of *Helianthus lenticularis*, and when specimens were sent to Mr. Busck, it turned out that they belonged to this same *P. similiella*, which is doubtless a regular sunflower insect.

A cutworm from a sunflower head, collected at Boulder, Aug. 16, gave a moth Oct. 4. It was the widely distributed *Lycophotia margaritosa* Haw. (*saucia* Hbn.).

In Sept., 1914, at Boulder, a larva of *Phyciodes ismeria* (*carlota* Reak.) was found on *Helianthus argophyllus* in the garden; a new food plant. On the ordinary sunflower young larvæ of *P. ismeria*, about 8 mm. long, were common October 5. Like *Chlosyne lacinia*, this species evidently hibernates as a larva.

The yellow Bombyliid fly, *Phthiria sulphurea* Lw., visits sunflower heads at Boulder in August, but I found that it sometimes got caught by the likewise cryptically coloured bug, *Phymata fasciata*.

NOTES ON SOME RECENTLY DESCRIBED SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WM. BARNES, M.D., AND J. MCDUNNOUGH, PH.D., DECATUR, ILL.

In the November number, 1914, of "Insecutor Inscitiae Menstruus," Dr. Dyar describes eight species of North American Lepidoptera. As far as can be judged from a mere reading of the descriptions, several of these species appear to have already received names, but without an actual knowledge of the type specimens we cannot state authoritatively that such is the case. We therefore

offer the following notes in the hope that those students who have an opportunity to examine the type material may either verify or disprove our statements.

Apantesis moierra Dyar.

This is apparently *quadrinotata* Stkr., a name at present sunk in the synonymy of *placentia* A. & S. Strecker's species, described and figured in the Proc. Dav. Acad. N. Sciences, Vol. II, p. 271, 1878, from several ♀'s from Texas agrees in locality with *moierra* Dyar. *Sociata* B. & McD., described from a single ♀ from New Mexico (1910, Journ. N. Y. Ent. Soc., XVIII, 149), will probably also prove to be a synonym. Until the ♂'s are known, nothing very definite can be said about the species, but we venture the guess that they will prove to have banded primaries and lie intermediate between *figurata* Dru. and *placentia* A. & S.

Schinia navarra Dyar.

The description reads remarkably like that of *cupes* Grt. and the type localities are similar. If it were not for the fact that *cupes* should be correctly identified in the National Museum, and therefore known to Dr. Dyar, we should not hesitate in making the two names synonymous. In his tables Hampson has not been very fortunate in his placing of *cupes*, and this may have misled Dr. Dyar.

Gonocausta sabinalis Dyar.

This is doubtless the species referred to by us (Contrib. II, 224) to *zephyralis* Led. A series will be necessary to prove whether the points of distinction mentioned by Dr. Dyar have specific value or not. Our single specimen lacks the fringes, so is of no value in this connection.

Artopsis nua Dyar.

We fear that the genus *Artopsis* Dyar must fall before *Parachma* Wlk. Hampson (Proc. Lond. Zool. Soc., 1897, p. 659), it is true, figures and defines the genus as having only 11 veins on the primaries, at the same time making *Perseis* Rag. (Ann. Soc. Ent. Fr., 1890, p. 538) a synonym. This latter genus, founded on *culiculalis* Hlst., is distinctly stated, however, to have twelve veins, and later Ragonot himself, after an examination of the British Museum types (Ann. Soc. Ent. Fr., 1892, p. 624) sinks his genus to *Parachma* Wlk.

Our own examination recently of the type of *Parachma ochracealis* Wlk. has confirmed Ragonot's statement and proved Hampson in error. Judging by Dr. Dyar's remarks, we doubt greatly whether he has correctly identified *ochracealis* Wlk., for he refers to it in the present paper for some subtle synonymic reason which we cannot fathom to *Arta* Grt., a genus not erected until 1875 and over which *Parachma*, in any case, would have priority if the two were synonymous, which they are not. We might further point out that *culicidalis* Hlst., at present reposing in the synonymy of *ochracealis* Wlk., was described from Florida as is *nua* Dyar, and it is not at all improbable that these two names refer to one species, which may or may not be distinct from *ochracealis*. A study of the type material will be necessary before any definite statement in this connection can be made.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The 52nd Annual Meeting of the Society will be held at Ottawa on the 4th and 5th of November. The public lecture will be delivered on the evening of Thursday, the 4th, by Dr. L. O. Howard, Chief of the Bureau of Entomology at Washington. The titles of papers to be presented should be sent as soon as possible to the acting secretary, Mr. Arthur Gibson, Division of Entomology, Department of Agriculture, Ottawa, in order that they may be included in the programme which is shortly to be issued. The length of time required for reading the paper should be mentioned, and also whether the use of a lantern is desired.

The members of the Society will be much gratified to learn that a branch has been formed in Nova Scotia, bearing the name of the Province and with headquarters at Truro. The initial membership is twenty-seven, and there are prospects of a goodly increase when the branch has become fully organized and entered upon active work. This is the first time that one of the Maritime Provinces has become formally connected with our Society, though all along we have had individual members in a few localities by the sea.

Professor Brittain, of the Agricultural College at Truro, N.S., is the acting secretary. A career of great usefulness is open to the branch, and hearty good wishes are extended for its growth and permanent success.

NEW CANADIAN AND ALASKAN MUSCOIDEA.

BY CHARLES H. T. TOWNSEND,
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This paper presents descriptions of some British Columbian forms, received for determination at the Bureau of Entomology, U. S. Department of Agriculture, sent by Mr. F. Kermode, Director of the Provincial Museum at Victoria, B. C. To these are added descriptions of a few new forms, represented by material in the U. S. National Museum collection, from British Columbia, Saskatchewan and Alaska, collected by Messrs. Currie, Cockle, Knab and Kincaid

Family *Callirhoidæ*.**Alaskophyto** new genus.

Genotype—*Muscopteryx obscura* Coquillett, 1902, Proc. U. S. Nat. Mus., XXV, 116.—St. Paul Island, Alaska.

May be distinguished from other members of the Phyto group as follows: Male—Vertex and posterior part of front one-ninth or one-tenth of head width. Ocellars rather strong; vibrissæ strong and decussate, curved, single, inserted even with oral margin; second and third antennal joints about equal, arista thickened on basal fourth or less; front but feebly prominent, cheeks over one-half eye-height; facial profile much shorter than frontal; palpi stout-filiform. Long decussate apical pair of scutellars and two laterals. Macrochætæ of abdomen weak, rather thickly placed, interspersed with hair, venter more hairy. Claws elongate. Wings narrow. Apical cell narrowly open or closed, ending slightly before wing-tip; cubitus very broadly open, no stump or wrinkle, apical cross-vein straight. Abdomen same width as thorax, elongate.

Family *Miltogrammidæ*.**Arabiopsis** new genus.

Genotype—*Arabiopsis cocklei* Townsend, new species.

Allied to *Euaraba* Townsend, from which it differs chiefly as follows: Head subrectangular in profile, the lower border about three-fourths as long as upper, the epistoma distinctly produced; facial depression shorter, facial profile slightly concave, third antennal joint of male shorter and broader, arista slender on distal third or more; parafacials naked below, with a patch of hairs above.

male with row of about six proclinate weak orbital bristles situated well in front outside frontal row, usually two or three more strongly developed than the others. Male front at vertex about equal to one eye, vibrissæ hardly meeting. Macrochætæ of mesoscutum, scutellum and abdomen long, rather thickly and evenly distributed, interspersed with long bristly hairs; apical scutellar pair well-developed and decussate. Abdominal macrochætæ only marginal, two median on first segment, about four median on second segment, practically complete row on third and anal segments, all very closely placed.

Arabiopsis cocklei new species.

Length of body 5 mm.; of wing 4 mm. One male, London Hill Mine, Bear Lake, British Columbia, 7,000 ft., July 21, 1903 (J. W. Cockle).

Blackish, front and face heavily silvered, changing to a leaden shade with incidence of light; frontalia invaded on each side about middle by an irregular patch from parafrontals whose light incidence is contrasted with that of frontalia, whereby the latter alternate with the patches in brilliancy according to the change of light. Mesoscutum thinly silvery on sides and in front, showing four narrow black vittæ, of which the middle ones stop at suture; in very oblique lights the scutellum and disk of mesoscutum are seen to be also covered with a thin coat of silvery pollen, but this is invisible in direct view. Abdomen blackish below and broadly so above, with rather broad silvery margin on sides, leaving a small blackish spot segregated from the median black on hind margin of second and third segments laterally. Legs wholly black, the femora silvery on outer surface. Wings clear; tegulæ whitish, narrowly bordered with pale yellowish. Third antennal joint soft black with a grayish sheen, arista deep black.

Holotype, No. 19554 U.S.N.M.

This species is named in honour of Mr. J. W. Cockle.

Family *Salmaciidæ*.

Knabia new genus.

Genotype—*Knabia hirsuta* Townsend, new species.

Differs from *Salmacia* as follows (male only described): Front at vertex distinctly less than one-half head-width. Frontal

bristles hairlike, in only two rows; parafrontals and parafacials thickly covered with long fine hair. Ocellars and the two proclinate and two reclinate fronto-orbitals rather hairlike, even the inner verticals but slightly stronger and still quite hairlike. Marginal row of bristles on parafacials same strength as frontals. Face conspicuously wider than front. Parafacials fully as wide as cheeks, hardly at all narrowed below, the parafrontals very conspicuously narrower. Proboscis much shorter, the part below geniculation not as long as third antennal joint. Thorax, pleuræ, scutellum, abdomen and femora thickly clothed with fine long hair, all the macrochaetae comparatively weak, Legs more slender. Claws short.

This genus is named in honour of Mr. Frederick Knab.

Knabia hirsuta new species.

Length of body 10.5 to 11 mm.; of wing 8 to 8.5 mm. Two males, Oxbow, Saskatchewan, April 30 and May 13, 1907 (F. Knab).

Black. Head all yellow, pale gold pollinose, satiny; lateral portions of occiput lead-gray. Palpi and second antennal joint rufous, third joint soft gray-black, arista jet-black. Occipital beard pale grayish-golden; cheek, facial, frontal and all the other hair black. Thorax with very faint bloom, four linear brownish or blackish vittæ showing. Scutellum testaceous, broadly black on base. Abdomen rather shining black; segments two to four, narrowly edged on base with silvery-white, broadening on sides of anal segment. Legs black, tibiæ often with a brownish tinge. Wings clear except the smoky oblique basocostal area. Tegulae nearly white, margined with pale tawny.

Holotype, No. 19555 U.S.N.M.

Family *Minthoidæ*.

Pseudodidyma new genus.

Genotype—*Pseudodidyma pullula* Townsend, new species.

Differs from Wulp's description of *Didyma* as follows: Head subquadrilateral, but profile much narrowed below, the face very receding. Front prominent, much wider than one eye, about same in both sexes. Facialia not ciliate, with only a few bristles that reach hardly over one-fourth way up. *Facial depression

broad, facialia flared outward, a weak median carina present. Parafacialia more on edge in male than in female. Second antennal joint short in both sexes; third joint of male well broadened and about six times second in length, that of female no broader than distal end of second and not over four times length of second. Arista thickened on basal three-fifths. Male without proclinate fronto-orbitals, but with three reclinate ones in triangle, of which the outer one corresponds to a proclinate one in female. Female with two proclinate and two reclinate. Both sexes with the frontal row doubled anteriorly, the outer row weak. Frontals descending quite to insertion of arista. Frontalia occupying fully one-third of frontal width in female, broad throughout; those of male narrowed anteriorly. Cheeks about one-half eye-height in both sexes. Epistoma cut off, vibrissæ practically on oral margin. Eyes quite thickly hairy in both sexes. Antennæ as long as face. Proboscis very short and fleshy, palpi slightly thickened apically. Scutellum without apical decussate pair of bristles; with three laterals, of which the posterior is longest; and a closely-approximated discal pair. Abdomen ovate in both sexes; macrochaetae marginal and discal, including median marginal pair on first segment. Claws of male quite elongate, about as long as last tarsal joint; those of female a little shorter. Hind cross-vein much nearer to cubitus than to small cross-vein. Belongs in the *Admontia* group. May be distinguished from *Admontia* by the bare parafacialia and short second aristal joint.

Pseudodidyma pullula new species.

Length of body 5.25 mm.; of wing 5 mm. One female, Farragut Bay, Alaska, June 1, 1899 (T. Kincaid). This is the specimen determined by Coquillett as *Didyma pullula* Wulp. Dipt. Harriman Alaska Exped., 438 (sep. pag. 52).

Blackish, cinereous pollinose. Whole face and anterior edge of parafrontals silvery-ashy, cheeks somewhat less so. Palpi fulvous. Frontalia brown. Antennæ blackish or brownish. Parafrontals blackish, thinly pollinose; thorax and scutellum same. Four vittæ on mesoscutum, middle ones narrow, outer ones heavier and broken. Abdomen blackish, not shining, with a submarmorate ashy-pollinose effect. the pollen for most part of same

obscure shade as that of thorax and front, but with a silvery shade in some lights; the pollen best defined on narrow base of second segment, basal half of third, and all of anal segment. Legs brownish, tibiae rufous. Wings distinctly smoky-yellow along the veins. Tegulae smoky-yellowish, front scale slightly more whitish.

Holotype, No. 19556 U.S.N.M.

A male from Victoria, British Columbia, April 2, 1906 (E. M. Anderson, through F. Kermode), measures 6 mm., wing 5.5 mm., and differs in wings being clear, tegulae watery-whitish, pollen of base of second abdominal segment broadening on sides, tibiae only narrowly rufous on middle, and antennae wholly deep black. It may be a distinct species, but seems congeneric with the above female.

Family *Larvæoridae*.

Okanagania new genus.

Genotype—*Okanagania hirta* Townsend, new species.

Differs from *Ostracophyto* as follows: Male.—Facial profile deeply bent in, the epistoma very prominent. Facialia with thick bunch of bristles just above vibrissae, but otherwise bare. Eyes thickly clothed with long hair. Parafacialia bare, wide. Front at vertex a little narrower than eye, much narrowed in middle, widening still more anteriorly than at vertex, very prominent in profile. Parafrontals broad anteriorly, with bristly hairs outside the frontal row and long hair on vertical and ocellar regions. Occipito-orbital fringe very long, decreasing in length gradually from the outer verticals. Vibrissae inserted well above oral margin, widely separated. Second antennal joint long; third broad, not twice as long as second. Arista thickened on more than basal half, first joint short, second joint elongate. Long apical decussate pair of macrochaetae on scutellum; discal pair of straight bristles, with several others approximating them in strength. Median marginal and discal macrochaetae on second and third segments, median and lateral discal on fourth with marginal row, fourth and fifth rather thickly covered with long hair besides the bristles. Thorax, pleurae, scutellum, venter and legs also with long hair and bristles. Claws elongate, about as long as last tarsal joint. Hypopygium large. Apical cell narrowed at extremity, narrowly open, ending

far before wing-tip. Hind cross-vein nearly straight, close to the right-angled cubitus. Apical cross-vein quite evenly concave outwardly. Cubitus with slight wrinkle. Costal spine small. Wings broad; third vein bristled only at base, others bare.

Okanaganian hirta new species.

Length of body 9.5 mm.; of wing 7.5 mm. One male, Okanagan Falls, British Columbia, April 27, 1913 (E. M. Anderson, through F. Kermode, No. 190).

Black. Head silvery-cinereous, epistoma and vertex with darker shade. Occipital beard brassy-gray, all other hair black. Thorax with submetallic shining greenish shade. Scutellum broadly testaceous on apex. Abdomen blackish, subshining; with a small rufous spot on each side of second segment near lateral margin, and a faint suggestion of same on third segment. Wings nearly clear. Tegulae whitish.

Holotype, No. 19557 U.S.N.M.

Panzeriopsis new genus.

Genotype—*Panzeriopsis curriei* Townsend, new species.

Differs from *Ernestia* as follows: Male. Front at vertex much wider than eye. Epistoma very prominent, subhorizontally projected. First and second arisal joints both elongate, the first longer than second. Third antennal joint same length as the elongate second, widened, rounded apically. Parafacials with long hair, same as front and cheeks. No ocellar bristles. Eyes bare. Three to six facio-orbitals. Proboscis much longer than head-height, moderately slender. Palpi elongate, slender, a little widened apically but thin. Cheeks only a little less than eye-height. Mesoscutum devoid of macrochaetae except on lateral margins and a weak pair or two on hind margin, the surface being clothed with long hair. Scutellum with a decussate apical pair of bristles, three fairly strong laterals, some weaker laterals and hairs, and some discals and hair. Abdomen with two to four discals on second and third segments, two to four median marginal on second, third with marginal row, fourth with marginal row and more or less complete discal row. Apical cell ending farther

before wing-tip, the cubitus more removed from hind margin of wing.

Panzeriopsis curriei new species.

Length of body 10.5 to 11.5 mm.; of wing 9 to 9.5 mm. Four males, London Hill Mine, Bear Lake, British Columbia, 7,000 feet, July 21 to 29, 1903 (R. P. Currie).

Black. Clypeus and parafacials silvery pollinose, shading to dark in oblique lights. Parafrontals polished black. Epistoma and cheeks subshining black, former slightly pollinose. Frontalia light brown. Palpi pale rufous to rufous. Beard brassy-gray. Thorax without pollen or vittæ, subshining, with slight metallic greenish lustre. Scutellum rufotestaceous on apex or almost wholly so. Abdomen subshining black, without pollen, usually obscure dull rufotestaceous on sides of second and third segments or on sides of second segment alone. There is some suggestion of metallic green on abdomen, especially on anal segment. Legs and antennæ black. Wings clear, base pale flavous, veins fulvous. Tegulæ watery-whitish, with pale yellowish margins.

Holotype, No. 19558 U.S.N.M. July 21.

Named in honour of Mr. R. P. Currie.

Rhachogaster new genus.

Genotype—*Rhachogaster kermodei* Townsend, new species.

Differs from *Upodemocera* as follows: Male.—Front narrowed at vertex to little over one-half eye-width. Third antennal joint normal, rounded apically. First arisal joint short. Lobular edges of second genital segment set with short toothlike spines. Second ventral plate with thick bunch of short sharp needle-point spines directed backward. Third ventral plate with some very short inconspicuous spines; fourth with a few short hairs; fifth with some long hairs. Ventral profile deeply cut out when hypopygium is exerted.

Rhachogaster kermodei new species.

Length of body 13 mm.; of wing 10 mm. Two males, Penticton, British Columbia, July 4 and 8, 1913 (E. M. Anderson, through F. Kermode, Nos. 187, 188).

Black. Face and cheeks pale golden pollinose. Parafrontals silvery-white pollinose. First two antennal joints and palpi rufous; frontalia brownish-rufous, with silvery bloom. Beard brassy. Thorax metallic greenish; scutellum testaceous. Abdomen black, shining. Wings clear, bases pale yellow. Tegulae tawny-white to whitish.

Holotype, No. 19559 U.S.N.M.

Named in honour of Mr. F. Kermode.

ORGANIZATION OF AN ENTOMOLOGICAL SOCIETY FOR NOVA SCOTIA.

At a meeting held at Truro on Aug. 3rd a Nova Scotia branch of the Ontario Entomological Society was successfully formed. This meeting was held in the Assembly Hall of the Normal College, and was largely attended by members of the staff of the Normal and Agricultural Colleges, by students of the Rural Science School, by members of the Provincial and of the Dominion Entomological Branch and others.

Both an afternoon and evening session were held, at which various interesting and instructive papers on various phases of entomology were read and discussed. Following the reading of the papers, the aims and purposes of the Society were explained by Mr. W. H. Brittain, Provincial Entomologist, whereupon the meeting proceeded to the election of the following officers for the ensuing year:

Hon. President—Dr. A. H. MacKay, Supt. of Education, Halifax.

President—E. Chesley Allan, Yarmouth.

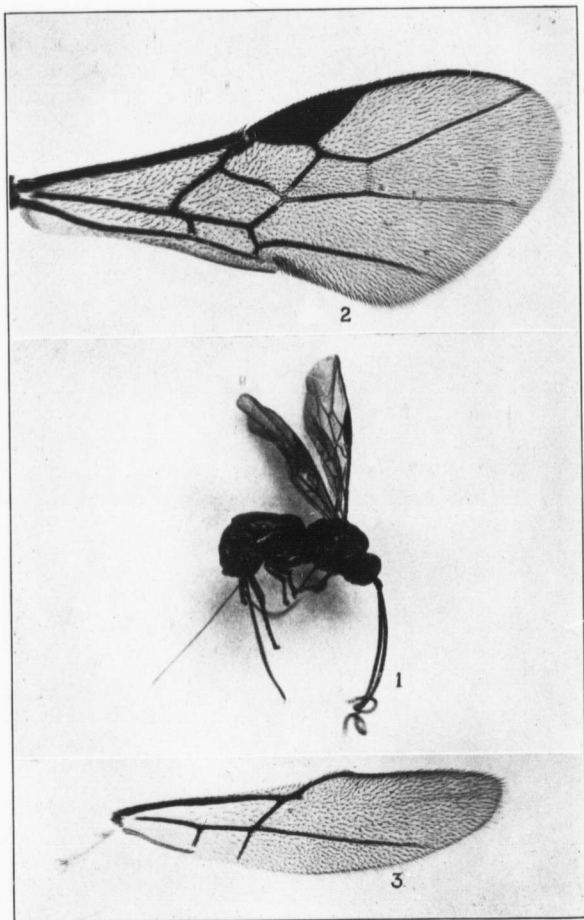
Vice-President—L. A. DeWolfe, Truro.

Secretary-Treasurer—W. H. Brittain, Truro.

Assistant Secretary-Treasurer—G. E. Sanders, Bridgetown.

Committeemen—C. A. Good, Truro; J. M. Scott, Truro.

At the close of the evening session 27 individuals signed the roll of the Society and handed in their annual subscription, while a number of others signified their intention of becoming members. With this auspicious beginning it is hoped that the Nova Scotia Entomological Society will continue to increase in members and influence and remain a live organization in the Province for many years to come.



BIOSTERES RHAGOLETIS, N.SP.

BIOSTERES RHAGOLETIS RICHMOND, SP.N., A PARASITE
OF *RHAGOLETIS POMONELLA* WALSH.*

BY WILLIAM COLCORD WOODS, ORONO, MAINE.

During the summer of 1913 the writer was engaged in studying blueberry insects in Washington County, Maine. A maggot was found infesting the berries, which when bred proved to be *Rhagoletis pomonella* Walsh, the apple maggot or railroad worm (Journal of Economic Entomology, 1914, Vol. VII, pp. 398-399). There were also obtained from larvæ of this species collected at Cherryfield, Maine, in August and September, 1913, twenty-one specimens of a parasite, which emerged from puparia kept under laboratory conditions, at various dates between February 25 and April 21, 1914.

Since no parasite has been recorded from *Rhagoletis pomonella* Walsh, this note accompanied by the plate should be of interest. The figures represent, enlarged, an adult, and the fore and hind wings.

This species belongs to the family *Braconidae* and to the subfamily *Opiinae*. In this same group are placed many of the parasites, including one of this genus, which are recorded by Silvestri as bred from various fruit-flies (Bulletin 3, Hawaii Board of Agriculture and Forestry, 1914).

Specimens of this species were swept on the blueberry barrens of Washington County last summer, where apparently they had considerably reduced the number of the maggots as compared with the preceding season. Unfortunately all the puparia which I collected during the summer of 1914 were destroyed so that neither parasites nor flies emerged, but I hope to make further collections this present year. I have not observed oviposition, but this species is undoubtedly a larval parasite, although the adults do not emerge until after the puparia have been formed.

Dr. H. H. P. Severin has this year bred the same species from puparia of *Rhagoletis pomonella* Walsh, obtained either from the

*Papers from the Maine Agricultural Experiment Station. Entomology No. 80.

wild crab or cultivated apples in Orono, Maine, while engaged in special work for this Station.

Specimens of the Cherryfield parasites were submitted to Mr. E. A. Richmond, of Cornell University, who determined it as a new species. The following description, which he has given me permission to publish, should be credited to him, as well as the synonymy of the genus, which follows:

Biosteres rhagoletis, sp.n. (Plate XII.)

"Fulvous (xanthine orange); antennæ, except scape in ♂ (partly in ♀), terminal joints of pro- and mesothoracic tarsi, entire metathoracic tarsi and tips of mandibles, brown; eyes and ocelli black; wings with membrane colourless, nervures and stigma brown; sheath of ovipositor brown; inner stylets fulvous. Length 3 mm.; ovipositor 3 mm. Habitat—Cherryfield, Maine.

"*Head* shining, closely tessellate, punctulate, pilose (including mouth-parts); ocellar elevation impunctate and not pilose; face with a median longitudinal elevation, almost a keel; *clypeus* with sparser punctures in centre; *flagellum* 36-41-jointed; scape a little longer than first joint of flagellum, pedicellum globular. *Thorax* shining, sparsely punctulate and pilose; parapsidal furrows converging and ending in a median V-shaped, impunctate impression, which lies in the posterior third of the mesonotum; mesonotum (including scutellum) margined; propodeum not flat but rounded, more pilose and punctulate than the rest of thorax, irregularly rugulose and tending to have poorly-defined areoles, which are more especially prominent in ♀ ♀; r (first abscissa of the radius), a little more than $\frac{1}{6}$ as long as r-m; shorter than the petiole of M₄; M₄ petiolate, petiole about $\frac{1}{5}$ as long as m-cu. *Abdomen* finely punctulate, shining, very sparsely pilose; 1st segment margined laterally, finely and closely striated with some of the elevations often more prominent at basal half; 2nd segment with a little more than its basal half finely and closely striated, except at sides; ♂ and ♀ similar, except as noted above.

"Cotypes deposited in collections of the Maine Agricultural Experimental Station, Orono, Maine; Cornell University, Ithaca, N. Y., and in the private collection of E. A. Richmond, Ithaca,

N. Y. Paratypes deposited in the collections of the Maine Agricultural Experiment Station, Orono, Maine; the United States National Museum, Washington, D. C., and in the private collection of W. C. Woods, Orono, Maine. Type locality, Washington County, Maine.

"Described from 10 specimens, 7 ♀♀ and 3 ♂♂. Bred from puparia of *Rhagoletis pomonella* Walsh from blueberries, by W. C. Woods, Maine Agricultural Experiment Station; lot 1,700, sub. 17."

Genus *Biosteres* Förster.

1862. *Chilostrichia* Förster, Verh. Nat. Ver. Preuss. Rheinl., v. 19:258.

Biosteres Förster, Verh. Nat. Ver. Preuss. Rheinl., v. 19:259.

Rhabdospilus Förster, Verh. Nat. Ver. Preuss. Rheinl., v. 19:259.

1895. *Trichopius* Thompson, Op. Ent., p. 2,176.

1904. *Biosteres* Szepligeti, Gen. Ins., Fasc. 22, p. 161.

The following description is a translation of the distinguishing characters of the genus *Biosteres* Förster, as stated in the Genera Insectorum, fascicle 22, p. 161.

"Clypeus bare or strongly and thickly pilose (*Chilostrichia* = *Trichopius*), forming no opening with the mandibles (except *Rhabdospilus*). Stigma small and long, the inner side shorter or almost as long as the outer. Second submarginal cell shorter than in *Opius*. Second abscissa of radial vein as long or barely longer than the r-m. Parapsides usually distinct, mesopleura with or without furrows."

Mr. Richmond informs me that *B. indotatus* Viereck (described from Kansas in the Trans. Kans. acad. sci., 1905, v. 19: 272-278), which is black in colour, is the only other species of *Biosteres* described from Region 5.

EXPLANATION OF PLATE XII.

Fig. 1. *Biosteres rhagoletis*, n.sp., female; fig. 2, fore wing of same; fig. 3, hind wing of same.

A CONTRIBUTION TOWARDS THE TAXONOMY OF THE *DELPHACIDÆ.*

BY F. MUIR,

Hawaiian Sugar Planters' Experiment Station, Honolulu, T.H.

[Continued from Page 270]

DELPHACINI.

- 1 (6) Mesonotum with five carinæ.
- 2 (3) Two medio-longitudinal frontal carinæ, { *Micromasoria*.
meeting together at base and apex { *Livalis**.
- 3 (2) One medio-longitudinal frontal carina.
- 4 (5) In profile head semicircular; antennæ terete.....*Paranda*.
- 5 (4) In profile head not semicircular; first joint of antennæ
compressed and dilated, obliquely triangular, second
slightly longer than first.....*Eodelphax*.
- 6 (1) Mesonotum with three carinæ or less.
- 7 (20) Antennæ with one or both segments distinctly flattened.
- 8 (9) Two medio-longitudinal frontal carinæ, distinct through-
out or approximate at one or both ends. *Pseudaræopus*.
- 9 (8) One medio-longitudinal frontal carina, simple or furcate.
- 10 (13) First antennal joint long, subparallel sided, semi-
foliaceous, antennæ as long as face and clypeus
together.
- 11 (12) Head as wide, or nearly as wide, as pronotum....*Delphax*.
- 12 (11) Head narrower than pronotum.....*Sparnia*.
- 13 (10) First joint of antennæ subtriangular or sagittate,
antennæ not as long as face and clypeus together.
- 14 (15) Length of face equal to width between eyes; clypeus
angled in middle, the median carina forming deep keel
at bend..... *Bostæra*.
- 15 (14) Length of face considerably greater than width.
- 16 (17) First joint of antennæ sagittate, antennæ not as long as
face; medio-longitudinal carina of face furcate at
extreme base; sides of face slightly arcuate; clypeus
bent nearly at right angle in middle.....*Belocera*.
- 17 (16) First joint of antennæ triangular, but not sagittate;
clypeus not angular in middle.

*I can find no distinctions between these two genera from the descriptions,
September, 1915

- 36 (37) Antennæ long, reaching nearly to end of clypeus, first joint distinctly more than half the length of second; spur with a few distinct teeth on hind margin *Kormus*.
- 37 (36) Antennæ not so long, reaching about end of face, second joint about double as long as first.
- 38 (39) First joint of hind tarsus longer than the other two together, spur with many fine teeth on hind margin *Anectopia*.
- 39 (38) First joint of hind tarsus not so long as the other two together, spur with minute tooth at apex, but none on hind margin, or very minute hair-like ones *Eurysa*.
- 40 (35) Carinæ of head distinct.
- 41 (52) Face with two medio-longitudinal carinæ.
- 42 (45) Vertex distinctly broader than long.
- 43 (44) Face angular, as wide as long.....*Amblycotis*.
- 44 (43) Face longer than wide; carinæ on face indistinct, especially at base and over vertex.....*Eurybregma*.
- 45 (42) Vertex much narrower in proportion to length.
- 46 (49) Apex of vertex subangular, making vertex somewhat 5-sided or apex broadly conical.
- 47 (48) Face broad, about as broad as long, medio-longitudinal carinæ very faint, especially at base, dividing face into three subequal parts.....*Metropis*.
- 48 (47) Face much narrower, decidedly longer than broad; median carinæ not so faint, contiguous or very approximate at base and apex; median portion of face narrower than lateral portions.....*Jessidæus*.
- 49 (46) Apex of vertex truncate or but little rounded, vertex square or little longer than wide, not 5-sided.
- 50 (51) Lateral carinæ of pronotum divergingly curved, not reaching hind margin..... *Criomorphus*.
- 51 (50) Lateral carinæ of pronotum straight, reaching hind margin *Macrotomello*.
- 52 (41) Face with one medio-longitudinal carina, simple or furcate.

- 53 (54) Medio-longitudinal carina of vertex with small areolet in middle; no transverse or medio-lateral carinae *Liburniella*.
- 54 (53) Medio-longitudinal carinae without small areolet, transverse or medio-lateral carinae present.
- 55 (74) Medio-lateral carinae of vertex converging apically, but not meeting on vertex, continued separate on to face, where they meet (frontal carina furcate).
- 56 (63) Lateral carinae of pronotum straight or convergingly curved posteriorly, reaching hind margin, or all but doing so.
- 57 (58) First joint of antennae more than half the length of second *Megamelus*.
- 58 (57) First joint of antennae less than half the length of second.
- 59 (60) Head and thorax (to end of mesonotum) twice or more the width of head, including eyes; length of face three times the breadth; spur with many (about 12-15) small teeth *Stenocranus*.
- 60 (59) Less slender forms. Head and thorax about one and a half times the width of head, including eyes; length of face 2 or $2\frac{1}{2}$ times the breadth.
- 61 (62) Vertex perceptibly longer than broad, apex narrower than base; spur with few (about 8) large teeth.....*Kelsia*.
- 62 (61) Vertex square; spur with numerous minute teeth *Peregrinus*.
- 63 (56) Lateral keels of pronotum divergingly curved posteriorly, not reaching hind margin.
- 64 (65) Medio-lateral carinae of vertex not meeting lateral carinae till base, forming two 4-sided areas; face considerably broadened in middle, furcation of median frontal carina very near base.....*Conomelus*.
- 65 (64) Medio-lateral carinae of vertex meeting lateral carinae before base, forming two 5-sided areas; face not so broad in middle.

- 66 (69) Vertex longer than broad.
- 67 (68) Vertex double the length of pro- and mesonotum together *Embolophora*¹
- 68 (67) Vertex only slightly longer than wide².....*Euidella*.
- 69 (66) Vertex not longer than wide.
- 70 (71) Face almost circular *Bakerella*³
- 71 (70) Face with sides nearly straight, subparallel.
- 72 (73) Median frontal carinae forked near base.....*Liburnia*.
- 73 (72) Median frontal carinae forked near middle *Dicranotropis*.
- a Median frontal carinae forked near apex.....*Leimonodite*.
- 74 (55) Medio-lateral carinae of vertex meeting together on vertex (meeting sometimes obscure) continued on to face as single carina.
- 75 (92) Lateral pronotal carinae straight or convergingly curved posteriorly, reaching hind margin or exceeding near it.
- 76 (77) Medio-lateral carinae of vertex meeting together some distance before apex, vertex long and narrow, produced well beyond eyes, slightly narrowed in middle; Y-shaped carina obsolete.....*Saccharosydne*.
- 77 (76) Medio-lateral carinae of vertex meeting at apex.
- 78 (79) Head, including eyes, distinctly wider than pronotum, hind edge of eyes nearly reaching to posterior angle of pronotum; vertex apically truncate, produced but slightly beyond eyes*Smicrotodelphax*.
- 79 (78) Head, including eyes, not wider than pronotum; hind edges of eyes not reaching near to posterior angle of pronotum.
- 80 (81) Head in profile semicircular.....*Prokelisia*.

1. I place this genus here on the strength of Stal having separated it from *Liburnia* by the length of head.

2. I have not seen *Euidella Speciosa* or *Dicranotropis hamata* so I must let them stand as above for the present. *Nilaparvata* may come next to *Euidella*.

3. It is possible that this genus will be more appropriately placed in Section B.

- 81 (80) Head in profile more or less angular at apex of vertex, face flattened.
- 82 (83) Vertex twice as long as wide.....*Zuleika*.
- 83 (82) Vertex considerably less than twice the width.
- 84 (87) First joint of antennæ more than half the length of second.
- 85 (86) Broad forms. In dorsal view width of head (including eyes) nearly twice the length; pronotal carinæ in some species not quite reaching hind margin, but not divergingly curved*Pissonotus*.
- 86 (85) More slender forms. In dorsal view width of head (including eyes) less than $1\frac{1}{2}$ times the length; pronotal lateral carinæ reaching hind margin. } *Megamelus*
Gelastodelphax
- 87 (84) First joint of antennæ less than half the length of second.
- 88 (89) Head and thorax (to end of mesonotum) twice or more the width of head, including eyes.....*Stenocranus*.
- 89 (88) Less slender forms. Head and thorax about $1\frac{1}{2}$ times the width of head, including eyes.
- 90 (91) Lateral margins of face straight, face broadest at apex, base truncate*Sogata*.
- 91 (90) Sides of face slightly arcuate, apex narrower than middle, base curved or subconical.
- a Junction of vertex and face angular in profile, a faint carina dividing them.....*Haplodelphax*.
- b Junction of vertex and face more rounded in profile*Kelisia**
- 92 (75) Lateral carinæ of pronotum divergingly curved posteriorly, not reaching hind margin.
- 93 (94) Medio-lateral carinæ of vertex meeting together before apex, vertex well produced beyond eyes (Y-shaped carina faint)*Sardia*.

**Conomelus* and *Eurysa* can be distinguished from this genus by the broader vertices if the furcation of the frontal carinæ are obscure. *Megamelanus* appears to be near this genus.

- 94 (93) Medio-lateral carinae of vertex meeting at apex.
- 95 (96) Apical margin of vertex conically or roundly produced; face distinctly longer than wide *Delphacinus*†
- 96 (95) Apical margin of vertex not conically or roundly produced, but truncate or slightly curved.
- 97 (100) Vertex distinctly longer than wide, apex narrower than base.
- 98 (99) First joint of hind tarsus distinctly longer than the other two together; antennae reaching beyond apex of face *Chloriona*.
- 99 (98) First joint of hind tarsus hardly as long as the other two together; antennae not reaching to apex of face *Chlorionidea*.
- 100 (97) Vertex not, or slightly, longer than broad.
- 101 (102) Face nearly as broad as long *Eoeurysa**
- 102 (101) Face much longer than broad..... } *Kalpa*
- 103 (104) Face very long and slender..... } *Nilaparvata* **
- 104 (103) Face longer than broad, but not greatly so.
- 105 (106) Face with lateral edges nearly parallel (first segment of antennae nearly as long as second; two basal areas of vertex 5-sided; two median sectors, first touching cubitus for short distance, characters not strictly reliable *Liburnia*.
- 106 (105) Face with lateral edges more arcuate (first segment of antennae much shorter than second; two basal areas of vertex 4-sided; one median sector which amalgamates with first cubitus to apex or near apex) *Conomelus*

†*Megamelanus* is separated from this genus chiefly by the straight lateral pronotal carinae reaching the hind margin.

*This may prove to be *Eumetopina*.

**In the Fauna of India *Nilaparvata* is separated from *Kalpa* by furcation of median frontal carina at base, but in the description of the genus the medio-lateral carinae of vertex are described as meeting before apex.

(To be continued.)

THE 1914 RECORD OF CATOCALÆ AND OTHER
LEPIDOPTERA.

BY R. R. ROWLEY AND L. BERRY, LOUISIANA, MO.

This record has to do with Missouri and contiguous territory only and is mainly the story of the best *Catocala* year since 1900.

The season was not unlike that of 1913, being very hot and dry, and both were duplicates of 1900 and 1901. The winter of 1913-14 was mild up to Christmas, dandelions blooming along the streets of Louisiana to the 23rd of December.

On the 28th of November, the day after Thanksgiving, the senior author collected from black mustard seven larvæ of *Pieris rapæ*, one third of an inch long, securing the first pupa on the 30th of the same month, and the first imago on the 15th of December. This imago was fed on sweet liquids and lived ten days.

Chrysalids of *Smerinthus ophthalmicus*, from larvæ fed the summer before, began giving moths April 18th and up to May 23rd, but only two perfect females out of sixteen were secured. Most of the seven males were perfect. A fine male of this moth that came from the chrysalis at 6 p.m. on the 3rd of May remained motionless, in a box, till 2.30 the next morning, when it began a noisy fluttering. An imago of *Papilio philenor* came from a chrysalis on the 21st of April.

Eggs of *Catocala cerogama* began hatching April 26th, those of *C. coccinata* on the 29th, and of *C. lacrymosa* on the 8th of May. A pair of *Samia columbia* moths from cocoons, furnished the senior author by Mrs. DeCoster of Buckfield, Maine, emerged April 27th.

Ten half-grown larvæ of *Catocala illecta* were collected from honey locust sprouts, April 29th, others on the 1st and 3rd of May.

The first *Samia gloveri*, a fine female, May 1st came from a cocoon furnished by the junior author, but collected by Tom Spaulding of Utah.

The first larva of *Catocala innubens* was found on the 3rd of May, and the first *illecta* began spinning on the 6th of the same month.

Eggs of several species of hickory-feeding *Catocalæ* began hatching May 5th.

A *Papilio troilus*, ex-pupa, on the same date.

Eggs of *Catocala lacrymosa* began hatching on the 8th of May.

The first luna from cocoon, on the 11th of May, and the first larva of *Catocala innubens* began spinning on the 17th.

A chrysalis of *Ceratonia amyntor* gave an imago on May 18th. Imagos of the larger silk moths usually emerge from the chrysalis in the forenoon, but occasionally later in the day, even to 9 p.m., while the hawk moths and ceratocampians generally emerge in the night time, probably toward morning, the *Catocalæ* making the change before midnight.

The first larva of *Catocala minuta* was found on honey locust May 21st. A pupa of *Smerinthus excæcatus* gave a moth on the following day.

Half-grown larvæ of *Catocala neogama* were found on walnut on the 26th of May.

The heat of the last week of May killed most of the larvæ of *cerogama*, as well as the hickory-feeding *Catocalæ*.

The first *illecta* imagos emerged June 6th, and the first promethea moths on the same date.

On June 6th the senior author received larvæ and pupæ of Texas hawk moths and chrysalids of butterflies from Miss Pattie Hutchinson of Beeville, Texas, but for lack of suitable food the hawk larvæ died.

The pupa period of *Catocala illecta* is one month.

The first trip to the woods in search of *Catocalæ* was on the 9th of June, when the senior author took a deformed *polygama* and two fine *ilia*, one of which was the white spotted variety.

On the evening of the 10th of June Miss Gertrude Wallace took *Catocala whitneyi* at bait. This was the first specimen of this species ever taken here.

Fresh specimens of *Apatura celtis* and *Callidryas eubule* were taken on the 10th.

The second trip to the woods was made on the 11th, and specimens of *Catocala ilia*, *polygama*, *epione*, and one *clintoni* were taken.

A pupa of *Catocala minuta* that as a larva spun on May 27th gave an imago on June 12th.

On June 11th, while wading through underbrush on a heavily wooded hillside, in search of *Catocalæ*, the senior author came upon a great spider web that held entangled twenty-eight struggling specimens of *Thecla calanus*.

On the 13th of June "Catacala hollow," as well as the hillside, was full of "Catos," *polygama*, *clintoni*, *minuta*, and many *ilia*. Took also *Vanessa antiopa*, *Pyrameis huntera*, *Euptoieta claudia* and *Feniseca tarquinius*.

Catocala were numerous on the 14th, but fewer on the 15th, due perhaps to the cloudy, cool character of the day. What few moths observed were high on the trees, while on the 7th, 11th and 13th, warm dry days, the "Catos" were abundant and at the very bottoms of the tree trunks.

The first bred imago of *Catocala coccinata* emerged on the 17th; a *minuta* on the 18th, and an *innubens* on the 19th.

In the woods on the afternoon of June 19th, found "Catos," very abundant and low on the trees. The day was warm. Both *ilia* and *epione* were by the hundreds, but wary. Individuals of the latter species were on both the tree trunks and in the brush, flying up at every step, and often as many as four or five would fly off of one tree. *Ilia* was hardly less numerous. *Polygama* was fairly common. On this trip the first *grynea*, as well as the first *innubens*, were taken. *Minuta* and *clintoni* were ragged.

Saw the first of the metallic black and green dragonflies (*Calopteryx*) along the Creek Bank on June 15th, and heard the first green cicada on the 16th.

Great numbers of *Argynnis cybele*, with an occasional *idalia*, were taken at *Asclepias* blooms during the third week of June. At the same time hundreds of individuals of *Pieris protodice* flitted about the fields; in fact, in greater numbers than the senior author ever saw before. Coliads were very few.

June 21st was a banner day. Took *Catocala amica*, *scintillans*, *ultronia*, *neogama*, *palæogama*, and two fine *dejecta*. The woods were full of moths, low on the trees, but very wary. Both the hollows and hillsides furnished good collecting. The day was hot and dry and the thermometer at 102°.

The next day, June 22nd, was hot and cloudy, and moths were again abundant, especially *amica*, *polygama*, *ultronia* and *innubens*, mostly along the branch beds. Saw a few *scintillans* and took a fine specimen with a white discal spot and a splendid female *dejecta*.

On the 23rd, after a slight rainfall of the night before, but still sultry, moths were not scarce, but hardly so plentiful as the day

before. Miss Gertrude Wallace was with the collecting party on this trip and took some good "Catos."

On June 25th saw the first *Catocala junctura* of the season, a beautiful new specimen.

On the night of the 25th took at bait in my own yard specimens of *Catocala epione*, *illecta*, *ultronia*, *amica*, *innubens*, and *grynea*.

On the forenoon of the 26th found the woods full of moths, 25 to 30 often flying from one tree trunk, but mostly *epione* and *innubens*. Took two fine *neogama*, three fine *palæogama*, the first *residua* of the season and five *Catocala serena*, the first senior author ever saw in Missouri. These last were taken on elm, hickory and oak, and when disturbed flew around the tree and alighted a little "higher up," like *amica*, *habilis* and other small species. *Catocala* of several species were not uncommon on the shade trees along the streets at Louisiana.

Another good day was the 28th, when the senior author, in company with Frank Caldwell and Lowell Pinkerton, took good specimens of *neogama*, *palæogama*, *residua*, *epione*, *innubens*, *scintillans*, *amica*, *ilia* and one *junctura*, a splendid specimen. The day was somewhat cooler and the moths correspondingly fewer than on the 26th. The best catch was, perhaps, a fine male *subnata*, a rare moth here.

At "Bouncing Bet" flowers, on the same day, took numbers of *Deilephila lineata* of the largest size, and on the 29th took a good specimen of *Hemisesia titan* on the same flowers.

In the woods on the 1st of July, after a steady all-night rain, found no moths on the hillsides, but a few *innubens* and *scintillans* about tree roots in the hollows. Took a perfectly fresh specimen of *Ceratonia amyntor* of as large size as the species attains. The day was cloudy, damp and threatening rain.

July 4th was a hot, damp day and "Catos" were plentiful at the bases of the trees. We took *flebilis*, *relecta*, *cara*, *palæogama*, *neogama*, *residua*, and *phalanga*. Of these *flebilis*, *relecta*, *cara* and *phalanga* were the first of the season. Miss Wallace and John DeGroot accompanied the senior author on this trip.

On the 5th found moths abundant and low on the trees. Weather hot and somewhat damp. Took fine specimens of *cara*, *residua*, *obscura*, *subnata*, *palæogama*, *neogama* and *phalanga*. Other species were poor.

The 6th was hot and close and the *Catocalæ* were abundant on the hillside facing the east and in the branch bed, but were few higher on the hill. The flight of scores of *innubens* and *palæogama*, disturbed by the collector's approach, scared other and better things away. Took a splendid female *subnata* near the head of the hollow, and on the hillside, took the first *viduata* of the season, a male *dejecta* and other good moths. *Residua* were abundant, and *cara* and battered specimens of *ilia* common.

On the afternoon of the 8th found "Catos," especially *palæogama*, *innubens*, and *residua* very abundant and *neogama* fairly common. Among other things, took a fine female *subnata* and a ragged female *isolabilis*. The day was close and hot.

July 12th was a red-letter day in moth collecting. Weather intensely hot and dry. Took the first *nebulosa*, *habilis* and *lacrymosa* of the season. The last named, a variety of singular beauty with both pairs of wings black and the front ones having a broad outer and posterior band of white. The colours much more intense than in *paulina*. Took also three fine *viduata*, *cara*, *neogama*, two faded *serena* and *palæogama*. The *lacrymosa* was a female, and so was the *nebulosa*.

Moths were mostly low on the trees and abundant everywhere, even at the mouth of the hollows where there was but little shade.

The 13th was dry and hot, and moths were not scarce. Took a *paulina*, *cara*, *palæogama*, *neogama*, *resecta*, *phalanga*, *residua* and ragged examples of *ilia* were very abundant. Miss Wallace took a second *junctura* on this date.

July 15th took six *Catocala viduata*, all males, four *resecta*, one brand-new *ilia* and a ragged *dejecta*.

Weather hot and dry. Few *Catocalæ* in the hollow, more on the hillside. *Viduata* is almost always at rest on white oak trees and usually under the leaves of vines, but rarely nearer the ground than four feet. When scared out of their resting places, they simply fly higher or around to the other side. They seem lazy. *Innubens* and *palæogama* stay near the bottoms of the trees in dry hot weather, and so do *neogama*, *cara*, *innubens*, *nebulosa* and *junctura* under roots along the little brooks. *Junctura* rests also under porches, in deserted sheds and under bridges.

(To be continued.)

FIELD NOTES AND QUESTIONS.

THE INSECT FAUNA OF THE NEW JERSEY COAST.

The coastal strip of New Jersey, which is that portion of the state bordering on the Atlantic Ocean, consists of the beach front and the sand hills immediately back of it, the marshlands lying between the beach and the mainland and various islands composed of different types of soil found chiefly in the southern portion of the coastal strip. These islands contain sandy areas, some agricultural land, salt marsh, cedar and sphagnum swamps, and have a varied flora. As a result, their insect fauna is correspondingly rich and many species occur there which are also found throughout the state.

The following information, compiled from Smith's "Insects of New Jersey," gives one an idea of the characteristic insect fauna of the marshlands and beach, both of which have been fairly well collected over. The Odonata of the beach number nine species, representing three families, and of the marshland, two species from two families. In the Homoptera, thirteen species occur on the marshland, seven of which belong to the Jassidæ, five to the Fulgoridæ, and one to the Coccidæ, while none is found on the beach.

The Hemiptera is poorly represented on both beach and marshland, one family and two species being found on the former and two families and two species on the latter. The Orthoptera of the beach number five species and two families, and of the marshland, seven species and two families. Of the Coleoptera, seventy-one species and twenty-two families occur on the beach and fifty-six species and fourteen families on the marshland, this order being the best represented on the coastal strip. Of the seventy-one species on the beach, seventeen belong to the Carabidæ, and of the fifty-six on the marshland, thirty-one belong to the same family.

The Lepidoptera is poorly represented on the beach by one species and one family, but on the marshland, eleven species and five families are found. In the Diptera, six species belonging to the family Tabanidæ are found on the beach, while on the marshland twelve species, representing the two families, Culicidæ and Tabanidæ, occur.

It must be remembered, of course, that overlapping takes place, it being impossible to separate the areas sharply from each other or from the adjoining section of the state.

HARRY B. WEISS,
New Brunswick, N.J.

A EUROPEAN BEETLE, RECENTLY INTRODUCED INTO CANADA.

(*Orchestes scutellaris*.)

This spring, while sweeping on the border of a wood—not far from the city of Ottawa—where small willows and raspberry bushes were growing, I captured an interesting small "Curculionid." The specimen was sent to the Bureau of Entomology, Washington. Mr. Schwarz, who identified it, sent me the following note: "Your beetle is a European species hitherto not known to occur in North America. It belongs to our jumping Curculionidæ (genus *Orchestes*), which have the hind femora incrassate. It is easily known by its brownish coloration, our common species being all black, or black with white markings."

The specimen has been kept for the U. S. N. M.
Ottawa, July, 1915.

BRO. GERMAIN.

BOOK REVIEWS.

THE BUTTERFLY GUIDE: A Pocket Manual for the ready identification of the common species found in the United States and Canada. By W. J. Holland, LL.D. Doubleday, Page & Co., Garden City, New York. (Price \$1.00.)

This little book is published in the same form as the well-known Bird, Flower and Tree Guides, with flexible covers, and in shape and size convenient for carrying in the pocket. It consists of 237 pages, and is illustrated with 295 coloured figures, representing 255 species and varieties. There are also five plates in explanation of structure, venation, metamorphosis, and the apparatus required for catching, breeding and mounting specimens.

The first sixty pages give an admirable introduction to the scientific study of the Diurnal Lepidoptera, explaining clearly the

external and internal anatomy of Butterflies, the wing-venation, and the life-history, during the four stages of metamorphosis. This is followed by full directions for collecting and preserving specimens. A careful study of this introduction, written as it is in simple language, will enable the reader to understand the classification, and to realize that the Butterflies he captures are something more than a collection of pretty objects.

The coloured figures, though they necessarily fail in some cases to represent the splendour of the originals, are true to nature and will enable anyone to identify the larger species almost at a glance; for the Skippers and other small forms it will be necessary to consult also the descriptions and comparisons given in the text. The possession of this handy little book will be a permanent joy to every collector of these lovely "winged flowers of the air," and it ought to find a place among the Nature-study books of every school library, as well as in the pocket of everyone who takes delight in the beauties of the world around him.

Dr. Holland's Butterfly and Moth Books were the first publications which gave coloured illustrations of the insects at a price within the means of those most interested, and deservedly met with a very large sale. Our debt of gratitude to the author is now largely increased by the work before us, which is so much cheaper and handier, and which includes all our Canadian Butterflies, with the exception of a few very rare species.

C. J. S. B.

INDIAN FOREST INSECTS OF ECONOMIC IMPORTANCE. COLEOPTERA.

By Edward Percy Stebbing, London. Eyre & Spottiswoode, Ltd., 1914. Price 15 shillings.

It may come to many as a surprise to see a volume of 648 pages on a single order of Indian forest insects, as we are accustomed to think of the vast insect fauna of India as too little known to render possible the preparation of such a work, and while Prof. Stebbing's book, as the author modestly remarks, "has no pretensions to be more than a pioneer endeavouring to indicate in some small degree the lines upon which the further study of the subject should proceed," there is nevertheless a vast amount of

information contained within it on the life histories and economic relations of the beetles that are more or less destructive to Indian forests.

Some idea of the vastness of the subject may be gained from the author's statement, quoted from J. S. Gamble (Manual of Indian Timbers) that "the Indian forests contain some 5,000 different species of trees, shrubs, climbers and bamboos"; for here, as elsewhere, the number of species of insects corresponds more or less closely upon that of the plants on which they feed.

The material for the present work was chiefly gathered by the author since 1898 while acting in the capacity of Imperial Forest Zoologist and Member of the Forest Research Institute, Dehra Dan, India.

The first five chapters deal with the more general phases of the subject, such as the distribution of forest insects in India (Chap. I), the methods by which the presence of insect pests in the forest can be ascertained, the general methods of control and the characteristics of the order Coleoptera. The special part treating of the various families and species of beetles, which are arranged according to Lefroy's *Indian Insect Life*, comprises the remaining 27 chapters. It deals with a very large number of species, about most of which very little is known; but the life histories of not a few of the more destructive species have been worked out by the author, and their economic relations, methods of control, etc., are given in considerable detail.

A good many of the species noticed are of no economic importance, all species showing any definite relation to trees or tree-products being included, on account of the necessity, on the part of the forester, of being able to recognize such species and distinguish them from the truly injurious forms.

There are no keys, but descriptions of all the species dealt with are given and a very large proportion are figured. Unfortunately a great many new species are described, an undesirable feature in an economic treatise. This was perhaps difficult to avoid, however, in the present work, as it is possible that the publication of so many new species in the regular journals might have caused serious delay in the issue of the book.

The illustrations include 64 plates, of which seven are coloured, and 401 text figures. They are of very variable quality, being the work of several different artists. The great majority are excellent in every respect, some of the plates, such as Plate XV, on which a group of Buprestids is shown in colour, being of great beauty and finish. Some of the coloured plates, however, are poor, and among the text figures are a few exceedingly crude sketches, which look like rough field notes that had never been intended for reproduction.

As a pioneer effort in the study of Indian forest insects, the book is deserving of great praise and will undoubtedly be the most useful work on the subject of Indian forest beetles for many years hence. We look forward with pleasure to the appearance of the next volume in this series.

A PRELIMINARY LIST OF THE INSECTS OF THE PROVINCE OF QUEBEC.

Part II—Diptera (Two-winged Flies). Compiled by Albert F. Winn (Westmount) and Germain Beaulieu (Ottawa). Published as a supplement to the 7th Report of the Quebec Society for the Protection of Plants, 1915.

We received with much pleasure recently a copy of Part II of the Quebec List of Insects, dealing with the Diptera or Two-winged Flies. As so few entomologists in Canada have given any attention to the systematic study of this order, it was with some surprise that we noted the names of nearly 800 species in the list. This number must, of course, be very far short of the actual number of species which inhabit the Province, but it is a very creditable beginning, and sets an example that should be emulated by entomologists in other Provinces.

The same plan is followed in this list as in that of the Lepidoptera, except in the omission of illustrations—an improvement in our opinion.

The localities given for species are naturally fewer than is the case of the Lepidoptera, there being fewer collectors of this order. A large proportion of the species were collected by the junior author and Mr. G. Chagnon, of Montreal.