

PHYCIODES BATESI REAK., AND *P. THAROS* DRURY.
(See p. 59).

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A SOLDIER'S COLLECTING DAY IN FRANCE.

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We were stationed away back of the lines but when they were putting over a big drive we were busy handling supplies, so that I was not sorry when a lull came that allowed me a day off.

I was stationed in the heart of Burgundy at Beaune, near the edge of the little range of hills known as the Cote d'Or. Here the forest-covered hills come down to meet the town, and it was to these hills that I made my way on this particular morning.

I had hardly started out the Faubourg when what should I find sitting on the sidewalk but a splendid specimen of *Lamia textor* Linné. This longicorn resented my grasping propensities very much and tried his best to bite a piece from my thumb. A little more and the town Octroi or limits was past, and on turning over a stone a fine large specimen of *Carabus coriaceus* Linné was acquired. In like manner under a neighbouring rock were picked up three more of the same and two *Carabus violaceus* Linné. Decidedly the species were well known, but they had charm for me as it was a new hunting ground. *Carabus auratus* was soon added to my list of discoveries, and it was not long and I had a fair series of each. A little further on I came to an apple tree with a little fruit on it. In response to a hearty shake of the tree I was rewarded by several hundred lively specimens of *Melolontha vulgaris* Linné, who "possumed" dead long enough for me to gather all I wanted, and then took wing. The leaves of this tree I found on closer examination were in a sad state of dilapidation due to these ravenous Scarabs.

A little bit further on I found several *Cetonia aurata* Linné, and a great many *Cetonia hirtella* Linné upon the flowers of mustard. A rose in a nearby garden yielded from its heart a *Trichius fasciatus* Linné. A few stones on the hillside yielded several specimens of *Pterostichus vulgaris* Linné, and a little further on a single rock provided cover for at least thirty specimens of that pretty little Bombardier, *Brachynus plagiatus* Reiche. Continuing this sort of collecting I soon added some more *Carabus auratus* Linné to the bag as well as several *Abax ater* Vill. and *A. parallelus* Dftsch.

On coming to a fallen log in a moist condition I removed from their snug position beneath the bark a series of *Uleiota (Brontes) planata* Linné, and several *Hispella atra* Linné. A little further on some manure yielded a pair of *Geotrupes sylvaticus* Panz. and one *G. stercorarius* Linné as well as several Staphylinidae unknown to me. A little further on I captured as it ran along on the edge of a pine grove a fine specimen of *Carabus marginalis* Rz, a very lively and speedy runner. This pine grove was exceptionally well cared for, all fallen limbs and

undergrowth being kept cleared out, so that outside of a few specimens of *Carabidæ* I got nothing there for my pains.

A little further on beneath a very old log my patience was rewarded by three specimens of *Lucanus cervus* var. *capra*—the variety with the short mandibles in the male. I later took the typical form, *L. cervus* Linné flying at dusk in the outskirts of Paris. Both of these latter I took at the same place exactly, the female one evening and the male the following evening. Both were on the wing, and I was attracted by their buzzing flight.

But to continue my history of this my first day in a new field, I proceeded on until mid-afternoon finding many old friends in a live condition more interesting than they had been in my collection. Everywhere on the deciduous trees were to be found swarms of *Melolontha vulgaris* and an unknown little weevil which also defoliated. I was just putting a pair of *Clivinia fossor* Linné into my vial when I noticed that the sun was low, and as I had to be on duty again at seven that evening it behooved me to hurry a little and return.

Thus closed my first experience in a strange land, and how I gloated over them when I packed them away that evening.

A REMARKABLE CASE OF HOMING INSTINCT. (HYMEN.)*

BY C. N. AINSLIE,
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August 31, 1919, was hot, dry, dusty and windy in Mandan, North Dakota, where the writer was spending the day. The wind was from the west, gusty, and at times almost reached the velocity of a gale.

Late in the afternoon as the writer was returning from a stroll, a flash of green from the grass beside the walk attracted his attention. A brief investigation disclosed the fact that a lady *Sphex* (or *Ammophila*)* had secured a green lepidopterous larva more bulky than herself and was trundling along with her prey swung beneath her body, one end of the larva being held in a firm grip by her jaws, the other supported in some manner by her legs. Its weight was clearly greater than that of the wasp herself, but she was evidently fresh and moved quite briskly at first.

She came out almost at once upon the cement walk that was being swept by the wind. When she felt its force she adopted the policy of least resistance and drifted before it for at least twenty feet eastward, running, walking and hopping in an effort to maintain her balance. For the time she was helpless. Finally she hove to and headed directly into the wind, going due west. Her progress was of course slow, but she persisted and managed to struggle along for a distance of about fifty feet, with occasional pauses for rest.

During this journey her prey must have shown signs of returning animation for at one point she stopped, adjusted her burden and, arching her slender waist, aimed her ridiculous little bulb of an abdomen directly downward. A few swift stings reduced her helpless victim to absolute submission, and during the remainder of the performance she had no more trouble of this sort.

After moving nearly fifty feet directly into the wind she seemed to realize

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**Determined by Dr. H. T. Fernald, of Amherst, Mass., as *Sphex vulgaris*.

something wrong and wheeling about went careering down the walk, driven by the breeze to the east. She slowed up as much as she was able, but just as she reached her former turning point an unkind gust struck and upset her, compelling her to let go of the worm while she struggled to her feet. The worm was carried half a yard beyond her and left in plain sight on the walk. She was bewildered for a few moments, then began an agitated search for the lost prize. Her eyesight was evidently of little use, for at first she walked about in an aimless manner but was soon travelling in circles like a dog locating a scent. As this produced no results she rose to wing and sailed above the walk, her long legs just trailing the surface of the cement as she flew. The circles gradually grew larger and she varied flying with running, always keeping close to the surface. The search appeared to be hopeless when all at once, in one of her wider sweeps, she managed to stumble across the outstretched worm. Instantly she straddled it, grasped it with her jaws and again headed west into the wind. Just why she spent so much valuable time chasing up and down this walk will always remain a mystery for, as subsequent history shows, she was merely wasting time and getting nowhere. But the facts are recorded as they occurred.

This excursion took her fully seventy-five feet into the wind, and she walked, hopped, ran and flew in short flights as if in haste to arrive somewhere. At brief intervals a short rest was taken, for the muscular exertion must have been tremendous in the teeth of the gusty wind with the load she was carrying.

Once more, and for the last time, she turned squarely about and headed east. She blew along in spasmodic fashion, now fast, now slow, seldom pausing even for an instant. At times she would run headlong for a yard or more, her abdomen held high in air and her long legs racing. Then she would make leaps of a foot or more, several in succession, then perhaps drag herself wearily along for a few steps as if tired out. For a hundred feet she drove with the wind to the east. Then, in some unknown way she got her bearings and turned directly into the grass lawn, moving south. This was really the most trying part of her entire trip, for although she was out of the wind she was at once involved in a jungle of tangled, close-clipped grass tufts through which she had to thread her way. Necessarily her route was far from being an air line since she had to accommodate herself to the surface obstructions and go around where she could not go through. This fact of itself must have embarrassed her in finding her destination, at least a human, like you or I, would undoubtedly have lost our way under similar conditions. But she kept steadily on, followed as closely by the writer as was deemed wise, although she appeared oblivious of his presence during the entire episode.

During her lawn journey she was first in the shade of one house, then of a second. Each time she emerged from the shade she topped and stretched herself in the grateful warmth before continuing. The second time she did this she released her victim and walked away a few steps. Returning, she almost immediately straddled the prize to pick it up but had evidently made the mistake of changing ends, for she promptly reversed her position and then seemed satisfied. Up to now she had been going mainly south but all at once changed her course and went southwest as if she were steering by some invisible star, and from that time until she reached her destination, held consistently on this new quarter. The vicious wind that blew directly across her line of march

precluded any theory of scent affording any aid to the wasp in reaching her burrow, and she certainly could see no landmark to assist her in steering her way.

Once an active grasshopper came bounding across her path and forced a change en route, a detour of a few inches. Later, another hopper, sitting in the grass near her route caught sight of her as she toiled toward him. With baleful eyes he glared at her, swung slowly about as she came closer and just as she passed him made a short, spiteful spring directly at her, giving her a violent kick and upsetting her completely. It was coarse comedy on his part, but might have proved tragedy for her. She meekly righted herself and trudged steadily on. Still further along, another wasp of the same species as herself crossed her track at right angles just ahead of her. She saw the newcomer, stopped short and flattened herself to the ground for a few seconds until her fellow raider had passed on.

At last, after crossing two lawns, two concrete walks leading to the houses she had passed, and going some distance into a third lawn, making fully one hundred feet of grass travel, she swung sharply at right angles and made a rapid run of about two inches. She was all animation now, dropped her load, jumped forward and seized in her jaws a pebble that lay before her. Its removal disclosed an opening in the earth down which she instantly plunged, to reappear almost as suddenly. The worm was grasped and dragged beneath the surface quickly. Twice more she came to the top and, sad as it seems, was captured the last time for the writer's cabinet.

This wasp with her heavy load had travelled in all more than 300 feet, had apparently lost her way at first yet had in some mysterious manner succeeded in steering herself with uncanny accuracy to her destination. How did she do it? It is possible but not probable that she had already been over the same route on foot and was merely following her own scent. But she appeared to enter the lawn in a haphazard manner, and any well-laid plans she may have had must have been much interfered with by the annoying wind as well as by the unexpected obstacles she encountered along the way. The mouth of her burrow was many feet from any prominent object that might have served as a landmark to guide her, and for nearly half an hour she was involved in a grass forest from which she could have seen but little of the outside world. All the while she acted as if absorbed in the petty details of the journey, but she must, in spite of this, have been feeling her way in some exceedingly definite direction and this super-sense, call it instinct or what you will, brought her to precisely the right spot.

These facts are a transcript of notes that were continuously recorded while following the wasp, and are neither coloured nor altered to make a good story.

At the recent meeting of the American Association for the Advancement of Science, held at St. Louis, the Council unanimously elected Dr. C. J. S. Bethune, Professor of Entomology at the Ontario Agricultural College, Guelph, a Fellow Emeritus "in recognition of his long and faithful membership."

Dr. Bethune has also been made an Honorary Life Member of the American Association of Economic Entomologists "because of his long membership in the Association and as a slight token of its appreciation of his work in Entomology."

OBSERVATIONS ON THE MORE COMMON APHIDOPHAGOUS SYRPHID FLIES. (DIPT.).

BY C. HOWARD CURRAN,

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During 1913 at Guelph, 1914 at Orillia, and 1915 and 1919 at Vineland, the immature stages of many species of Syrphidæ, but more especially the aphidophagous or aphid-eating forms, have been studied by the author. As the study of these flies is of considerable interest to the fruit grower and gardener, owing to their beneficial habits, the observations made chiefly concern such species as were found to be of the greatest economic importance.

Species belonging to four genera, *Syrphus*, *Allograpta*, *Sphærophoria*, and *Paragus* have been especially studied with the view of obtaining information as to their importance in the natural control of aphids injurious to farm crops. No suggestion is made here that any one species is of greater importance than another, although it is quite evident that the species discussed are of more importance than others, due to the fact that they are, for the most part, very common.

It has been found that Syrphid larvæ of all species are more or less heavily parasitized, some years much more severely than others. During 1919 parasites were over twice as numerous as during 1915.

Difficulties occur in the study of these larvæ, such as the almost complete absence of food at some periods of the year. Thus, during the past season, Syrphid larvæ were particularly numerous on small aphid colonies early in the summer, but it was found to be impossible to secure sufficient aphids for food, as some species cannot thrive, except on a particular type of aphid. But during the early part of the past season even general feeders, such as *Syrphus americanus*, could not be reared successfully.

The eggs of aphidophagous Syrphidæ are laid singly on the leaves or stems of plants, either in or near an aphid colony. They are creamy-white, but in many cases become grayish after one or two days. They vary in size according to the size of the fly.

The larvæ are more or less flattened beneath, without true legs, and often with fleshy, spine-like protuberances. They vary in shape, colour, size and convexity, according to species.

The pupæ of our common species resemble each other to a considerable extent. Pupation, however, may take place either in the soil, or on the plant. In one case, at least, it occurs in either place.

The more important species are dealt with regarding their feeding habits and abundance.

***Allograpta obliqua* Say.** This is one of our most common syrphus flies and is common during the whole season, from May until October.

The larva is a very general feeder, having been found during the past season on *Aphis brassicæ*, *A. rumicis*, *A. cardui*, *A. pomi*, *A. gossypii*, *Myzus cerasi*, *Macrosiphum*, sp. on wild lettuce (*Lactuca canadensis*) and *Macrosiphum* sp. on wild aster (*Aster* spp.).

On all hosts except *Aphis pomi* this species was very abundant. In the

case of *A. pomi* the aphids were usually too much exposed to the direct rays of the sun to afford the shelter required by syrphid larvæ. On *M. cerasi* and *A. brassica* it was exceedingly common and a very important check. About 50% of the larvæ were parasitized during last year.

Sphaerophoria cylindrica Say. An exceedingly common species, found in abundance from early May to early November. The larva is a general feeder, but prefers aphids found on low-growing plants. It and the larva of *A. obliqua* are very similar, and without close examination are ordinarily considered as the same species. They are found on the same plants as the preceding, and the remarks on that species apply here also.

Syrphus americanus Wiedemann. Is a well-known member of the family. It is common in orchards and gardens, especially where plants are infested with aphids. During 1919 the larvæ were found feeding on *Aphis brassica*, *A. rumicis*, *A. cardui*, *A. pomi*, *A. gossypii*, *Macrosiphum* sp. on wild lettuce, and *Myzus cerasi*.

The larvæ are quite common on all the hosts mentioned above. It is of considerable economic importance as a check of aphids attacking cultivated plants and fruits.

Syrphus ribesii Linné. Larvæ found attacking: *Aphis brassica*, *A. cardui*, *A. pomi* (apple and pear), *A. gossypii*, *A. viburnicola*, *Myzus cerasi*, *Eriosoma lanigera*, *Macrosiphum pisi*, and *Macrosiphum* sp. on wild lettuce.

Syrphus ribesii is probably the best known member of the family, and is very common in orchards and gardens. Unfortunately this species and others are frequently mistaken for bees, and are often killed in mistake for such. It is probably the most important species in the orchard, where it occurs in moderately large numbers throughout the season from early May to November, attacking especially *Aphis malifolia* and *A. pomi*, and to some extent, the Woolly Aphis of the apple. It is the most common species attacking currant aphids, and is usually very common during October on Viburnum, where the larvæ attack the return migrants and sexual females of *Aphis viburnicola* and *A. rumicis*.

The larvæ are also found in large numbers in vegetable gardens on cabbages, etc., which are infested with aphids. They usually prefer well-shaded places, such as curled leaves or dense foliage, but are often found in more exposed positions.

Syrphus torvus Zetterstedt. Is an extremely important species. During the first warm days in spring the adults emerge and eggs are laid on the first colonies of aphids appearing on the shoots of various plants. The young larvæ develop on clusters of stem mothers and often wipe out whole colonies. Again in the autumn it preys upon the return migrants and sexual females, in addition to living upon summer forms of aphids upon various plants.

Paragus tibialis Fallen is rather common in Ontario. The larvæ are enemies of the pea aphid (*Macrosiphum pisi*), but I have observed them more frequently attacking *Aphis cardui* on thistle.

Paragus bicolor Fabricius is similar in habits to the preceding, but is much less common.

OBSERVATIONS ON THE NUMBER OF APHIDS DESTROYED BY SYRPHID LARVÆ.

In order to obtain specific data on the number of Aphids destroyed by a single larva during the larval stage, newly-emerged larvæ were isolated on plants and a count kept of all aphids consumed. This was done by adding fresh aphids each day, in the numbers likely to be eaten. No count was kept of the aphids which were born on the plants, but these would not be numerous. However, it may be granted that the figures given in the accompanying table are slightly below the average, although they are the average of numerous experiments conducted.

TABLE SHOWING DURATION OF IMMATURE STAGES AND NUMBER APHIDS DESTROYED.

Species.....	Number of Exp'ts	Duration of Egg Stage	Duration of Larval Stage	Duration of Pupal Stage	Average Total Aphids eaten by one Larva	Average Daily Consumption
<i>Allograpta obliqua</i>	9	Days 5-10	Days 12-20	Days 5-13	265	17
<i>Sphaerophoria cylindrica</i>	8	6-12	16-27	5-10	530	24
<i>Syrphus americanus</i>	10	5-12	8-11	8-15	474	47
<i>S. torvus</i>	5	—	14-20	10-20	242	15
<i>S. ribesii</i>	8	6-8	14-24	12-24	312	19

NOTE.—The larvæ were fed upon *Aphis pomi* and *A. malifoliae* in these experiments.

As shown by this table there is considerable variation, between species, in the total average number of aphids destroyed, and in the average daily consumption.

It may be noted that the number of aphids eaten or destroyed by a larva will depend, to a great extent, upon the abundance of food and the size of the aphids. In the field it was found that where food was very plentiful, the larvæ often killed two or three aphids in succession, but did not suck them dry. Also, in such cases, the larval and pupal stages appeared to be of shorter duration. As the development of the larva depends to a very great extent upon the abundance of food, it is safe to state that such abundance stimulates the insect to more rapid maturity. This fact was clearly demonstrated in the insectary, as the duration of both the larval and pupal stages was markedly shorter in cases where larvæ were reared on aphid colonies, rather than upon a certain number of aphids per day.

Again, the time of the year has a great effect upon the development of the larvæ. In warm weather growth is much more rapid. Larvæ feeding upon colonies of stem mothers are of more importance than those feeding upon summer colonies, as the stem mothers are more productive, and their destruction means that for each one destroyed, possibly millions of aphids will not be brought into the world, as each stem mother is the progenitor of inestimable numbers.

This brief outline of one phase of the work on the immature stages of Syrphidæ merely furnishes the basis for further extensive work. It might be pointed out that besides the determination of the economic value of the various species, considerable information on the systematic classification of the various species and genera is obtained from such investigations.

NOTES ON THE LIFE-HISTORY OF PHYCIODES BATESI REAK.
(LEPID).*

BY J. MCDUNNOUGH, PH.D.

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Phyciodes batesi Reak. is one of the specialties of the Ottawa district. Like *Plebeius scudderi* it extends eastward from Manitoba through northern Ontario into Quebec and thence down the White Mountains, Adirondacks and Alleghanies into Virginia; although widespread it is apparently, for some unknown reason, restricted to a few isolated localities; further intensive collecting may, however, show that it is more common than we think and that its apparent rarity is due to the fact that it has been confused with *tharos*. I first made its acquaintance in the spring of 1918 when visiting Ottawa for the purpose of arranging the National Collection of Lepidoptera; noticing local specimens of this species in the collection I enquired where they had been obtained, and learned from Mr. A. Gibson that the species was rather common at Queen's Park, Aylmer, a summer resort about twelve miles up the Ottawa River and situated on the Quebec side. I was fortunate enough during the last week of May to obtain a good series of freshly emerged males, no females being obtained until nearly a week later, during the early part of June. The species was extremely local and frequented the lower dry slopes of a small ridge which at this point parallels the Canadian Pacific Railroad tracks; the area in question was adjacent to a wood but was itself rather open and covered with a miscellaneous growth of small bushes and plants among which a species of *Aster* with heart-shaped leaves was quite conspicuous. The same year stray specimens were taken at Chelsea, Que., on the Gatineau River, and other adjacent localities, but nowhere, except at Aylmer, did the species appear in any numbers.

This past spring (1919) *batesi* was even more numerous than in 1918 at its haunts in Aylmer, and by confining several females in a glass jar containing plants of the above-mentioned *Aster* species I was successful in securing a large batch of eggs. I further discovered a colony of freshly emerged larvæ on the same food plant at Aylmer. The ova laid in confinement on June 7th hatched on June 18th; the first pupa formed on July 14th and emerged on July 22nd, the remaining larvæ pupating during the following fortnight and emerging in due course, the last date of emergence being August 10th. Of the batch of young larvæ found in the open only about one-third fed up, pupated and reached the adult stage; the remainder stopped feeding after the third moult and remained quiescent in some secluded corner, evidently preparing for hibernation. It seems evident, therefore, that under natural conditions *batesi* (in the Ottawa region at least) is normally single-brooded with a partial second generation occurring under favourable conditions. That the ova laid in confinement all produced adults in the same year is probably due to the fact that shortly after being deposited they were subjected to intense heat, the jar in which they were contained having been left for a whole morning in a very hot sun.

As is only natural, the larvæ of *batesi* are very closely allied to those of *tharos*; in one feature, however, they appear to show a distinct difference, viz., that in their early stages, up to the third moult, they live gregariously on the

*Contributed from Entomological Branch, Department of Agriculture, Ottawa, Canada, March, 1920

underside of the leaf in a fine web, whereas Scudder emphatically states of *tharos* (Butt. New Eng. I, p. 637) that "not the slightest web of any kind is spun." With regard to the adults they are, in the male sex at least, quite readily separable from *tharos*; apart from the fact that they appear at least ten days earlier on the wing than *tharos* in this vicinity, the narrowness of the orange-banding on the upper side of both primaries and secondaries is quite characteristic; a comparison of our figures 2 and 6 will show that in *batesi* the first extra-discal row of spots is well separated by the black ground colour from the following series of spots, whilst in *tharos*, especially on the secondaries, there is a strong tendency for the two rows to coalesce; in *batesi* this same inner row of spots on the primaries is distinctly paler in colouration than the remaining orange spots, a feature which, to my mind, throws the species into the *campestris*—*camillus* group, in fact, I have little doubt that *batesi* is the eastern representative of the West Coast *campestris*. On the underside of secondaries the male of *batesi* almost entirely lacks the dark semicircular patch so characteristic of *tharos* (vide figs. 4 and 5). In the female all these points of distinction fail to a greater or less degree and individual specimens are often extremely difficult to place correctly. Up to the present time nothing regarding the life-history has, to my knowledge, been published: I therefore append a more detailed account of the various stages.

Ovum.—Very similar to that of *tharos* (according to Scudder's description); pale green, conical, with truncate apex, base slightly rounded. The lower half of the sides and the base covered with numerous small, slightly depressed, hexagonal cells; upper half with about twenty vertical ribs, slightly raised. Surface of the truncate apical portion very faintly reticulate, almost smooth. Height .66 mm., width of apex .2 mm. Greatest width (at about 1/3 height), .5 mm.

Larva.—Stage I. Head black-brown, broader than first segment, with lobes well rounded and divided posteriorly; hairs short, whitish. Body pale ochreous (greenish after feeding) with long, single, whitish hairs arising from minute tubercles. Prothoracic plate slightly darker than surrounding integument, broad, lunate posteriorly, with the lateral anterior edges forming a slight angle centrally at their junction point. Along the anterior margin six hairs overhang the head, three on each side of the centro-dorsal line; subdorsally on the posterior margin are two additional hairs. On the abdominal segments tubercle I is situated subdorsally about the centre of the segment; its long white seta is inclined forward. Tubercle II is well laterad to I and near the posterior margin of the segment; its seta is very short and points slightly backward. Tubercle III, situated centrally on the segment, bears a long hair similar to I, curving outward and forward; IV is slightly nearer the posterior margin of segment than III, V is in line with III, each with a fine white seta, directed outward; VI and VII represented by single hairs near the base of prolegs. In late stages of this instar the incipient spines of the following instar may be seen as large round disks which do not coincide in position with the primary tubercles. Length 2 mm.

Stage II. Head black, small, with rather sparse long hair. Body pale ochreous with greenish tinge. The primary tubercles have disappeared and the customary spines are now present. Prothorax without spines but with

well-developed dorsal plate containing six long, black hairs on anterior margin, overhanging the head, and two hairs on the posterior margin; several very short secondary hairs are also interspersed; laterally, on prothorax, a small hair ventrad to the plate and a raised tubercle with central long hair and several short ones on the lateral flange. Extending from the first abdominal segment is a centro-dorsal row of spines, each spine with terminal long hair and about seven others at various heights on it, decreasing in size as base of spine is approached. A subdorsal row of spines extends over all the segments but the prothorax, the spines being noticeably larger on thoracic segments, each with terminal hair and 11-14 others between apex and base: a similar supra-spiracular row is present with rather fewer hairs on each spine; a subspiracular row is found on abdominal segments only, being represented on the thoracic segments by two small hairs. A tuft of hairs placed on a small tubercle is found at the base of the legs and prolegs. The length of the spines is about equal to the width of the segments. Length $3\frac{1}{2}$ mm.

Stage III. Head black-brown, with pale front (clypeus) and mouth parts; the apex of each cheek (epicranium) is well rounded and the central suture deep; on each lobe a pale stripe is present extending downward from apex to a point midway between mouth parts and apex. Body green, with very prominent white spines thickly covered with black-brown hair; the supra-spiracular spine is preceded by a lunate patch of brown at its base, best defined on the posterior segments. In late stages the dorsal and lateral lines turn dirty brown and a pale subdorsal line crossing the spines is evident. Length $4\frac{1}{2}$ mm.

Stage IV. Head as in preceding stage. Body varying in colour from deep muddy brown to pale greenish brown with rather broad subdorsal and subspiracular creamy lines. Spines paler than the integument, thickly covered with brown hairs. At times the dorsal area is distinctly paler than the lateral area between the subdorsal line and the spiracle and generally the spiracular area is paler than the preceding lateral rows. Distinct tubercles are present along the anterior edge of the prothorax. Length 6 mm.

Stage V. Head black; apical two-thirds of front (clypeus), a streak across the clypeus, a semicircular area extending on cheeks from palpi around and above the eyes, and a vertical band from apex of cheeks to centre of same, white. Eyes white, situated on a black patch. Body deep purple-brown, the spines generally somewhat paler, arising from a white base; at times the supra-spiracular row is deeper in colour than the integument. Over the whole surface minute white spots are scattered, most numerous in the spiracular area, giving the appearance of a broad, pale, spiracular band; a pale subdorsal line, a faint supra-spiracular one and a very distinct subspiracular one; in late stages traces of orange at the bases of the subdorsal spines appear. Length 10 mm.

Stage VI. Head as in preceding stage, the extent of the lateral white area at base of cheeks rather variable. Body much as before with narrow, well-defined, pale yellow, subdorsal and broader subspiracular bands. Spines arising from a pale base and with white tip; hairs black-brown. Spiracle black; legs black; crotchets of prolegs arranged in a double row. Length 21 mm.

Pupa.—(Figs. 8-10). Ground colour pale creamy, but so thickly veined with brown and purplish as to appear superficially pale brown with whitish shadings. Shape much as in Scudder's figure of *P. tharos*; apex slightly truncate,

the lateral edges above the eyes pointed. Mesothorax crossed by an oblique lateral ridge terminating in a small tubercle representing the subdorsal spine of the larval stage; wing sheaths in the thoracic area bordered by a sharp irregular ridge. Transverse ridges cross the dorsal anterior portion of abdominal segments IV-VII, the spines of the larval stage being marked on them by small tubercles; remaining segments with dorsal and subdorsal rows of small warts, distinctly orange-tinged. Spiracles pale orange. In the intersegmental area traces of the subdorsal and subspiracular lines of the larva may be found, but these are not distinguishable on the general surface of the pupa. Wing sheaths with the brown veining forming more or less dark patches centrally near the antennal sheath and at the apex, adjoining abdominal segments I-III; an apical double row of raised white dots, about 1 mm. apart. Antennal sheath purplish with a row of raised white dots extending the entire length. Width of truncate apex $2\frac{1}{2}$ mm. Length from apex to cremaster abdominally 10 mm. Width of mesothorax $3\frac{1}{2}$ mm. Breadth at apex of wing cases $4\frac{1}{2}$ mm.

EXPLANATION OF PLATE I.

- Fig. 1.—*Phyciodes batesi* Reak. ♀.
 Fig. 2.— " " " ♂.
 Fig. 3.— " " " ♀, underside.
 Fig. 4.— " " " ♂, "
 Fig. 5.— " *tharos* Drury. ♂, "
 Fig. 6.— " " " ♂, "
 Fig. 7.— " " " ♀, "
 Fig. 8.—Pupa of *Phyciodes batesi*, dorsal view.
 Fig. 9.— " " " lateral view.
 Fig. 10.— " " " ventral view.

TWO NEW SPECIES OF PLATYCAMPUS—
(HYMENOPTERA TENTHREDINIDÆ).*

BY ALEX. D. MACGILLIVRAY,
 University of Illinois, Urbana, Ill.

The genus *Platycampus* contains four species, *americanus* Marlatt from New York and New Hampshire and three western species, *smihi* Rohwer and *albstigmus* Rohwer from Colorado and *juniperi* Rohwer from New Mexico. To these are now added another species from New Mexico and one from British Columbia. The following table, in which the species of Rohwer are placed from his descriptions, will serve for their discrimination:—

- a. Head and thorax wholly or in great part reddish-yellow
- b. Clypeus broadly shallowly emarginate, almost truncate.
- c. Head wholly or for the most part reddish-yellow
- d. Frontal crest strongly notched at middle; median fovea shallow, walls sloping; ocellar basin with rounded walls; antennal segments enlarged at distal end, third segment longest; stigma broad, not strongly tapering to distal end; colour reddish-yellow with the following parts white: clypeus, labrum, mandibles,

*Contributions from the Entomological Laboratories of the University of Illinois, No. 63, March, 1920

- cheeks, and tegulae in part; with the following parts black: first and second and part of third antennal segment above, eyes, ocelli, spot on lateral lobes, suture between mesonotum and mesoscutellum, metanotum, postscutellum, middle of basal plates, proximal part of metacoxae, a spot above, and saw-guides; wings with veins pale brown, costa and stigma white.—Colorado..... *albostigmus* Rohwer.
- dd. Frontal crest entire, not notched, large and prominent; median fovea broad and shallow; ocellar basin sharply limited, walls rounded; antennal segments enlarged at the distal end, the third and fourth segments subequal; stigma long, the caudal margin broadly convex; saw-guides retracted and concealed, distal end bluntly pointed; colour reddish-yellow with the sutures of the thorax in part and the central area of the mesosternum black.—Cloudcroft, New Mexico; H. L. Viereck, collector..... *vierecki*, n. sp.
- cc. Head wholly black; median fovea shallow, triangular; ocellar basin almost wanting; antennae with the third and fourth segments subequal; stigma broad, rounded on the caudal margin, broadest at proximal end; saw-guides broad, apex truncate, the lower margin oblique; colour reddish-yellow with the following parts black: the head, antennae, spots on the lateral lobes of the mesonotum, the metanotum, the pectus, the legs, and saw-guides; labrum and four cephalic tibiae and tarsi brownish.—New Mexico.—Bred from larvae on Juniperus..... *juniperi* Rohwer.
- bb. Clypeus deeply emarginate; stigma wholly or part yellowish hyaline; antennae black above or wholly black.
- c. Median fovea broad, comparatively deep, sides oblique; frontal crest strong, hardly notched; ocellar basin a rounded depression with rounded lateral walls, connecting with ocellar furrow; antennal segments three and four subequal; saw-guides pointed, the upper margin straight, the ventral margin slightly convex; colour reddish-yellow with the sutures of the thorax in part and the scutellum and the metathoracic pleurae sometimes black; the antennae blackish or brown above; coloration extremely variable.—New Hampshire, New York.—Larva feeds upon poplar..... *americanus* Marlatt.
- cc. Median fovea shallow, broad, walls sloping; frontal crest strong, slightly notched at middle; ocellar basin distinct, rather sharply pointed above; walls somewhat rounded; stigma large, broadest near the proximal end, tapering to the distal end; saw-guides broad, rounded on ventral margin, a brush of setae at the distal end; colour reddish-yellow; clypeus, labrum, proximal portion of mandibles, posterior angles of pronotum and tegulae somewhat pallid; antennae above, small spot around ocelli, a small spot above each antenna, two spots on lateral lobes of mesonotum, sutures of caudal part of thorax, postscutellum, metanotum, middle of basal plates, proximal portion of posterior coxae, caudal

- portion of first and second terga, and proximal portion of saw-guides, black or brownish.—Colorado..... *smithi* Rohwer.
- aa. Head and thorax, except pleuræ, glossy black; frontal crest moderately prominent, deeply interrupted by an extension of the elongate suboval median fovea; ocellar basin distinct with rounded walls extending around median ocellus; antennæ with third and fourth segments subequal; head and thorax finely setaceous; saw-guides straight above, pointed at distal end above, and ventral margin convex and oblique at distal end; colour reddish-yellow with head, including clypeus, labrum and antennæ, the pronotum except the lateral portion, the mesothorax and metathorax except the lateral aspects; the pectus, and the tips of the tarsi black; the proximal portion of the stigma and the longitudinal veins extending through the disc of the wing blackish; the male differs in having the antennæ reddish-yellow and the frontal crest obsolete and the sides of the median fovea continuous with the sides of the ocellar basin; the proximal end of the ventral side of the third antennal segment provided with a blunt, rounded projection.—Victoria, British Columbia, bred by W. Downes from larvæ on lombardy poplar.—Type deposited in National Collection of Insects, Ottawa, from which it was received..... *victoria*, n. sp.

NOTES ON COCCIDÆ VI. (HEMIPTERA).*

BY G. F. FERRIS,
Stanford University, Calif.

Genus POROCOCCUS Kll.

Coccidæ referable to the subfamily Dactylopiinæ (of the Fernald Catalogue) and belonging to the *Pseudococcus* group, that is, with at least the posterior pair of dorsal ostioles present. Adult female with the legs and antennæ present, the former without a tooth on the claw, the latter 6-7-segmented; without cerarii of the usual type but with the last three or four abdominal segments bearing at each lateral margin a chitinized area which may be continuous with a chitinized area extending across the dorsum of the segment and is beset with stout, conical spines; trilocular pores numerous and very conspicuous; anal ring with six long setæ, well developed and heavily chitinized, not borne at the inner end of an invagination.

Adult female enclosed within a test of hard, black secretion which in texture much resembles that of the genus *Tachardia*.

Type of the genus, *Porococcus tinctorius* Kll

Notes.—In the Fernald Catalogue this genus is placed near *Ericoccus* but it is distinctly a pseudococcine form. At present the genus contains but the type species and another, *P. pergandii* Kll., both of which occur on mistletoe in Mexico.

*Continued from Canadian Entomologist, Vol. LII, p. 32.
March, 1920

Porococcus tinctorius Ckll.

Fig. 12.

Habit.—Adult female entirely enclosed within a test of hard, black secretion which is roughly spherical in form.

Morphological characteristics.—Length (flattened on slide) 2.5 mm. In form the body (flattened on the slide) is almost circular except for the fact that the last four abdominal segments, together being much narrower than the remainder of the body, form a sort of tail (Fig. A). The terminal segment bears the rather large and heavily chitinized anal ring, which is flanked on each side by a large, chitinized area bearing two or three conical spines and a few

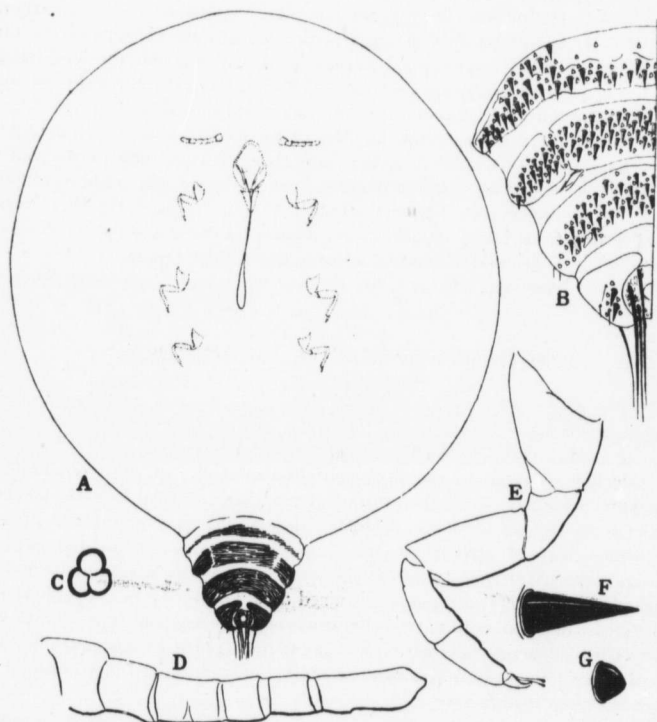


Fig. 12.—*Porococcus tinctorius* Ckll. A, general aspect of body; B, dorsal aspect of last four abdominal segments; C, trilocular pore; D, antenna; E, leg; F, type of spine occurring on dorsum of last four abdominal segments; G, type of spine on the dorsum anterior to the last four abdominal segments.

pores, these areas nearly meeting at the median line of the dorsum and extending slightly on to the ventral side. The next three segments each bear a transverse, heavily chitinized area beset with numerous conical spines of the type shown in Fig. F and pores (Fig. B). Over the remainder of the body the spines are rather few and are much smaller, short and tubercle like (Fig. G). Tri-

locular pores, of the type shown in Fig. C are very numerous and unusually large and conspicuous. The antennæ (Fig. D) are relatively quite small but are well developed and show six or seven segments. The legs (Fig. E) are likewise relatively quite small, and the coxæ of the posterior pair show many small pores.

The first stage larva likewise bears numerous large, trilocular pores and a few small, conical spines. The anal ring is large and cellular and bears six setæ. The anal lobes each bear a single seta which is about as long as those of the anal ring. There are no indications of cerarii.

Material examined.—Two slides received from Professor Cockerell and labeled merely as "types" of this species and a slide mount of a single individual received from Mr. E. E. Green and said to be from the type material of the species. It is from the last that the accompanying figures were made.

There has evidently been some mixing of material in connection with this species for another slide received from Professor Cockerell and likewise labeled as a "type" of this species represents some Lecaniine form.

Through the kindness of Professor Cockerell I have had the privilege of examining a slide labeled as a "type" of *P. pergandeei*. The two species are very similar but I am not prepared to say whether or not they are identical.

Genus *CISSOCOCCUS* Kll.

Brain¹ has considered it necessary to erect a new subfamily, the *Cissococcinae*, for this genus. As I have previously pointed out in this series of notes this genus is a Lecaniine form showing certain affinities with *Ceroplastes*. The statement that the anal plates are four in number is erroneous, the supposed outer pair being nothing more than the chinitized area upon which the anal plates are borne. The arrangement is strictly the same as that seen in *Ceroplastes*, and a comparison with the latter genus will dispel any thought of the necessity of a new subfamily for *Cissococcus*.

Genus *HOWARDIA* Berlese and Leonardi.

1896. Berlese and Leonardi, Rev. Patologia Veg., 4: 347.

1896. Cockerell, Bull. Bot. Dept. Jamaica, 3: 256.

1903. Fernald, Cat. Coccidæ, 226.

1915. Paoli, Redia, 11: 255.

There appears to be some confusion concerning the type of this genus.

Under the original description there were included three species, *Chionaspis biclavis* Comst., *C. citri* Comst. and a species there described as new under the name of *Howardia elegans*, this last being a synonym of *Diaspis zamia* Morgan. No type was designated. Cockerell (1896) in a paper which seems to have been omitted by the Fernald Catalogue, designates as type, *Chionaspis biclavis* Comst. This paper appears to have been overlooked by Paoli (1915) who states that *H. elegans* (= *zamia*) is the type of the genus and he names a new genus, *Megalodiaspis*, for *Chionaspis biclavis*.

It is evident that the type-fixation made by Cockerell must stand, and that *Megalodiaspis* must be placed as a synonym of *Howardia*.

Genus *ANOPLASPIS* Leonardi.

1898. Leonardi, Rev. Patologia Veg., 6: 207.

¹Brain, C. K. Coccidæ of South Africa II. In Bull. Ent. Res. 9: 109, (1918).

1900. Leonardi, *Ibid.*, 8: 344.

1903. Fernald, Catalogue Coccidæ, 299.

This genus was named by Leonardi in 1898 and its type was definitely stated to be *Mytilaspis metrosideri* Maskell. Later (1900) Leonardi stated that he found *metrosideri* to be a species of *Aspidiotus* and he transferred the generic name *Anoplaspis* to the species earlier named by Cockerell as *Aspidiotus bambusarum*, designating this as the type. This procedure is followed in the Fernald Catalogue and *Anoplaspis* is placed as a synonym of *Odonaspis* in which the species *bambusarum* is included. The species *Mytilaspis metrosideri* Maskell is placed under *Lepidosaphes* in the catalogue and no reference is given under it to Leonardi's first paper.

It is obvious that the first type fixation must stand and that the status of the genus *Anoplaspis* depends upon that of *Mytilaspis metrosideri*, its type species.

A revision of the genera of Diaspinæ must soon come for the group is falling into confusion because of the many genera and subgenera that have been named usually upon characters of no particular significance. Many of these names, however, must be used, and it is desirable that such points as those discussed above be straightened out.

SYNONYMY OF SOME SPECIES.

Targionia yuccarum Ckll.

1898. *Aspidiotus yuccarum* Ckll., Ann. Mag. Nat. Hist., (7), 2: 25.

1900. *Chrysomphalus (Melanaspis) tonilensis* Ckll., *Ibid.*, (7), 10: 470.

1919. *Targionia covilleæ* (Ferris), Contrib. Knowl. Coccidæ Sw. U. S., Stanford Univ. Publ., 67-8.

Mr. Morrison has called my attention to the fact that my *Targionia covilleæ* is identical with *T. yuccarum* (Ckll.), and has sent me a specimen of the latter species. There is no doubt that the two are the same. Also, through the kindness of Professor Cockerell, I have been enabled to examine a slide of *Chrysomphalus tonilensis* Ckll. from the type material, and this too proves to be the same. The species is a true *Targionia* as I have pointed out in the description of my *T. covilleæ*.

Aspidiotus herculeanus Doane and Hadden.

1909. *Aspidiotus herculeanus* Doane and Hadden, Can. Ent., 41: 298.

1918. *Aspidiotus subsimilis* var. *anona* Houser, Ann. Ent. Soc. Am., 11 m.: 163; pl. 18, f. 1.

The figure given by Houser indicates clearly that his *A. subsimilis* var. *anona* is identical with *A. herculeanus*, and Mr. Morrison, to whose attention I have called this and who has examined specimens, agrees that this is the case. I have had the privilege of examining a "type" slide of *A. subsimilis* Ckll., and unless intergrading forms exist there is no reason for placing *herculeanus* as a "variety" of this species.

Pseudodiaspis yuccæ Ckll.

1896. *Aspidiotus yuccæ* Ckll., Psyche, 7; Suppl. 1, p. 20.

1898. *Aspidiotus yuccæ* var. *neomexicana* Ckll., Ann. Mag. Nat. Hist., (7), 2 m.: 25.

1899. *Xerophilaspis parkinsoniæ* Ckll., Ariz. Exper. Sta., Bull. 32 m.: 282.

1899. *Diaspis celtidis* Ckll., Can. Ent., 31 m.: 106.

1919. *Pseudodiaspis parkinsonia* (Ckll.), Ferris, Contrib. Knowl. Coccida Sw. U. S., Stanford Univ. Publ., 56; Fig. 30.

Through the kindness of Professor Cockerell I have been enabled to examine "type" slides of all the above species. There is not much room for question that they are the same. In the specimens of *yucca* the lobes are shorter than in the others, but otherwise there is no difference, and I suspect that, as not infrequently occurs, the lobes in these specimens are worn or broken off.

Lepidosaphes hawaiiensis Maskell.

1894. *Mytilaspis flava* var. *hawaiiensis* Mask., N. Z. Trans., 27: 47.

1914. *Lepidosaphes erythrina* Rutherford, Bull. Ent. Res., 5: 264.

1916. *Lepidosaphes moorsi* Doane and Ferris, Bull. Ent. Res., 6: 401; f. 3.

1919. *Howardia moorsi* (D. & F.), Brain, Bull. Ent. Res., 9: 220; pl. 13, f. 132.

Mr. E. R. Sasser has called my attention to the fact that *L. moorsi* appears to be identical with Maskell's *L. flava* var. *hawaiiensis*, and after the examination of a photograph of the pygidium of the latter I am entirely disposed to agree. I have at hand some specimens from Ceylon which agree with the description of *L. erythrina*, and there is not much doubt that this too is the same. It is evidently a widely distributed tropical and subtropical species.

Brain has recently referred the species to *Howardia*, but it is most certainly not congeneric with *H. biclavis*. For that matter it is hardly a *Lepidosaphes* but it may well remain in the latter genus until revisional studies have been made. There is no evidence that it has anything to do with *L. flava*.

DESCRIPTIONS OF A FEW NEW DIPTERA.

BY NATHAN BANKS.

Museum of Comparative Zoology, Cambridge, Mass.

The types of the following new species are in the Museum of Comparative Zoology.

Euparyphus pretiosa, sp. nov.

Differs from *crotchi* as follows: Legs wholly yellow, the median black stripe from vertex mark to antennæ does not go below antennæ, the submedian pair of stripes on thorax extend a little beyond the suture, are broader posteriorly and slightly approximate there, the hind part of lateral stripe is longer, the upper pleural stripe is longer and has a forward extension, the spots on third and fourth abdominal segments are much larger and almost meet in the middle, venter wholly pale (mostly dark in *crotchi*). The scutellum is yellow, broad, and the spines are far apart as in *crotchi*; the discal cell is clearly outlined; eyes pubescent.

Length 7.5 mm.

Vancouver, one female.

E. septemmaculata Adams agrees with *E. crotchi*.

Nemotelus melanderi, sp. nov.

Black, polished, without pale marks, in some a faint lateral margin to thorax, the extreme tips of femora, bases of tibiæ and tarsi pale; halteres pale,

the thorax with faint white pubescence. Facial projection extremely short, about as in Melander's figure of *N. bruesi*, but not blunt at tip, and the antennae plainly at base of the projection; discal cell with upper side distinct.

In Melander's table it runs to *N. carbonarius*, which has a very much larger facial projection.

Length 3 mm.

From Chesapeake Beach, Ind., 9 July, also Bayville, N.Y., and Nahant, Mass., (Agassiz). Evidently a costal species.

Stenopogon (Scleropogon) uhleri, sp. nov.

Clothed with grayish pubescence and white hair and bristles; antennae black, wings hyaline, abdomen obscure, tips of segments paler, legs dark, some reddish on front and middle femora. Wings with first and fourth posterior cells closed and petiolate; hypopleura with white hairs, sternopleura with short fine hair. Male ventral plate divided at tip and the lobes divergent; the intermediate appendages have the inner black hooks as in *S. similis*, but when seen from the side do not have a black process at the lower corner, seen in *S. similis*.

Length 2.3 mm.

From the hills west of Denver, 18 Aug., (P. R. Uhler). Differs from *S. similis* and *S. pumilus*, which are of the same general appearance, by having the lobes of the ventral plate longer and divergent.

Atomosia antennata, sp. nov.

Head black, thorax metallic bluish, abdomen metallic greenish, venter brown, legs with the femora pale reddish or yellowish, tibia dark brown, tarsi lighter brown, palpi pale, antennae dark, second joint yellowish, wings nearly hyaline, pleura with two or three patches of silvery pubescence. Face clothed with whitish pubescence and white hair, thorax and abdomen with very short pale hair, legs with longer white hair. Ocellar tubercle with two bristles; first joint of antenna a little more than twice as long as the second, which is rather shorter than usual, third not twice as long as first and second together; end of discal cell curves out a little from the end of the fourth posterior cell.

Length 5 mm.

From Douglas, Arizona, August, (L. H. Snow). Distinct from all our other species by colour of second antennal joint, as well as by the metallic colour of thorax and abdomen.

Nicocles utahensis, n. sp.

♀ Structurally similar to *N. aemulator* Lw., the bristles on the scutellum and thorax as in that species. It is, however, black in colour with white hair and pile, instead of the brown hair and somewhat yellowish pile of *N. aemulator*. The dorsum of thorax beside the middle geminate dark stripe has also short lateral dark stripe in front; the legs are entirely black (without the red seen in *N. aemulator*); the abdomen is very similar to the female of that species, with pollinose white spots, but those on the fifth segment are triangular and smaller than in *N. aemulator*. The wings are marked on the same plan, but the marks follow the longitudinal veins, and there is no tendency to form dark clouds

across middle and tip as in the California species. In both wings the small cross vein is double, and situate at middle of discal cell (in *N. emulator* nearer to tip of cell).

From Eureka, Utah, 31 May, (Tom Spalding), from Mr. Hagan.

Laphria varipes, n. sp.

Closely similar to *L. ruficauda* Will.; it differs in the antennæ being black, and the legs have the apical fourth of the femora and the tarsi wholly black; the abdomen is dull black (instead of shining blue black), the last three segments red as in *L. ruficauda*; the humeri and scutellum are also reddish; the wings as in *L. ruficauda*.

Length 2.3 mm.

From Cuba (Poey).

Asilus persimilis, n. sp.

Similar to *A. truquii* in the male genitalia, which have a long, slender tooth on the upper forceps, which bends inward and downward; the main part of the forceps, however, bends downward, instead of upward as in *A. truquii*. It differs from that species in having a large facial gibbosity that almost reaches to the antennæ. The mystax is black above and below, with yellowish hair on the middle; the wings are faintly reddish from near the middle, especially near costa. The body is black, with black hair and bristles; the abdomen above rather more grayish, and the hind border of each segment in certain lights paler gray; the genitalia black, black haired, and the lower forceps rather heavily black bristled. Legs black, apical part of all femora and almost basal half of all the tibiæ reddish; tarsi black.

Length 16 mm.

From California (Loew coll.).

Asilus sackeni, n. sp.

In size and general appearance similar to *A. mesæ* Tucker; about 8 to 10 mm. long. Differs in the longer appendages to the male, and in the black hair in the mystax.

Black; mystax largely black, lower part white; the facial gibbosity not higher, but longer than in *A. mesæ*; occipital orbital bristles black; pleuræ more black, with faint gray pollen; thorax and the scutellum with black bristles. Abdomen above brown (not gray), with gray borders; genitalia reddish, the superior forceps plainly more slender than in *A. mesæ*. Legs black, the tibiæ more or less brown, especially within, bristles of legs all black. The antennæ has the arista more differentiated than in *A. mesæ*, but not as strongly separated as in most species.

From Webber Lake, California, 22 July (O. Sacken), and also Oregon (O. Sacken).

The much longer, superior forceps and largely black mystax and darker colour generally will separate it from *A. mesæ*.

NOTES ON THE WINTER COLEOPTERA OF WESTERN AND SOUTHERN FLORIDA, WITH DESCRIPTIONS OF NEW SPECIES.

BY W. S. BLATCHLEY,
Indianapolis, Ind.

(Continued from p. 46).

***Ptinus tuberculatus*, sp. nov.**

Oblong-oval. Head and thorax dark chestnut-brown; elytra dark reddish-brown; antennæ and legs paler brown, densely clothed with prostrate yellowish hairs; under surface reddish-brown, sparsely pubescent with yellowish hairs. Antennæ reaching middle of elytra, second joint one-half the length of fourth; fifth to eleventh subequal, each slightly longer than fourth. Head finely granulate-punctate. Thorax subcylindrical, but slightly wider than head, densely and rather coarsely granulate-punctate and bearing four large conical tubercles arranged in a median cross-row, two above and one each side, each of these bearing a tuft of short, erect yellowish hairs. Elytra oblong, rather strongly convex or ventricose, their striæ feebly impressed, each composed of a row of coarse, close-set punctures, which are much wider than the intervals, each puncture bearing a long inclined yellowish hair. First joint of hind tarsi slightly longer than the next two united. Abdomen very finely and sparsely punctate. Length 3.2 mm.

A single specimen, probably a female, was taken while beating along a blazed roadway in a dense hammock at Cape Sable, Feb. 23. It is different from any species described by Fall, and is unknown to him. The head and thorax are distinctly darker than elytra, and the tuberculate thorax reminds one of the spiked collars often worn by an aristocratic Boston bull terrier.

***Heteracthes sablensis*, sp. nov.**

Elongate, slender, subcylindrical. Head, thorax, under surface and all the femora and tibiæ dark chestnut-brown; antennæ, elytra and tarsi reddish-brown, the elytra each with a large, elongate-oval, yellow spot at basal third and the apical fifth wholly yellow. Antennæ, as usual with males of the genus, with joints 1-6 much thicker than the others, fourth, two-thirds the length of either third or fifth, the minute second joint obconical. Thorax cylindrical, twice as long as broad, feebly constricted near base, its disk with a low median tubercle, surface minutely granulate-rugose and pubescent with very fine, appressed hairs. Elytra three times as long as thorax, one-third wider at base, their tips subtruncate, the outer apical angle produced as a short spine; surface with scattered small tubercles, thickly and very finely punctate, minutely pubescent. Under surface very finely punctate and pubescent. Length 8.5 mm.

Described from one male swept from low herbs just back of the beach at Cape Sable, Feb. 21. Very distinct from our other species in colour and in the truncate, feebly spined tips of elytra.

***Euderces reichei* Lec.** A half dozen specimens of this small Cerambycid were beaten March 21 from the flowers of a dogwood in Skinner's hammock near Dunedin. The first record for Florida, it being known heretofore only from Indiana, Illinois and Texas.

Liopus floridanus Ham. Two specimens of this small, dull-coloured Lamiinid were swept from ferns in a dense hammock near Dunedin, March 10-March 24. Described¹¹ from Biscayne Bay and not recorded elsewhere.

Lepturges signatus Lec. A single specimen taken at light at Dunedin, June 15. Schwarz records it from Enterprise as "rare."

Spalacopsis filum Chev. This was a common species on dead twigs in the hammocks at Cape Sable and Key West. When stretched out on a twig with their long antennæ at full length in front of them, their gray colour is so similar to that of the bark that they are almost invisible. Although three or four species of this genus have been described or listed from southern Florida, it is very doubtful if more than the one above named really exists in that region.

Exema neglecta, sp. nov.

Oblong, robust. Black, opaque; antennæ, palpi, front and middle legs in great part, and some spots on head, dull clay yellow; face and front half of thorax of male wholly of the same hue. Head finely, not closely ocellate-punctate. Thorax finely and irregularly punctate, the middle of disk strongly elevated, tuberculate and with a shallow median sulcus, the sides and posterior declivity of the elevation strigose-punctate. Tegmina oblong, each with a subsutural row of three or four blunt tubercles and several other scattered ones, the intervals between them coarsely, more or less confluent punctate. Pygidium with a narrow, entire median carina between two shorter, broader ones, the intervals coarsely punctate. Hind femora and under surface coarsely punctate. Length male 2.7; female 3 mm.

Common throughout Florida on huckleberry and other low shrubs throughout the winter months. This is the species known in most cabinets as *Exema conspersa* Mann., and has been distributed by me under that name. On taking the true *conspersa*, which is very scarce in Florida, I sent specimens of both to the U.S. National Museum, and H. S. Barber replied that the larger one above described was in the museum collection under the name *conspersa* var., some specimens also having been labeled *E. dispar* Lec. On a recent visit to Cambridge, I found that the smaller form was the one there recognized as *E. conspersa*, and as the larger and more common one appears to have no name, I have given it that of *neglecta*.

Exema conspersa Mannerheim. This is a much smaller (1.8-2 mm.), more subquadrate species than *neglecta* and usually has both thorax and elytra distinctly maculate with brownish-yellow. The thorax is without strigæ, its punctures more numerous, much deeper. The elytra are more rugose with crests of tubercles longer, more narrow, and the punctures much smaller. A single specimen is in the National Museum from Enterprise, Fla. About Dunedin I have taken it on several occasions by sweeping weeds about the margins of low, moist, cultivated tracts. It ranges from Florida to California and Mexico.

As pointed out to me by Mr. Barber (Ms.) my *Chlamys nodulosa*¹² is probably a synonym of *Exema gibber* Fabr. It was originally described from

11. Trans. Amer. Ent. Soc., XXIII, 1896, 125.

12. Can. Ent., XLV, 1913, 22.

Charleston, S. Car., and occurs in both bronzed and opaque black forms. The description of Fabricius mentions the black form only.

Metachroma terminale Horn. Frequent at both Cape Sable and Key West on the foliage of shrubs in hammocks. The elytra vary much in colour, being sometimes wholly dull yellow, again uniform pitchy black without the terminal pale spot on which the specific name was based.

Metachroma testacea, sp. nov.

Form short, robust. Head and thorax reddish-brown, remainder of body a uniform testaceous. Head coarsely, shallowly and irregularly punctate. Thorax semi-elliptical, much wider and with sides less declivent than in *M. pellucidum*; sides and hind angles broadly rounded, disk finely, rather closely, evenly and sharply punctate. Elytra one-third longer than wide; striæ near suture distinctly impressed, those on sides scarcely so, all with distinct rows of round punctures separated by two-thirds their own diameter. Abdomen rather finely and very sparsely punctate. Length 2.3-2.5 mm.

A small species of the form and size of *M. pellucidum* Crotch, but much duller in colour, with different form of thorax and with elytral striæ all entire and punctate throughout their length. It was taken in some numbers by beating and sweeping at Key West, March 1-3. Specimens were submitted to Mr. Fall, who states that he has it unnamed in his collection and considers it an undescribed form.

Trirhabda virgata Lec. One specimen taken at light at Dunedin, July 1, was sent to me by my son. No definite Florida record can be found. Horn states that it "Occurs on the Atlantic coast from Massachusetts to Florida, from which point to Texas it is replaced by *brevicollis*." It is frequent throughout Indiana.

Galerucella bivittata, sp. nov.

Elongate-oblong. Dull clay yellow; antennæ and occiput entirely deep black; labrum, mesosterna, sides of abdomen and tarsi piceous black; thorax with a median stripe and a spot each side black; elytra each with a broad sub-marginal and a narrow subsutural stripe, the two broadly united at tip, deep black. Thorax transversely elliptical, about one-half wider than long, angles all rounded, disk concave each side of the median line, very finely and sparsely punctate, each puncture bearing a very short, fine, appressed hair. Elytra elongate-oval, margins not explanate, disk densely and coarsely punctate, each puncture bearing a silken yellowish semi-prostrate hair; middle coxæ contiguous. Under surface minutely punctate, very finely pubescent. Length 4.5 mm.

Two specimens swept from huckleberry blossoms near Dunedin, March 21. The wholly black antennæ and occiput and bivittate elytra distinguish it from all other described species.

Longitarsus subcylindricus, sp. nov.

Elongate-oval or subcylindrical. Dull reddish-brown; basal half of antennæ, under surface and legs paler reddish-brown; apical half of antennæ fuscous. Head smooth, occiput strongly convex. Second, third and fourth joints of antennæ subequal in length, two-thirds the length of fifth. Thorax subcylindrical, scarcely longer than wide, disk convex, sides strongly declivent,

their margins feebly curved, surface finely and very shallowly punctate. Elytra conjointly elongate-oval, widest at middle, three times as long as wide, not wider at base than thorax, humeri and umbones wholly absent, disk with fine shallow substriate, close-set punctures. Abdomen smooth. Length 1.8 mm.

Very distinct in its elongate subcylindrical form, being widest at middle of elytra and tapering gradually but very feebly both ways. The surface is not alutaceous but appears subopaque, due to the numerous shallow punctures. It is probably apterous. Known from a single specimen taken by beating in Skinner's Hammock near Dunedin, March '27. Not in either the Leconte or Horn collections, and unknown to Fall.

Coptocycla repudiata Suffr. Twenty or more specimens of this tortoise beetle were taken at Cape Sable from among the bases of the tufts of a coarse grass growing on the open prairie. It was described from Cuba and is recorded by Barber¹³ from Haw Creek, Crescent City and Coconut Grove, Fla.

Metriona ormondensis, sp. nov.

Broadly ovate or subcylindrical. Above dull yellow; elytra with a broad, purplish-red stripe extending obliquely from humerus to middle of lateral declivity of each strongly convex elytral disk, thence curving outward to margin near apical fourth; thorax and broadly flattened crescentic middle third of each elytral margin translucent yellow; eyes and under surface deep black; legs and joints 1-8 of antennæ pale yellow; joints 9-11 of antennæ fuscous. Thorax transversely elliptical, nearly twice as wide as long, its front margin very broadly curved, front angles narrowly rounded, surface reticulate and with a few scattered punctures near middle and at base. Elytra strongly elevated at middle with sides of elevation almost perpendicular; margins strongly explanate; disk with rows of round, shallow punctures, separated by about their own diameters, those on basal third and near humeri somewhat confused. Abdominal segments finely and sparsely punctate. Length 6 mm.; breadth 5 mm.

Described from two specimens taken from wild morning-glory at Ormond, Fla., April 13, 1913. Much larger than *M. purpurata* (Boh.), with flattened margins of elytra much wider, thorax wider and proportionally shorter and colour very distinctive. It is probably the same as the specimen referred to by Barber (loc. cit., p. 125) as being in the Schæffer collection from Florida. Barber considered that to be only a geographic race of *purpurata*.

Chelymorpha geniculata Boh. This large Chrysomelid was common and mating along the beach at Long Key, Feb. 27 on the foliage of the creeping goat's-foot morning-glory, *Ipomœa pes-caprae* Sweet. It was taken on the same vine at Cape Sable, Key West and Dunedin, and I believe that to be its true, perhaps only, food plant in Florida. In my opinion this species should be placed as distinct from our northern *C. cassidea* Fabr. (*argus* Herbst.). In addition to the very different hue and much smaller black spots it is always narrower and more oblong in form.

Branchus floridanus Lec. A single specimen of this large, oval, gray, scaly Tenebrionid was found lying on its back in a roadway, but alive and kicking, at Key West. It was described¹⁴ from Florida without definite locality and Schwarz lists it as "On Atlantic seashore, very rare."

13. Proc. Entom. Soc. Wash., XVIII, 1916, 123.

14. Smiths. Misc. Coll. No. 167, 1866, 111.

Polypleurus geminatus Sol. This is also apparently a scarce species. It has not been recorded from Florida. One specimen was taken near Lakeland, Feb. 15, beneath a large pine chip, and another at Dunedin, Dec. 25, by beating Spanish moss. Horn in his Revision of the family says that it occurs in the "Southeastern United States." The closely allied *P. perforatus* Germ., is listed by Schwarz from Enterprise as "very rare." The third and only other known species, *P. nitidus* Lec., is common beneath bark and logs about Dunedin and elsewhere in southern Florida throughout the winter.

Blapstinus alutaceus Casey. Three specimens of this scarce species were taken, one at Cape Sable, by beating dead branches, the others at Key West by sifting dead leaves. It was previously known only from Key West and Buck Key, Fla., and Texas. First described¹⁵ by Leconte as *B. opacus*, which name was preoccupied.

Acanthinus trifasciatus Fabr. A single specimen of this West Indian species was taken from beneath a chunk on the beach at Cape Sable. It is also known from Key West.

Pomphopœa femoralis Lec. Two specimens of this large and brilliant Meloid have been in my collection unnamed since January, 1913, when they were taken at light at Dunedin. I supposed them to be some introduced tropical form which I could not place by the literature available. They were finally named for me by A. J. Mutchler of the American Museum of Natural History. Leconte described¹⁶ the species from Louisiana, as *Lytta femoralis*, but it was afterwards erroneously placed as a synonym of *P. polita* Say by Horn.¹⁷ The head and thorax are a shining bronze, while the elytra are of a brilliant coppery hue.

DIVISION OF FOREIGN INSECT PESTS SUPPRESSION.

In an endeavour to prevent the further spread of the apple sucker (*Psyllia mali* Schmid) by artificial means, a quarantine has been placed on the infested district in the vicinity of Wolfville, N.S. No apple stock, including seedlings, scions, buds or grafts may be removed from the quarantined area unless it is accompanied by a certificate of inspection.

The Brown Tail Moth work in New Brunswick was closed down in the middle of January. No nests have been found during the past two years. Only four men were employed this season, and the greater portion of the territory was scouted with the aid of a car. In Nova Scotia 267 Brown Tail nests were collected up to January 31st; this is a considerable reduction as compared with previous years. The brown tail is still continuing to breed in this Province, and local infestations are uncovered from time to time. The majority of scouts were discharged on January 31st.

15. Proc. Amer. Phil. Soc., XVII, 1878, 420.

16. Proc. Acad. Nat. Sci. Phil., VI, 1853, 336.

17. Proc. Amer. Phil. Soc., XIII, 1873, 116.