

# The Canadian Entomologist.

VOL. XXXVIII. LONDON, SEPTEMBER, 1906.

No. 9

## PRACTICAL AND POPULAR ENTOMOLOGY.—No. 16.

### THE OYSTER-SHELL BARK-LOUSE.

BY TENNYSON D. JARVIS, ONTARIO AGRICULTURAL COLLEGE, GUELPH.

The purpose of this article is to place before the fruit-growers and all interested in practical entomology, the main facts regarding the life-history, habits and appearance of the Oyster-shell Bark-louse Scale, and of the scales which are often mistaken for it. The damage done by this scale of late years has attracted so much attention, and so many enquiries have been received concerning the best methods for its eradication, that it is hoped earnest efforts will be made at once by all concerned to get it under control.

The Oyster-shell Bark-louse (*Mytilaspis pomorum*) is widely scattered throughout the orchards of Ontario, and the damage done by it is very considerable over the Province and rapidly on the increase.

Although of European origin, it has been known in America for more than a century, and has gradually spread throughout the larger portion of North America.

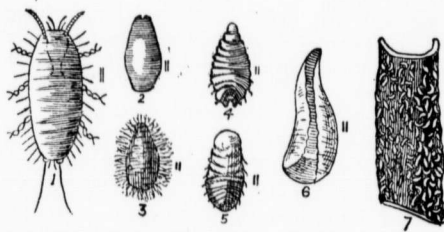


FIG. 30.—The Oyster-shell Bark-louse.

This scale is a very serious pest in orchards which are neglected and badly treated, but experience has shown that with careful treatment it can be readily kept in check. It has been found to occur on the following

trees and shrubs: Apple, plum, pear, wild red cherry, grape, currant, rose, maple, poplar, ash, birch, and various others.

In order to combat this scale, it is first absolutely necessary that one should be well acquainted with its life-history.

*Life-history.*—This minute insect, found upon the bark of the small twigs and also upon the branches and trunks of the above-mentioned trees, is readily identified by its oyster-shell-shaped scale, about one-sixth of an inch in length. It is of a brown colour, and, thus disguised by the bark, is not seen unless by close observation. Usually a good many are clustered together, and their shape is so marked that orchardmen should soon recognize them. These scales sometimes cover twigs and large branches completely; even the leaves are often infested, and sometimes the fruit itself becomes more or less covered. Last year the fruit on several Maiden's Blush apple trees grown in the orchard of the O. A. C. was noticed to be affected by the scale. This, however, is the exception rather than the rule.

This insect is one-brooded, and winters over in the egg stage. The eggs can be easily seen if at any time in the fall or winter the old scales be lifted up and examined beneath. Numbers of very small whitish-yellow eggs will be seen. Here beneath this oyster-shaped scale they remain until early in the summer. The young yellow lice escape from the eggs during the last week in May and the first week in June; that is, in the vicinity of Guelph. They wander for a few hours, or a few days, on the limb, then settle down and secrete a scale. They fix themselves upon the tender bark, which they pierce with the beak-like structures connected with their mouths, and by means of which they are able to suck the sap from the tree. The larvæ moult, or shed their skins, twice in the course of their growth during the summer. These moults can be readily seen on the narrow end of the large scale. The adult female dies soon after the laying of the eggs, about 50 in number, in the fall. They may be spread from tree to tree to some extent by birds, and also by other insects.

Such is the life-history of the Oyster-shell Bark-louse, and before entering into a discussion as to the best means to adopt for its eradication, it will be as well to briefly mention and describe one or two other species of the commonly-occurring scales which most closely resemble it, and to point out the differences for this purpose cuts are given with the various scales.

*The Scurfy Bark louse (Chionaspis furfurus)*.—The Scurfy Bark-louse is not so widely distributed through Ontario as the Oyster-shell Bark-louse, and does less damage. It occurs most commonly on pear,

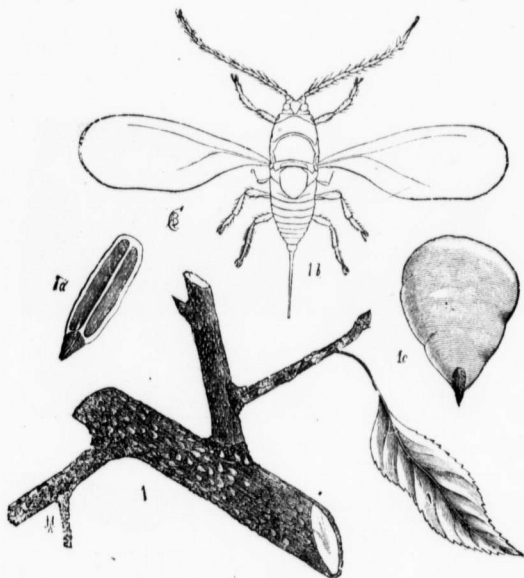


FIG. 31.—The Scurfy Bark-louse.

apple, gooseberry and black currant. This scale resembles the Oyster-shell Bark-louse closely in shape and size, the main points in which they differ being in the colour of the eggs and in the adult scale.

The eggs of the Scurfy Bark-louse are of a purplish colour, whilst those of the Oyster-shell are a whitish-yellow. The adult scale of the Scurfy Scale is also white in colour. The female scale is much larger and more oval than the male scale.

The same remedies may be employed against the Scurfy Bark-louse as are advised in this article as being most suitable for the Oyster-shell Bark-louse.

*San José Scale (Aspidiotus perniciosus).*—The San José Scale is readily distinguished by the characteristic shape of the female scales. They are round and nearly white, with generally a clearly-defined central nipple. After the first moult the scales become almost black, with a conspicuous depressed ring around the nipple. The adult male scale is oblong in outline, with the nipple near one end, and is much smaller than the female.

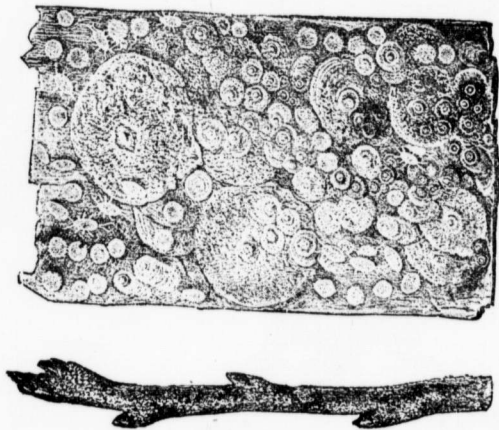


FIG. 32.—San José Scale.

The following points will clearly separate the San José Scale from the Oyster-shell Bark-louse and the Scurfy Scale :

First : The arrangement or grouping of San José Scales on the bark is generally characteristic, and is often sufficient to at once identify them. They seldom have a tendency to cluster, if there be few in number, but, instead, are scattered somewhat evenly on the bark.

On badly-infested trees the presence of the scale on new growths and the fruit produces a deep-red coloration on the tissues of the bark.

It leaves no conspicuous, ventral, whitish scale on the bark after the removal of the insect, as does the Scurfy Bark-louse.

The reason for considerably more damage being done by the San José Scale than by the Oyster-shell Bark-louse is on account of the San José Scale producing many broods in one season, and also bringing forth its young alive; whereas the Oyster-Shell Bark-louse is one-brooded and winters over in the egg stage.

The treatment to be adopted for nearly all the scales is practically the same in all cases. On deciduous trees, where the scales remain during the winter upon trunks and branches, and where the trees become dormant, the scales are best treated during the winter. At that time there is no foliage to interfere, and much stronger washes can be used than would be possible during the summer, or when the tree is active. It is extremely difficult to penetrate insect tissues with ordinary liquids, and it has been found impossible in practice to obtain good results in the destruction of scale insects, except by means of caustics. The common soaps are all caustic, and, when applied in strong solutions, the scale is shrivelled, lifted, and partially corroded, so that the oily mixture works its way beneath into absolute contact with the insect. Or it is raised at the edges and washed off by the rains, carrying with it either eggs or young, as the case may be. In fact, where the eggs hibernate, winter applications act only by exposing them, so that they are easily washed away by rains and scattered.

In the case of plants which do not lose their foliage at any period, or in conservatories, or where winter treatment for any reason is not feasible, we must attack the insects when the larvæ are crawling about, and before they are fixed. At that time, whilst not protected by a scale, they may be easily killed, almost any of the contact insecticides being effective.

*Remedies.*—Owing to the large number of applicants who were desirous of obtaining information on the best methods of combating the Oyster-shell Bark-louse, it was decided to carry on a number of experiments here, to test the efficiency of the various insecticides commonly used against scale insects.

Of all the spray mixtures tried, the well-known lime, salt and sulphur wash gave the best results.

The lime, sulphur and caustic soda, and the lime, sulphur and sal soda were also tried, but without quite such good results. The lime, sulphur and caustic soda proved to be a little superior to the lime, sulphur and sal soda, owing to its apparent power of better penetration.

*Soaps.*—Various soaps were also tried, and of these the Whale-oil Soap Emulsion gave the best results, many of the scales being killed.

The Whale-oil Soap gave good results also, but not equal to the Emulsion.

Sunlight and Lifebuoy soaps, and also a mixture of both, proved to be of very little value, inasmuch as they did not prevent the eggs from hatching. These soaps are claimed by the makers to be most effective against the San José and other scale insects, but applied as a winter wash against the Bark-louse they have little value. Undoubtedly they should be applied after the young lice hatch, and not as a winter application, and then would most likely prove effective against the tender lice.

*Kerosene Emulsion.*—Kerosene Emulsion was also tried, and this proved of more value than the Whale-oil Soap Emulsion, but not so effective as the lime, salt and sulphur wash.

*Lime.*—Quick slaked lime, 1½ lbs. to 1 gallon of water, proved very effective applied as a winter wash, and equalled the results obtained by the lime, salt and sulphur.

*Kerosene-Lime.*—This was also tried, but did not prove superior to the Kerosene Emulsion, and therefore is not to be preferred to it.

#### A NEW CRYPTINE GENUS FROM CUBA.

BY WILLIAM H. ASHMEAD, M.A., D.SC., WASHINGTON, D. C.

Some years ago Mr. J. M. Espin, of Guantanamo, Cuba, sent to Dr. L. O. Howard for names some parasitic Hymenoptera, among which I indicated a new genus, but which I neglected to describe. As Mr. Espin has recently written about it and desires its early description, I submit the following :

##### *Nesolinoceras*, new genus.

Resembles *Linoceras*, Taschenberg, in the shape of the abdominal petiole, which is straight or nearly, not elbowed, and only slightly thickened at apex. It also resembles somewhat *Joppidium*, Walsh. In my Classification of the Ichneumon Flies, 1900, p. 40, it will fall in next to Walsh's genus on account of the metathoracic characters and the transverse median nervure in the hind wings being broken *above* the middle.

The two, however, may be easily separated by the following differences :

September, 1906

Metathorax rounded off posteriorly, punctate, with only one transverse carina—the basal, the spiracles rather large, elongate oval.

Submedian cell in front wings a little *longer* than the median, the areolet large, pentagonal, the sides parallel; wings black, brown or fuscous.....*Joppidium*, Walsh.

Submedian cell in front wings a little *shorter* than the median, the areolet not large, irregularly pentagonal, the sides strongly convergent above; wings hyaline, with transverse brown

fasciæ.....*Nesolinoceras*, n. g.  
(Type *N. Espini*, Ashm.)

*Nesolinoceras Espini*, n. sp.

♂.—Length, 11 mm. Red, marked as follows: The clypeus and the face, the upper front orbits to summit of the eyes, the hind orbits and cheeks to base of mandibles, a spot at base of mandibles, the front coxæ and their first joint of trochanters, the front margin of the prothorax and the hind margin on each side to the tegulæ, the inner margin of the tegulæ, a large rounded spot beneath tegulæ, a large triangular spot beneath the insertion of the hind wings, a large but obscure spot on the mesopleura posteriorly below it, most of the middle coxæ, a transverse band across disk of scutellum, a spot on the hind coxæ at base above, a streak on the scape beneath, and the extreme apices of dorsal abdominal segments 3, 4, 5 and 6, but very narrowly, all white; the flagellum, the depression of the prothorax laterally, the tegulæ, except as noted, a streak surrounding the posterior white spot on the mesopleura, and the scutellum, except the transverse white band, are black or blackish; wings hyaline, with three transverse fuscous fasciæ, *i. e.*, one across from the middle of the basal nervure, another from the stigma, and the third at the apex of the wing, becoming more or less confluent with the second on the hind margin; the hind wings are wholly hyaline; the stigma and most of the veins in both wings are black, but there is a streak across at base of the stigma, a bulla near apex of the first recurrent nervure, another at apex of the first transverse cubitus, and most of the second transverse cubitus and the second recurrent, except at base and apex, are white.

Type.—Cat. No. 9958, U. S. N. M.

Guantanamo, Cuba.

This interesting species is dedicated to Mr. J. M. Espin, who captured it July 26, 1901.

*ANOPHELES CRUCIANS*, WIEDMANN.

BY C. S. LUDLOW.

Laboratory of the Office of the Surgeon-General, U. S. Army, Washington, D. C.

A curious little error has crept into the description of this mosquito, and has been carried into so many authors that it seems as if the easiest way would be for the insect to rearrange its markings.

Wiedmann, in his description (*Anse Europ. Zweifleg, Ins.*, p. 12, 1828) says: "Taster bräunlich schwarz, glieder an der Wurzel wenig shneeweiss," but this is, of course, a broad generalization, and the words are used loosely.

Coquillett (*Circ. 40, 2nd series, Dept. Agri.*, p. 4, 1899) makes the statement more definite: "palpi marked with white at the bases of last four joints."

Theobald, quoting this, makes it part of his description. (*Mon. Cul. of the World, Vol. I, p. 204, 1901.*)

Blanchard (*Les Moustiques, Hist. Nat. et Med.*, p. 171, 1905), apparently using the same information, says: "Palpes d'un noir brunâtre, marques de blanc à la base des 4 dernier articles."

Felt (*Mos. or Cul. of N. Y. State, N. Y. State Museum*, p. 270, 1904) also carries on the error, giving as one of the distinctive characteristics, "the white bases of the last four segments of the palpi."

Smith, in his synoptical table (*Report on Mosquitoes, N. J. Agri. Expt. Sta.*, p. 152, 1904), makes the "palpi white-marked at base of joints," but figures and describes the palpi correctly (*id.*, p. 170).

Coquillett, in his last work on the subject (*A Classification of the Mosquitoes of North and Middle America*, p. 12, 1906), drops this characteristic, but does not correct his former error.

In reality, the specimens sent in to this office, for more than a year, from various parts of the U. S., and those in the collection of the National Museum show the last joint of the palpi entirely white (silvery-gray) and very narrow white bands at the bases of the penultimate and antepenultimate joints, sometimes involving slightly both sides of the joints, the remainder of the palpi being entirely brown. The only variation on this is that in some rubbed specimens the base of the ultimate joint appears *brownish*, but the perfect specimens show the entire distal joint and *two* bands white.



## SYNOPSIS OF BEES OF OREGON, WASHINGTON, BRITISH COLUMBIA AND VANCOUVER.—V.

BY HENRY L. VIERECK, ASSISTED BY T. D. A. COCKERELL, E. S. G. TITUS,  
J. C. CRAWFORD AND M. H. SWENK.

This portion of the synopsis was kindly prepared by Mr. J. C. Crawford, and is based on material, in the main, from Dr. Cordley, of Corvallis, Oregon; Prof. Harvey, of Victoria, British Columbia, and Mr. Venables, of Vernon, B. C. A species from Montana is also described.

*Halictide*, HALICTUS, Latr.

BY J. C. CRAWFORD, DALLAS, TEXAS.

## Females.

1. Having no green.....2.  
Having more or less green.....17.
2. Cheeks armed.....*ligatus*, Say.  
Cheeks not armed.....3.
3. Tegulae large, punctured all over.....4.  
Tegulae normal in size; not punctured all over.....5.
4. Mesothorax closely, coarsely punctured; metathorax coarsely rugose.....*Kincaidii*, Ckll.  
Mesothorax finely, sparsely punctured; metathorax finely rugose.....*Vachali*, n. sp.
5. Species having well-marked hair bands on the apical margins of abdominal segments.....6.  
Species without such hair bands.....7.
6. Larger, 10-14 mm., bands very broad, cream-coloured.....*farinosus*, Sni.  
Smaller, about 10 mm. or less, bands narrow, white...*Lerouxii*, Lep.
7. Truncation of metathorax entirely surrounded by a salient rim....8.  
Salient rim of metathoracic truncation lacking at least above....15.
8. Base of metathorax with coarse, deep rugae.....9.  
Base of metathorax with fine striae.....12.
9. Striae of base of metathorax regular parallel, 1st abdominal segment distinctly punctured.....10.  
Striae irregular.....11.
10. A band on middle of 1st segment, bands on bases of segments 2-4, complete.....*sixymbrii*, Ckll.  
No band on segment 1; bands on 2-4 narrowed or interrupted medially.....*Olympiae*, Ckll

11. Base of metathorax with distinct, semilunar enclosure; punctures of mesothorax crowded anteriorly . . . . . *pacificus*, Ckll.  
 Enclosure indistinct, punctures of mesothorax not crowded . . . . . *truncatus*, Robt.
12. Abdomen with basal hair patches or bands; size larger, 7½-8 mm. 13.  
 Whole surface of abdomen covered with pubescence; size smaller, 6-7 mm . . . . . 14.
13. Length, 7½ mm.; segments 2 and 3 with only basal hair patches; teeth of hind inner spur very oblique . . . . . *occultus*, Vach.  
 Bands on basal segments complete; teeth of hind inner spur not oblique . . . . . *Cooleyi*, n. sp.
14. Facial quadrangle about square, apical margins of abdominal segments testaceous . . . . . *Cordleyi*, n. sp.  
 Facial quadrangle longer than broad, apical margins of segments not testaceous . . . . . *fartus*, Vach.
15. Apical margins of segments not testaceous . . . . . 16.  
 Apical margins of segments more or less testaceous . . . *diatretus*, Vach.
16. Thorax almost impunctate . . . . . *Titusi*, Cwfd.  
 Thorax closely punctured . . . . . *trizonatus*, Cress.
17. Bands on apical margins of abdominal segments . . *Provancheri*, D. T.  
 No bands on apical margins of abdominal segments . . . . . 18.
18. Punctures of mesothorax coarse . . . . . 19.  
 Punctures of mesothorax fine . . . . . 20.
19. Truncation of metathorax surrounded by a salient rim; wings dusky . . . . . *Cressonii*, Robt.  
 Truncation of metathorax not with a salient rim; wings white . . . . . *albipennis*, Robt.
20. Abdomen green, apical margins broadly testaceous . . . *zephyrus*, Sm.  
 Abdomen not green . . . . . 21.
21. Head and thorax blue, tinged green, abdomen black, not pubescent . . . . . *atriventris*, n. sp.  
 Head and thorax brassy-green, abdomen pubescent . . *versatus*, Robt.

## Males.

1. Species without any green . . . . . 2.  
 Species with more or less green . . . . . 14.

2. Face and legs entirely dark ..... 3.  
 Face and legs not entirely dark ..... 5.
3. Smaller, about 6 mm. long ..... *diatretus*, Vach.  
 Larger, about 8 mm. long ..... 4.
4. First abdominal segment closely punctured, rugæ of metathorax  
 irregular ..... *sisymbrii*, Ckll.  
 First segment sparsely punctured, rugæ of metathorax regular  
 parallel ..... *Olympiæ*, Ckll.
5. Species with hair bands on the apical margins of abdominal  
 segments ..... 6.  
 Species without such hair bands ..... 8.
6. Flagellum bright ferruginous beneath ..... *ligatus*, Say.  
 Flagellum darker beneath ..... 7.
7. Punctures of abdomen close, abdomen shiny ..... *Lerouxii*, Lep.  
 Punctures of abdomen sparse, abdomen not shiny ..... *farinosus*, Sm.
8. Tibiæ entirely dark ..... 9.  
 Tibiæ not entirely dark ..... 10.
9. First abdominal segment almost impunctate ..... *Titusi*, Cwfd.  
 First abdominal segment closely punctured ..... *trizonatus*, Cress.
10. Base of metathorax with a triangular enclosure ..... *Kincaidii*, Ckll.  
 Base of metathorax without such enclosure ..... 11.
11. Base of metathorax with fine striæ ..... 12.  
 Base of metathorax with coarse rugæ ..... 13.
12. About  $6\frac{1}{2}$  mm., anterior tibiæ yellow, with a black  
 stripe ..... *Cordleyi*, n. sp.  
 About 8 mm., anterior tibiæ black, with a yellow stripe. *Cooleyi*, n. sp.  
 About  $9\frac{1}{2}$  mm. .... *arctous*, Vach.
13. Punctures of mesothorax close, enclosure of metathorax  
 distinct ..... *pacificus*, Ckll.  
 Punctures of mesothorax not close, enclosure of metathorax not  
 distinct ..... *truncatus*, Robt.
14. Abdomen with bands on the apical margins of  
 segments ..... *Provancheri*, D. T.  
 No bands on the apical margins of segments ..... 15.
15. Abdomen green, with more or less testaceous ..... *zephyrus*, Sm.  
 Abdomen not green ..... 16.

16. Mesonotum finely punctured . . . . . 17.  
 Mesonotum coarsely punctured . . . . . 18.
17. Nervures and stigma pale, abdomen brownish . . . . . *versatus*, Robt.  
 Nervures and stigma dark, wings dusky, abdomen  
 black . . . . . *atriventris*, n. sp.
18. Wings, including nervures, whitish . . . . . *albipennis*, Robt.  
 Wings and nervures dark . . . . . *Cressonii*, Robt.  
*H. ligatus*, Say.—Corvallis, Ore., May 29, 1 ♀.  
*H. Kincaidii*, Ckll.—Olympia, Wash. (recorded by Ckll.), Corvallis,  
 Ore., June, August.

*H. Vachali*, n. sp.—♀. Black, facial quadrangle slightly longer than broad; face, including supraclypeal area, closely punctured, clypeus sparsely so; antennæ reddish beneath; mesothorax dull, finely-roughened, rather sparsely, finely punctured; base of metathorax narrow, finely striatulate, striæ not reaching apex, rest of space, including metapleura, rather coarsely roughened; truncation finely roughened, not surrounded by a salient rim; wings slightly dusky, nervures brown; tegulæ large, punctured all over, dark, with a brownish centre; legs dark, hind inner spur with about five long teeth, abdomen shiny, small lateral hair patches on bases of segments 2 and 3, base of segment 1 sparsely, and bases of remaining segments closely punctured, apical margins almost impunctate and reddish.

Length about  $6\frac{1}{2}$  mm.

Corvallis, Ore., June 6, 1898, 1 ♀.

On account of the punctured tegulæ this is related to *Kincaidii*, but is separated by the fine punctures of the mesothorax and the fine striæ of the metathorax.

*H. farinosus*, Sm.—Synonyms: *H. montanus*, Cwfd.; *Paranomia Venablesi*, Ashm.; *H. proceris* and *H. denticulus*, Vach. Taken at Wawawai, Yakima, Almota, Wash.; Corvallis, Ore., June; Harrisburg, Ore.; Vernon, B. C., May 5, Aug. 17.

*H. Lerouxii*, Lep.—Corvallis, Ore., June. Many ♀'s showing great variation in size and in the width of the abdominal bands, some having them a mere line. Vernon and Coldstream, B. C.

Var. *ruborum*, Ckll.—Seattle, Wash. (Type.)

*H. sisymbrii*, Ckll.—Recorded from Olympia, Wash., by Prof. Cockerell.

*H. Olympia*, Ckll.—Described from Olympia, Wash., Corvallis, Ore., May and June. Many ♀'s.

Var. *subangustatus*, Ckll.—Described from Olympia.

*H. pacificus*, Ckll.—Recorded from Olympia and Seattle, Wash., by Prof. Cockerell.

*H. truncatus*, Robt.—Prof. Cockerell gives this species as *similis*, Sm., from Olympia, Wash.

*H. occultus*, Vach.—Described from Wash.

*H. Cooleyi*, n. sp.—♀. Black, head, thorax and legs clothed with ochraceous pubescence, abdominal segments with basal whitish hair bands, apical margins of segments broadly testaceous. Facial quadrangle about square, head closely punctured, punctures crowded above antennæ, below, the sides of face rugoso-punctate, supraclypeal area very closely punctured, clypeus, except base, sparsely punctured, very shiny; antennæ dark, only very obscurely reddish beneath toward apex; punctures of mesothorax crowded except medially, surface finely roughened, shiny; base of metathorax finely striate to apex; truncation surrounded by a cordate salient rim, rather indistinct above and with a few fine striæ; pleura rather coarsely sculptured, especially the metapleura above; wings slightly dusky, the nervures and stigma yellowish; tegulæ dark, with a light centre; legs dark, hind inner spur with about seven teeth; abdomen shiny, segment 1 almost impunctate, bases of other segments finely closely punctured, apical margins more finely and sparsely punctured; hair bands on bases 2-5, the last showing only when the abdomen is distended; discs of segments with a few yellow hairs; pubescence of apical segments yellow.

Length about  $8\frac{1}{2}$  mm.

Bozeman, Montana, June 6, 1904.

♂. Similar to ♀, antennæ long, entirely dark, sculpture of metathorax and pleura coarser than in ♀; clypeus anteriorly, labrum and a spot on mandibles, one on tubercles and tegulæ, line on front of anterior tibiæ and bases and apices of all tibiæ and tarsi entirely yellow; punctuation of abdomen coarser and more distinct than in ♀; 1st segment distinctly punctured; apical margins of segments only narrowly testaceous; last ventral segment with a median longitudinal carina.

Length, 7-8 mm.

Missoula, Montana, Aug. 23, 1904.

Paratypes from various localities in Montana and from Corvallis, Ore., April 26-June 17; 16 ♀'s.

*H. Cordleyi*, n. sp.—♀. Length, 6-7 mm. Black, facial quad-angle about square; face above antennæ closely, strongly and rather finely punctate; below very shiny black, sparsely, coarsely punctate; mandibles ferruginous at tips; head and thorax with abundant long, slightly ochraceous pubescence; flagellum ferruginous beneath; mesothorax finely sericeously roughened, finely, closely punctate, much sparser medially; median and parapsidal grooves apparent; base of metathorax wide, no distinct disk; covered with fine vermiform rugæ; truncation surrounded by a rather indistinct cordate rim; legs black, tarsi more reddish; hind inner spur with about four large flattened teeth; wings hyaline, nervures and stigma honey-colour, second submarginal cell as broad as high; tegulæ mostly testaceous; abdomen brownish, apical margins broadly ferruginous; segments with fine sparse punctures; segments 2 and 3 with lateral basal following segments covered with dense appressed whitish pubescence; venter obscurely ferruginous.

7 ♀'s. Corvallis, Ore., May 24, 1898; June 17, 1897; June 4, 1898; July 17, 1896; May 20, 1899; May 15, 1898; April 4, 1897.

Var. *a* appressed pubescence of abdomen almost lacking (worn?), rugæ of metathorax finer, less numerous. 1 ♀. Corvallis, Ore., May 24, 1898.

Differs from *dasiphora* by its subquadrate face; and from *Foxii* and *quadrimaculatus* in the same manner.

♂. Similar to the ♀; antennæ long, reddish beneath, joint four longer than two and three; clypeus anteriorly, labrum and mandibles, tubercles, tarsi, anterior tibiæ except a blotch medially, and bases and apices of other tibiæ, yellowish; pubescence of abdomen confined to the basal hair patches; abdomen finely, rather closely punctured.

Length, nearly 6 mm.

Corvallis, Ore., Aug. 14, 1896.

*H. fartus*, Vach.—Described from Washington.

*H. diatretus*, Vach.—Described from Washington. Six specimens from Corvallis, Ore., are very doubtfully referred here.

*H. Titus*, Cwfd.—Corvallis, Ore., 3 ♂'s, Oct.; 14 ♀'s, May and June.

*H. trizonatus*, Cress.—2 ♀'s, Corvallis, Ore., June 6. The record of *coriaceus*, Sm., from Olympia, Wash., by Prof. Cockerell, I think is this species, as I have never seen the true *coriaceus* further west than Michigan. *H. egregius*, Vach., would run to this species in the table, and from his description I am unable to separate it, except that he says hind inner spur with six teeth or spines, which is not true of *trizonatus*, it having eight or nine saw-like teeth.

*H. Provancheri*, D. T.—Synonym: *H. nearcticus*, Vach. Recorded from B. C. by Vachal. All the specimens from Corvallis, Ore., are much smaller and may be distinct, but the ♂ is needed to verify this.

*H. Cressonii*, Robt.—Corvallis, Ore., May and June, 2 ♀'s.

*H. albipennis*, Robt.—Corvallis, Ore., May 27, 1 ♀.

*H. zephyrus*, Sm.—Corvallis, Ore., June 11, Oct. 14, 2 ♀'s.

*H. atriventris*, n. sp.—♀. Head and thorax dark blue, finely lineolate, slightly shiny, the whole insect covered with sparse, slightly ochraceous pubescence; head above antennæ closely, finely punctured; facial quadrangle about square; mesothorax finely, sparsely punctured, median groove plain, parapsidal grooves subobsolete; base of metathorax finely, irregular rugulose and finely lineolated, the rugæ reaching the apex; wings dusky, nervures and stigma dark testaceous; second submarginal about half as long as third, third narrowed only slightly to marginal; tegulæ piceous, with a dark reddish centre; legs dark, pubescence slightly ochraceous, hind inner spur with about four long teeth; abdomen black with greenish reflections, almost entirely nude, shiny, almost impunctate, the apical margins of the segments dark testaceous.

Length about 6 mm.

Goldstream, B. C., July 27, 1902.

♂. Similar to the ♀; has no light on face or legs, more greenish in colour than the ♀, but the metathorax blue and coarsely rugose; nervures darker, apical margins of the abdominal segments not light.

Length about 6 mm.

Mission, B. C., August 8, 1904.

Apparently close to *semicæruleus*, Ckll., which, however, has hyaline wings, large punctures on the mesothorax, light tegulæ, etc.

In addition to the species listed above, the collection contains a large series of a male from Corvallis, but since the males of most of the western species are yet undescribed, it was thought that this might represent a

species already described. There are also some small green females, but rather poor specimens, so they are not described, although apparently new.

AGAPOSTEMON, Sm.

BY J. C. CRAWFORD, DALLAS, TEXAS.

1. Females ..... 2.  
Males ..... 6.
2. Abdomen black, with hair bands on the bases of segments two to four.....*viridulus*, Fabr.
3. Mesothorax with fine punctures and interspersed large punctures... 4.  
Mesothorax not with double punctuation..... 5.
4. Base of metathorax with indications of a triangular enclosure ..... *Texanus subtilior*, Ckll.  
No enclosure as above, size large, about 12 mm..... *borealis*, Cwfd.
5. Larger, blue-green, mesothorax rugoso-punctate... *femoratus*, Cwfd.  
Smaller, golden-green, punctures of mesothorax distinct. *radiatus*, Say.
6. Hind femora almost globose..... *femoratus*, Cwfd.  
Hind femora not greatly swollen... .. 7.
7. Last ventral segment with a median longitudinal carina..... *viridulus*, Fabr.  
No carina on last ventral ..... 8.
8. Abdomen with six yellow bands, pubescence on apical segments dark..... *radiatus*, Say.  
Abdomen with five yellow bands, pubescence on apical segments light..... sp.  
*A. viridulus*, Fabr.—Corvallis, Ore. Three ♀'s May and June; 3 ♂'s Sept. and Oct.; Fossil, Ore., Sept., one ♂.  
*A. radiatus*, Say.—Recorded by Prof. Cockerell from Pasco, Wash.  
*A. femoratus*, Cwfd.—Type material from Washington. One ♀ labelled W. T.; 2 ♂'s, Mt. Hood, Ore.; W. T.  
*A. borealis*, Cwfd.—Type from Vancouver.  
*A. Texanus subtilior*, Ckll.—A series from Corvallis collected during May and June, varying from the typical form to that of *Texanus* and to specimens large enough for *borealis*. The ♂ recorded as sp. is probably the ♂ of this species, but further collections are needed to determine their status. From this material it would appear that the males can be easily separated, while the females are much more difficult.



## THE AMERICAN SPECIES OF PRIOPHORUS.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

There have been described thus far three species of this genus from the United States, two of them known only in the male sex, the third known only in the female sex. A fourth species, known only in the female sex, is described below. The types of *æqualis*, Nort., and *simplicicornis*, Cress., are in the collections of the American Entomological Society, and I am indebted to Mr. J. Chester Bradley for examining these types and furnishing me with the notes on which the descriptions given below are based. The species can be separated by means of the following table :

- A. Frontal crest large and prominent, extending laterally to the eyes ; the free part of Sc, almost entirely atrophied..... *simplicicornis*, Cress.
- AA. Frontal crest wanting or variously developed, never extending laterally to the eyes ; the entire free part of Sc, always distinct.
  - B. Colour resinous, with notal portions black ; frontal crest wanting ; transverse groove caudad of the ocelli distinct..... *acericaulis*, n. sp.
  - BB. Colour black, with the apical half of the legs paler ; frontal crest distinct or subdistinct.
    - C. Frontal crest broken by the antennal fovea ; sides of the ocellar basin scarcely indicated ; transverse groove caudad of the ocelli distinct..... *æqualis*, Nort.
    - CC. Frontal crest entire, not broken by the antennal fovea ; sides of the ocellar basin clearly distinguishable ; transverse groove caudad of the ocelli scarcely indicated..... *solitaris*, Dyar.

*Priophorus simplicicornis*, Cress.—♂. Long, robust ; clypeus transverse, somewhat elongate, deeply emarginate, pitted ; tentorial invagination deep, extending as a groove along the lateral margin of the antennæ to about the middle of the front, where it is interrupted by the frontal crest, continued as a short groove behind the lateral ocelli, transverse groove indistinct, evident behind the anterior ocellus ; antennal fovea triangular, flat, pointed in front ; antennal area almost linear ; frontal crest large and prominent, extending to the eyes ; the sides of the ocellar basin with a distinct rim ; antennæ elongate, tapering to the apex, not enlarged in the middle, segments stout and rough, of the same form as in *solitaris* ;

free part of  $Sc_1$  almost atrophied, a mere trace of a stump on one side, its own length or slightly more proximad of the medio-cubital cross-vein; stigma short and rather broad; cell  $R_5$  a little longer than cell  $R_4$ ; claws small, the outer ray the longest; colour black, except the legs beyond the knees, varying from semiresinous to brown; wings with the basal half clouded.

Length, 6 mm.

*Habitat*.—Maine.

*Priophorus acericaulis*, n. sp.—♀. Short, rather robust; clypeus broad, without setæ, broadly and shallowly emarginate, with the lateral angles rounded; tentorial invagination deep, abrupt on the clypeal side, extending as a deep groove along the lateral margin of the antennæ to the lateral ocelli, where it joins a deep, transverse, curving groove, extending along the caudal margin of the ocelli, from the middle of this transverse groove there is a cephalic projecting groove surrounding the anterior ocellus; the antennal fovea shallow, broad and indefinite; ocellar basin and crest entirely wanting; antennæ short, slightly enlarged at middle, the first and second segments subequal in length, the second twice as long as broad, the third segment at least one-third longer than the fourth; the free part of  $Sc_1$  distinctly proximad of the medio-cubital cross-vein; stigma pointed at apex, with the caudal margin almost straight; the cell  $R_4$  longer than the cell  $R_5$ ; claws large and slender, cleft, the outer ray longest; cerci minute; saw-guides pointed at apex, sides equally, convexly convergent, dagger-shaped; colour resinous, with the following parts black: the antennæ beyond the second segment, the head, except the clypeus, the labrum, the mandibles, the mesonotum, the metanotum, and a spot beneath the wings; wings hyaline.

Length, 4 mm.

*Habitat*.—New Haven, Connecticut.

Described from numerous females received from Dr. W. E. Britton.

*Priophorus æqualis*, Nort.—♂. Moderately robust; clypeus transverse, somewhat elongate, deeply emarginate, pitted; tentorial invagination prominent, extending into a large prominent depression surrounding and extending above the antennæ, continued as a prominent groove to the ocelli, with a distinct transverse groove extending along the caudal margin of the ocelli, and projecting cephalad surrounding the anterior ocellus; antennal fovea deeply concave; antennal area long, narrow, pointed at apex; frontal crest indistinct, broken by the antennal fovea; the sides of

the ocellar basin scarcely indicated; antennæ stout, rather short, covered with a fringe of long setæ, at the base of which are small protuberances, giving the antennæ a roughened appearance; first segment twice as long as the second, flaring at apex; the second short, transverse; the third and fourth subequal; the free part of  $Sc_1$  about twice its own length proximad of the medio-cubital cross-vein; stigma short, rather broad; the radio-medial cross-vein hyaline; the cells  $R_4$  and  $R_5$  subequal in length; claws cleft, the outer ray longest; colour black, except the legs beyond the knees, four hind trochanters, and anterior femora on sides white, apex of posterior tibiæ fuscous.

Length, 6 mm.

*Habitat*.—Farmington, Conn. (Norton.)

*Priophorus solitaris*, Dyar.—♀. Long, robust; clypeus transverse, densely covered with long setæ, deeply and roundly emarginate, with the lateral angles prominent, angulate; tentorial invagination prominent, expanding into a large, prominent depression surrounding and extending above the base of the antennæ, continued as a broad concave depression to caudad of the lateral ocelli, not breaking through the occiput, slightly, transversely interrupted midway between antennæ and ocelli, caudad of the ocelli transformed into a deep line-like groove, the transverse groove and the groove of the anterior ocellus hardly indicated; the antennal fovea large, broad, shield-shaped; the antennal area long, narrow, pointed at apex; the frontal crest distinct, not interrupted; the sides of the ocellar basin indicated; the antennæ long and slender, narrowed to apex, first segment twice as long as the second, flaring at apex, the second short, transverse, the third and fourth subequal; the free part of  $Sc_1$  about three times its own length proximad of the medio-cubital cross-vein; stigma short, blunt, broadly convex on the caudal margin; the radio-medial cross-vein almost completely hyaline; the cell  $R_5$  distinctly longer than cell  $R_4$ ; claws cleft, outer ray longest; cerci minute, inconspicuous; saw-guides prominently retracted, exposed portion pointed, concave on dorsal and ventral edges before the apex; colour black, except the legs beyond the knees, which are white, with apices of the tarsi infuscated; wings infuscated, stigma and veins brownish.

Length, 7 mm.

*Habitat*.—Described by H. G. Dyar from a female bred from larvæ on *Alnus*; Franconia, N. H. (Mrs. A. T. Slosson); Ithaca, N. Y. (MacGillivray).

## TWO NEW SPECIES OF THERIDIIDÆ.

BY CYRUS R. CROSBY, ITHACA, N. Y.

*Theonoe stridula*, new species.—Male: Length, .78 mm.; cephalothorax, wide .35 mm., long .39 mm. In the following table the measurements are given in millimeters:

LEGS.	I.	II.	III.	IV.
Tar.....	.24	.22	.2	.24
Met.....	.18	.16	.14	.17
Tib.....	.24	.19	.16	.25
Pat.....	.13	.12	.11	.12
Fem.....	.36	.3	.25	.34

Cephalothorax short and moderately elevated, sides arcuate, slightly narrowed in front, dull grayish-yellow, eyes surrounded by narrow black rings; posterior eyes in a slightly recurved line, equal, the median separated from each other by one and one-half times their diameter, and from the lateral by one-half their diameter; anterior eyes in a very slightly procurved line, subcontiguous, the median smaller than the lateral; median ocular area wider behind than in front and wider than long. Clypeus protruding, slightly convex and slightly wider than the ocular area. Chelicerae longer than the clypeus and paler than the rest of the cephalothorax. Sternum strongly convex and nearly circular, widely separating the posterior coxae, dull yellowish-brown, bordered on the sides and behind with dark gray, sparsely and evenly clothed with small erect hairs, labium and endites lighter in colour. Abdomen dark gray, in life probably nearly black, beneath the same colour, except the strongly developed epigastric sclerite, which is grayish-yellow. Stridulating organ present as two short broad teeth on the front of the abdomen, just above the pedicle, which are opposed by striated areas on the posterior part of the cephalothorax. Legs yellowish, patellæ much lighter. The so-called auditory hairs are arranged as follows: On the first and second pairs of legs, two near the base of tibia, one on the basal half of metatarsus and one on basal third of tarsus; on the third pair, three near the base of tibia, none on metatarsus, one on basal fourth of tarsus; on the fourth pair, three on tibia, one at middle and two on basal half, none on metatarsus, one on basal fourth of tarsus. Palpus with the femur rather long, curved slightly inward, patella short and curved, tibia a little longer and prolonged on the upper outer side, so that the bulb is contained in the angle between it and the tarsus.

One specimen collected November 20, 1904, on the south bank of Hinkson Creek, Columbia, Missouri. Type in the Cornell University collection.



FIG. 33.—*Theonoe stridula*, n. sp.  
Male palpus.



FIG. 34.—*Theonoe stridula*, n. sp.  
Male palpus.



FIG. 35.—*Histagonia Marxi*, n. sp.  
Male palpus.

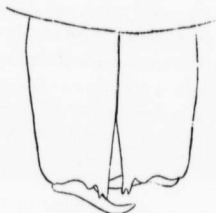


FIG. 36.—*Histagonia Marxi*, n. sp.  
Chelicerae.

*Histagonia Marxi*, new species.—Male: Length, 1.1 mm.; cephalothorax, wide .43 mm., long .52 mm. Cephalothorax a short oval, narrowed in front, strongly elevated and protuberant in the eye region, brownish-yellow. Posterior eyes in a moderately recurved line, about equidistant and with the median eyes a little smaller than the lateral; anterior eyes in a procurved line, equidistant and with the median the smaller. Clypeus concave. Chelicerae nearly parallel, upper margin of the furrow provided with an angular projection, bidentate at the tip and preceded by an obtuse lobe, lower margin unarmed. Sternum wider than long, rounded at the sides and widely separating the posterior coxae

behind. Endites slender and inclined towards each other. Abdominal sclerites well developed, the dorsal one covering nearly the whole upper surface, the antemamillary sclerite in the form of a ring surrounding the spinnerets, epigastric sclerite very large, completely surrounding the pedicle as a broad plate. Legs yellowish-brown, the patellæ much lighter, anterior femora enlarged and armed below with a series of eight or nine strong spines. Palpus with the femur rather long and slender, patella short and rounded, tibia short, prolonged on the outer side, and bearing near the margin a row of long hairs.

Female: Much like the male in colour, but lacking the dorsal abdominal sclerite. The cephalothorax is not so strongly prominent in the eye region, the anterior eyes not being borne on a protuberance are therefore much closer together. Anterior femora neither enlarged nor armed with a series of spines. The epigynum consists of a large convex sclerite, the posterior margin of which is raised into a thin transverse, nearly vertical plate, which bears a very small obtuse tooth at the middle. The ducts are united just in front of the opening, which is small, round, and situated on the inner side of the plate near its posterior margin.

The proportions of the segments of the legs are shown in the following table:

LEGS.	MALE.					PALPUS.
	I.	II.	III.	IV.		
Tar.....	.24	.21	.18	.21	..	
Met.....	.28	.21	.18	.23	..	
Tib.....	.28	.23	.18	.25	..	
Pat.....	.17	.15	.13	.14	..	
Fem.....	.47	.37	.3	.4	..	
	FEMALE.					
Tar.....	.26	.24	.21	.23	.19	
Met.....	.29	.23	.17	.24	..	
Tib.....	.31	.25	.19	.26	.09	
Pat.....	.17	.16	.14	.17	.07	
Fem.....	.5	.43	.22	.48	.14	

Beersheba, Tennessee and District of Columbia, contained in a collection purchased by Cornell University from William Fox, and bearing the label "*Ceratinella unimaculata*, Marx, MS." Type in the Cornell University collection.

## FOUR NEW CULICIDÆ FROM JAMAICA, WEST INDIES.

BY M. GRABHAM, KINGSTON, JAMAICA.

The larvæ of the four species described below were collected, with a large number of others, from temporary pools which form on the plains around this city after the seasonal rains. The different species were separated into breeding bottles, and specimens of the larval skin casts and of the larvæ themselves, when abundant, were preserved for study.

*Janthinosoma echinata*, nov. sp.—♀. Head covered with flat spindle-shaped yellow scales, mingled with black hairs, a few long yellow hairs projecting between the eyes, many upright forked scales at the back. Eyes with deep purple reflections, bordered posteriorly with silvery-white scales. Antennæ brown, basal segment deep brown, second slightly inflated, with a few short black hairs. Proboscis black, with violet reflections, speckled with yellow scales. Palpi densely covered with black and yellow scales, the latter predominating in two basal joints. Clypeus black. Prothoracic lobes with a few golden scales and black hairs. Mesothorax black, with spindle-shaped golden scales scattered over its surface, two denser clusters of these scales on the front margin adjoining the prothoracic lobes, also at the posterior margin between the lateral and mid bare spaces. Two narrow median bare lines running over three-quarters length of the mesothorax, broadening as they approach its anterior margin; a median and two lateral bare areas at the posterior margin. A row of long black hairs above the wing insertions; a number of short black hairs distributed in no definite order over the mesothorax. Scutellum black, clusters of golden scales on the mid and lateral lobes; six to eight black hairs spring from the posterior margin of the mid lobe, and three to four from each of the lateral lobes. Pleura with patches of silvery-white scales. Metanotum deep brown. Abdomen black, with violet reflections, basal segment with long white hairs, apex of each segment bordered with a few long white hairs. Lateral apical patches of white scales in the posterior segments. Venter yellow, densely covered with broad yellow scales, among which are interspersed a few violet scales, especially near the bases of the segments. Legs dark metallic violet, with well-marked knee spots on all the femora. Tibiæ,



FIG. 37.—*Janthinosoma echinata*, n. sp.—a, b, upper and lower pecten teeth; c, a few spines from dorsal patch.

metatarsi and tarsi of the hind legs densely scaled. Third and fourth tarsi of the hind legs white scaled. All the ungues uniserrate and equal. Wings, first submarginal longer and narrower than the second posterior, its stems less than half its length. Stem of the second posterior cell a little shorter than the cell. Posterior cross vein more than its own length behind the mid cross vein. Halteres with pale stems and knobs. Length, 5.5 mm.

♂.—Antennæ pale brown, second joint slightly inflated, thickly clothed with a number of long-stalked black scales, with fan-like heads, and long black hairs. Proboscis black, with a faint band on its lower third. Palpi longer than the proboscis by the two terminal joints. Two terminal joints inflated and densely black-scaled, a number of long black hairs along the under surface, a few black hairs on the apex of the terminal joint. Antepenultimate joint inflated at the apex, a few black hairs on the under surface near the apex. A single narrow band of golden scales on its lower third. Terminal segment of the clasp greatly dilated in the middle. Harpes, limb extending into a thin lamina at the apex, from the internal border of which a number of long thin flattened hairs arise; at the tip two convoluted processes are attached. Harpagones with strong recurved tips and two stout thorn-like tubercles on their convex surfaces. Unci deeply chitinized adherent along their internal borders. Setaceous lobes absent. Ungues of the fore and mid tarsi unequal, the larger with two teeth, a long blunt one and a small basal one; the smaller with a minute basal tooth. Ungues of the hind tarsi uniserrate and equal. Length, 5.5 mm.

The following points were noted in the adult LARVA: Fully grown adult larva nearly 5/16 inch long. Antennæ large and prominent, longer than the head, strongly curved about the middle, deeply fuscous except at the base. Slightly inflated in the lower half. Tuft at the middle of about six fine feathered hairs not exceeding half the antennal shaft in length. Apex with three or four short spines. Surface covered with stout chitinous spines. Mentum deeply infuscated, somewhat narrowly triangular; teeth dark and numerous; apical tooth large and prominent. Both upper and lower epistomal hairs are double and feathered, extending beyond the margin of the head. Anteantennal tuft of 8-10 feathered divisions. Body glabrous except for a few small scattered dendritic hairs. A small dorsal patch of minute thorn-like spines, arranged in curved lines, on each segment from the second to the seventh. Lateral



hairs of the abdomen paired and flattened; on the anterior segments each hair is large and 4- to 7-branched, hairs becoming smaller and with fewer branches on the hinder segments. Comb of six or seven scales in a curved row, the largest in the middle. Central scales joined by a thin broad chitinous band, the upper and lower scales separate, base of each scale oval, sides coarsely setose below, the apical free border with one curved stout central spine and two to six much shorter lateral spines. Air tube fusiform, inflated, deeply infuscated, devoid of hairs, about four times as long as wide (at the base); pecten rows of four well-separated teeth in each, a fifth small pair at the extreme base in some specimens; rows one-quarter length of tube; upper two pairs of teeth with two or three smaller denticulations on the inner side, lower pairs with denticulations on both sides. Band ringing the anal segment about as long as broad; barred area running along whole length of the band. Ventral tufts of 18-20 pairs. A pair of tufts and long simple setæ dorsally. Anal gills very long, narrow, pointed,  $2\frac{1}{2}$  times as long as the longest hairs of the ventral brush. Pupa with short, stout siphons.

*Observations.*—Four living larvæ of this handsome species were taken from a temporary pool in a logwood thicket, about  $5\frac{3}{4}$  miles along the Molyneux Road, near Kingston, early in April, 1906. The larva is large and stout, the head, which is much compressed antero-posteriorly, is set at right angles to the thorax, and the large antennæ are carried almost vertically downwards, giving the larva a peculiar appearance. The description of the larva is drawn up from the larval skin casts, that of the adult head, thorax and abdomen from the freshly-killed specimens. A notable feature in the male is the thickly-scaled second antennal joint.

*Aedes auratus*, nov. sp.—♀. Head covered with narrow curved yellow scales and hairs. Many forked upright yellow scales at the back; a few forked upright black scales and black hairs at the sides. Antennæ dark brown, joints with pale yellow hairs. Palpi black, speckled with yellow scales. Proboscis black, with scattered yellow scales and hairs, especially near the base. Clypeus black. Thorax rich golden yellow. Prothoracic lobes with black hairs and yellow scales. Mesothorax densely covered with narrow curved golden-yellow scales in front, somewhat more scantily at the back (scales of thorax darker in shade than those on the head); on each side in front, near the middle line, there are two small dark spots; there is also a large dark area on each side reaching from the prothoracic lobes to above the wing insertions, and extending

laterally to the margin, and a pair of conspicuous black spots near the middle line on the posterior third. A row of black hairs extends from these spots to the posterior margin of the mesothorax. Scutellum with patches of yellow scales on the mid and lateral lobes. Pleura grayish, with patches of white scales and hairs. Metanotum brown. Abdomen black, with narrow basal bands of golden scales and a row of long white hairs along the posterior margin of each segment; lateral areas of silvery scales on the hinder segments; scattered over the dark scaled areas are a number of lighter scales, which form an ill-defined stripe along the middle of the abdomen. Venter white scaled, small apical areas of black scales on the hinder segments at the sides. Legs black: femora white below through the whole length, except near the apex, where there is a black spot; thickly speckled with white scales above, especially near the base; knee spots small. Tibiæ, metatarsi and tarsi all ventrally white scaled, a few long bristles on the joints, those along the tibiæ longest. Ungues all equal and uniserrate. Wings, veins covered with broad, short, flattened scales, extremities of the upper veins with long narrow ones as well. Upper forked cell narrow and a little longer than the lower. Stem about half its length. Posterior cross vein rather more than its own length distant from the mid cross vein. Halteres with pale stems and knobs. Length, 3.5 mm.

♂.—Proboscis black, nearly as long as the palpi, with scattered yellow scales, especially near the base, apex slightly swollen, tip light brown. Both terminal joints of the palpi somewhat swollen, and covered with many long black hairs, more numerous underneath. Ungues of the fore and mid tarsi very nearly equal, larger with two teeth, smaller with one basal tooth; unguis of the hind tarsi equal and uniserrate. Genitalia closely



FIG. 38.—*Aedes auratus*, n. sp.—a, pecten tooth; b, thorn-like spines on abdomen; c, ornamentation of thorax.

resembling those described and figured by Felt (N. Y. State Museum, Bulletin 97), for *Culicada confirmatus*, Theo. The spine at the apex of the terminal clasp segment is about one-fifth length of segment. Claspette obsolete, represented by a few weak setæ and long hairs, one hair much longer than the others, curved at the tip and swollen towards the base. Harpes slender, curved, base without hairs. Harpagones stout, very deeply infuscated, with a recurved sharp point. Setaceous lobes with a few short, stout setæ. Length, 3.5 mm.

Notes on the adult LARVA.—The fully grown larva attained a length of nearly  $\frac{1}{4}$  inch. Head nearly circular, deeply infuscated; antennæ uniformly chitinized, short, stout, subconical, gradually tapering to the apex, straight along the inner surface, outer surface with a constriction at the lower third, giving the antennal shaft a semi-bulbous outline at the base. Apex with four short, stout spines. Tuft below the middle of about six short hairs not reaching to the apex. Lower surface of antenna with a few large isolated chitinous spines, upper surface with several longitudinal lines of small closely-placed spines; these lines extend through nearly the whole length of the antennal shaft; near the base they divide and ramify. The spines vary much in size, and are for the most part directed inwards. Mentum broadly triangular, with about 40 rather small teeth. Upper and lower epistomal hairs single, short; antantennal hair tuft with about ten divisions. Thorax densely spinous, with short, stout, thorn-like spines; abdominal spines less dense, arranged in ill-defined transverse rows. Lateral hairs paired on the first segment, single on all the other segments. Scales of lateral comb about 15 in a group. Each scale bordered with fine setæ, one or two rather longer terminal spines, the longest of these about half as long as the body of the scale. Air tube about twice as long as broad, a little inflated above the base, deeply infuscated except just at the apex; pecten reaching to the middle, a pair of rather weak hair tufts on a level with the highest pair of pecten teeth; teeth about 15 in number, deeply chitinized, each tooth with several minor teeth on the inner side, one of the latter greatly exceeding the others in size. Anal plate completely encircling the segment, about two-thirds as long as broad; ventral hair tufts about ten pairs springing from a separate barred area; dorsal group of two pairs, upper pair short, compound; lower simple, four times as long as the former. Anal gills equal, lanceolate, narrowing to a fine point, about half as long again as the ventral hair group.

*Aedes pertinax*, n. sp.—♀. Head with a triangular, yellow area in the centre, made up of yellow hairs and narrow curved scales, some rather broad, flattened ones at the sides, sides and back of the head black, with many upright forked scales and hairs; antennæ dark brown, with silvery hairs on the joints; palpi and proboscis black, speckled with silvery hairs. Clypeus dark brown. Prothoracic lobes black, with many long black hairs. Mesothorax black, sparingly covered with very small narrow curved dark brown scales, a narrow line of brilliant golden scales in the

middle line extending to the posterior quarter (in some specimens this line is ill-defined, in others broad and conspicuous), a few long hairs near the posterior border and in front of the wing insertions. Scutellum dark brown, with many long black hairs. Pleura grayish, with patches of silvery scales and hairs. Abdomen, upper surface black, with moderate basal bands of yellow scales, and with large lateral areas of silvery ones, two small circular areas of golden scales in the centre of each segment. A few long white hairs along the apical border of each segment. Venter almost entirely white, with creamy scales, a few black scales near the apical borders of the segments. Wings, extremities of the long veins with long narrow scales and short broad ones, upper forked cell longer, but about as broad as the lower, its stem half its length; the stem of the lower forked cell nearly as long as the cell. The posterior cross vein half its own length behind the mid cross vein. Halteres with pale stems and knobs. Legs black, unbanded, femora and tibiæ with many yellow scales beneath, fewer in the metatarsi and tarsi; knee spots small. Ungues all equal and uniserrate,



FIG. 39.—*Aedes pertinax*, n. sp.—a, pecten tooth; b, comb scale; c, ornamentation of head and thorax.

the tooth large. Length, 4 mm.

♂.—Head, yellow area in the centre more extensive, broad, flat, yellow scales abundant; palpi black, terminal joints slightly inflated, a little longer than the proboscis; both terminal joints and apex of the antepenultimate densely covered with long hairs, some very stout ones at the apices of the joints. Mesothorax with the band of golden scales conspicuous. Terminal clasp segment slender, curved, slightly swollen in the middle, apical spine blunt, about one-fifth length of limb. Basal clasp segment with a large apical lobe; claspette a well-developed lobe near the base, covered with short spines (no long ones present). Harpes, bases villous with fine hairs, at the apex of each a recurved sickle-like portion. Harpagones deeply infuscated, with a strong recurved spine on each. Unci membranous, separated, each terminating in a point. Setaceous lobes pyramidal, with about ten strong curved spines along the internal borders only. Ungues of the fore and mid legs unequal, the larger claw with two teeth, the smaller with one. Ungues of the hind legs equal and uniserrate. Length, 4 mm.

Notes on the adult LARVA.—Head broadly elliptical, long diameter transverse, deeply infuscated. Antenna subcylindrical, with a slight curve inwards, infuscated uniformly. Apex with four short spines, one much longer than the others. Surface with scattered large chitinous spines; the upper surface has in addition several longitudinal rows of minute spines running the whole length of the shaft, the points of these spines directed inwards. Tuft below the middle of about eight short hairs not reaching to the apex of the shaft. Upper and lower epistomal hairs single, a small compound hair on the inner side of these, anteantennal hair tuft of 7-8 divisions. Mentum triangular, with about 30 small teeth. Thorax and abdomen sparingly covered with fine setae. Two large hairs on each side of the first abdominal segment, a single large one on all the others. Comb of about ten scales in a single curved row, each scale with a strong apical spine and a number of fine setae on each side, spine as long as the body of the scale. Air tube 2x1, deeply chitinized except just below the apex, subconical, slightly swollen above the base. Rows of pecten teeth insertions reaching up half the tube. Teeth evenly spaced, about twelve in number, each with several small denticles on the inner side; these are progressively smaller from above downwards. A pair of large compound hairs at the level of the upper pair of teeth. Band ringing anal segment about two-thirds as long as broad; ventral group of hair tufts (about ten pairs) from a separate barred area; dorsal group composed of a pair of compound and simple hairs. Anal gills unequal,

tapering; ventral pair a little longer than the longest ventral hairs, dorsal pair one-third as long again as the ventral pair.

*Observations.*—The larva of this species superficially closely resembles the foregoing, and still more those of *A. hemisurus*, Dyar and Knab. The last named has no rows of spines on the antenna, the comb scales are without spines, having only setæ, and the compound hairs in the tube are above the pecten rows. According to Dyar and Knab's table and figure (from N. Y. Ent. Soc., Vol. XIV), it would seem to be near *A. tormentor*, D. & K., a mainland species.

*Mochlostyrax Jamaicensis*, nov. sp.—♀. Head with pale yellow flattened scales at the middle and sides, many long black forked scales at the back, each of these irregularly frayed along the upper expanded border. Some long black hairs among the other scales. Proboscis black, swollen at the apex, speckled with yellow scales, tip yellow. Palpi black, the terminal joints yellow scaled. Eyes with white borders posteriorly. Clypeus dark brown. Antenna dark brown, joints with scattered brown hairs, these are rather larger and arranged in a ring below each clear area, suggesting a double set of verticillate hairs. Prothoracic lobes black, somewhat prominent, covered with fine scales and long black hairs. Mesothorax black, with two dark brown median bands anteriorly. Surface covered with fine hair-like scales, a row of long black hairs on each side of the mid line, another row at the edge near the prothoracic lobes, and a group in front of the insertion of the wing. Scutellum dark brown, with fine scales, six long bristles on the posterior border of the mid lobe, and four on each of the lateral lobes. Metanotum dark brown. Pleura grayish, with a line of black bristles down each side to the mid coxæ, a cluster of bristles anteriorly between the front coxæ, several small patches of white hairs below the insertions of the wings. Abdomen black, and speckled with dull white scales, the latter denser at the bases of the segments, forming a pronounced band at the base of the second segment, long white hairs along the posterior borders of the segments. Small lateral white scaled areas on the sixth and seventh segments formed by the extensions of the white ventral bands. Venter with broad crescentic basal bands of silvery scales. Legs black, ventral surfaces of the femora white, except at the extreme apices, where there are



FIG. 40.—*Mochlostyrax jamaicensis*, n. sp.—a, bar from comb; b, hook from tube.

patches of black bristles ; apices of femora and tibiae swollen. A band of lighter scales running along the under surfaces of all the legs (especially marked on the mid legs) to the tips. A yellow spot at the apex of hind tibiae. Knee spots not defined. Ungues equal and simple. Wings, the apical portions of the first four long veins densely scaled with broad fan-shaped scales. The two median rows of broad scales are represented by narrow elongated ones on the bases of the second and third, first part of the base of the fourth and upper arm of the fifth. The remainder of the base of the fourth and the lower arm of the fifth have long scales on one side only. The base of the fifth has broad scales only throughout its length. On the sixth long vein the scales are all slender and elongated. First submarginal cell as wide as but much longer than the second posterior, about four times as long as the stem ; second posterior with the stem about half length of the cell. Posterior cross vein about twice its own length distant from the mid cross vein. Halteres with pale stems and knobs, the latter mottled with dark areas. Length, 2.5 mm.

♂.—Palpi black, copiously speckled with yellowish scales, slender, larger than the proboscis, the tip of the latter reaching to the middle of the penultimate joint ; long hairs along the sides and under surfaces of the first two joints and apex of the antepenultimate joint. Both terminal joints and apex of antepenultimate joint slightly swollen. Abdomen black, with scattered dull white scales : these form an ill-defined band down the centre of the abdomen, lateral patches of silvery scales on the fifth, sixth and seventh segments. Legs black, conspicuous lines of lighter scales on the under surfaces of all the legs. Ungues of the fore and mid tarsi unequal and uniserrate ; larger with one long median blunt tooth, smaller with a small basal tooth. Ungues of the hind tarsus equal and simple. Length, 2.5 mm.

The following points were noted in the adult LARVA : Fully grown larva about  $\frac{1}{8}$  inch long, with relatively large head and thorax. Antennae large and prominent, larger than the head, slightly curved in lower third, somewhat swollen in the basal half, only moderately infuscated, rather more so above the lateral tuft and at the extreme base. Tuft a little above the middle, of about twelve fine flattened hairs measuring about three-quarters length of the antennal shaft. Apex with four large deeply infuscated spines, the two longest about half the length of shaft. Surface covered with many fine chitinous spines, especially along the outer aspect. Mentum small, with about fifteen teeth, apical tooth prominent. Upper

epistomal hair double or single, lower larger, single, both flattened, neither reaching to the anterior border of head. Antennal hair with five or six divisions, flattened. Thorax coarsely pilose along the anterior and lateral aspects. Abdomen finely pilose, more densely at the insertion of the lateral hairs and near the comb. Lateral hairs long, five on each side of the first segment, three on the second, paired on the hinder segments. Comb of 10-12 well-separated bars in a curved row, upper ones smaller, smallest about one-third length of longest. Each scale has a line of fine hairs on each side, most marked on the swollen basal portion. Air tube subconical, with a slight curve forward, about five times as long as broad (at the base). A pair of hooks at the tip, each with a fine curved tooth at the middle. Eight or nine pairs of long hairs along the posterior surface, each with 4-5 divisions; upper shorter, two pairs within the lines of insertion of the pecten teeth. Lines of pecten teeth insertions reach up one-quarter of the tube; teeth about nine pairs, upper very long, tips of the highest approach the middle of the tube, each tooth narrow, flattened, slightly curved, with many fine setae along its inner border. Two pairs of small compound hairs on each side of the tube, one near the middle, the other within the upper quarter. Band ringing the anal segment about as long as broad. Ventral group of hairs spring from a separate barred area. Dorsal group of two pairs of very long simple, nearly equal, hairs. Anal gills with prominent tracheae, elongated, narrow, unequal, lower pair longest, half as long again as the ventral hair group. Pupa with rather long, deeply-infuscated siphons.

*Observations.*—The larvae of this species, belonging to Dyar and Knab's interesting new genus, *Mochlostyrax*, were collected in the same locality as the preceding. They were placed in a separate jar, with an abundance of Crustacea and Infusoria, and developed rapidly. The usual position of the larva was on its back at the bottom of the jar or hooked up on the sides by its siphon. It apparently never rose to the surface except just before pupating. The adults bear a strong superficial resemblance to the small swamp mosquito, *Melanoconion atratus*, Theo., the venation and form of the wing scales being precisely similar. The description of the adults was drawn up from freshly-killed specimens.

Mailed September 7th, 1906.