This species is related to *willistoni* Wh. and *vietus* sp. nov. but differs much in general color, and in the form of the hypopygium and its appendages. It also differs from *vietus* in having the antennæ brown, not yellow as in that species.

SYSTEMATIC PAPERS ON NEW ENGLAND HEMIPTERA.¹

BY H. M. PARSHLEY.

With Plates VI and VII.

I. SYNOPSIS OF THE FAMILIES.

The tables to be published under the above title form a part of a general account of the Hemiptera ² of New England on which I am engaged, but as an early appearance of the whole is not to be expected, it seems desirable that the more generally useful parts be made immediately available.

There are to be found in various publications a number of keys to the families of Hemiptera, but for one reason or another they do not enable those who are unfamiliar with the group to place specimens with certainty in their proper families. Some are inaccurate, some incomplete, while those which are free from these faults are very difficult to work because they generally lack figures and employ obscure characters, the latter often necessary in a table which aims at universality or natural arrangement. It seems to me that these difficulties can be avoided by limiting the application of the key to the fauna of a restricted region,³ sacrificing natural arrangement in favor of clearness, and illustrating structures of importance. The synopses in this series are offered as an attempt in that direction.

In preparing the tables I have made free use of the writings of previous authors, but all the work has been done with continual reference to the specimens themselves, more particularly of the species occurring in New England, of which I have before me a fairly complete collection. Thus the characters proposed by others

¹ Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 91.

² Considered as an order distinct from the Homoptera.

³ Thus permitting in some cases the use of easily observable characters not common to all members of the family in question.

have been examined with regard to their applicability to our species, and not a few have been found to be decidedly misleading when presented without qualification. Groups not known to me to occur in this region are marked with an asterisk, and those of which I have not as yet seen specimens are indicated by a dagger. I hope that anyone who may know of New England records for the forms so marked will communicate with me on the subject.

The characters which are of distinctive importance are given first in the dichotomies. Those which follow have been added to assist in determination, and they are not necessarily peculiar to the group in question, except such as are strictly alternative. To the short descriptions of the families should be added the characters already used in the appropriate divisions of the key. In studying the smaller forms a binocular or ordinary compound microscope will be found almost indispensable.¹

There is difference of opinion among authorities regarding the names which should be used for certain families, and in such cases I have given both terms. The cause of this disagreement lies in the fact that the present rules of nomenclature may be interpreted in more than one way. There seems to be a growing sentiment among zoölogists in favor of establishing a list of names not subject to change, and if this action is taken by the International Congress it may be that those of the more familiar names which are now held by some to be invalid will regain their standing.²

DESCRIPTIVE SYNOPSIS OF THE FAMILIES.³

1. Antennæ shorter than the head, generally concealed in cavities between head and thorax; metasternal orifices absent.....	2
Antennæ as long as or longer than the head, exposed.....	8
2. Ocelli present; littoral; not over 10 mm. in length.....	3
Ocelli absent; aquatic.....	4

¹ Definitions of a number of hemipterological terms will be found in a paper on the squash-bug by Tower, Ann. Ent. Soc. Am., VI., 1913, p. 427; and in my paper on Miridæ, Ent. News, XXVI., 1915, p. 208. In connection with the latter should be mentioned an additional reference on the Mirid "anal" vein; Reuter, Bemerk., Oef. Fin. Vet. Soc. Förh., LIV., 1911-12, p. 19.

² It should be noted that as a result of more or less recent nomenclatorial changes, the species represented by certain figures on the plates would be otherwise named by some authorities, as follows: fig. 1, *C. lintneriana*; fig. 3, *Saldula pallipes*; fig. 8, *Hebrus burmeisteri*; fig. 11, *Nabis pallescens*; fig. 13, *Phymata erosa wolffi*; fig. 22, same as fig. 8.

I am indebted to Mr. E. P. Van Duzee for his kindness in giving me advance information in regard to his list of Hemiptera, which is soon to be published.

³ This table is adapted for the determination of adults only; and mature forms which are brachypterous or wingless must in some cases be treated with caution.

11. Antennæ 5-segmented. 12
 Antennæ 4-segmented, disregarding minute ring-segments; (antenniferous tubercles of head should not be mistaken for segments, figs. 11, 30) 13
12. First and second segments of antennæ thicker than the others (fig. 8); clavus similar in texture to the membrane which is without veins (fig. 22); head and thorax sulcate beneath; rostrum 3-segmented; tarsi 2-segmented; aquatic, living on the surface; minute in size. **HEBRIDÆ** or **NÆOGEIDÆ**
 First segment of the antennæ thickened, second slender (fig. 1); margin of head carinate above insertion of antennæ; scutellum rather large, usually extending beyond middle of abdomen; terrestrial; moderate in size, rarely minute 32
13. Prosternum with a median longitudinal transversely striated or granulated stridulatory groove visible anterior to front coxæ, receiving the tip of the rostrum; rostrum 3-segmented, short and strong; length not less than 5 mm. 14
 Prosternum without a stridulatory groove; size large or small. 15
14. Terminal segment of antennæ thickened; front legs highly modified, stout, raptorial (fig. 13); scutellum moderate in size; membrane with numerous veins; front tarsi small and retractile; tarsi 2-segmented; roughly sculptured predatory forms; moderate in size **PHYMATIDÆ** or **MACROCEPHALIDÆ**
 Terminal segment of antennæ filiform (sometimes faintly divided into numerous small parts); front legs usually much like the others, though raptorial in function, sometimes somewhat thickened and spinous; scutellum small; membrane with few veins; tarsi 3-segmented; body robust or linear; usually predatory; large or small in size **REDUVIIDÆ**
15. Hemelytra closely reticulate in relief, membranous between the reticulations, more or less lace-like in appearance (figs. 17, 18); size small. 16
 Hemelytra not so reticulate, or absent; size large or small. 17
16. Jugal free, produced before apex of head, longer than tylus (fig. 14); hemelytra with a non-reticulate membrane, the rest reticulately punctate (fig. 18); ocelli present; rostrum 4-segmented; tarsi 2-segmented; one small species **PIESMIDÆ**
 Jugal not prominent, not longer than the tylus (fig. 15), head sometimes with dorsal anteriorly projecting spines; hemelytra of similar texture throughout, densely reticulate (fig. 17), membranous between the reticulations; ocelli absent; rostrum 4-segmented; tarsi 2-segmented; numerous small species **TINGITIDÆ**
17. Pronotum divided into three lobes; head contracted behind the eyes; hemelytra wholly membranous, with a few distinct longitudinal and cross veins; ocelli present; rostrum 3- or 4-segmented (?); front tarsi 1-segmented, intermediate and hind 2-segmented; predatory; fly in swarms; very minute and delicate forms¹. ***HENICOCEPHALIDÆ**
 Pronotum, head, and hemelytra otherwise constructed. 18
18. Rostrum really or apparently 3-segmented. 19
 Rostrum 4-segmented, first segment sometimes short (fig. 11). 24

27. Front legs raptorial, the tibiae and usually the femora armed with rows of numerous closely set fine spines which interlock when the leg is flexed, front femora more or less thickened (fig. 23), the femoral spines sometimes replaced by closely set even setae; rostrum 4-segmented, the first segment short (fig. 11); membrane with a few long cells from which radiate numerous veins; sometimes brachypterous; tarsi 3-segmented; wandering predatory species of moderate size **NABIDÆ**
- Front legs not especially modified for grasping, generally much like the others, front femora sometimes thickened and armed with a few teeth; first segment of rostrum generally longer than wide 28
28. Body and appendages extremely slender, linear; antennae geniculate, biclavate; eyes distant from base of head; ocelli present; rostrum 4-segmented; tarsi 3-segmented; inhabit underbrush; probably phytophagous; moderate in size **NEIDIDÆ**
- Body and appendages not extremely slender, antennae otherwise constructed 29
29. Membrane with five usually simple veins (fig. 6); antennae inserted low on the side of the head, usually below or on a line drawn from the middle of the eye to the anterior end of the buccula (fig. 24); ocelli present; rostrum 4-segmented; tarsi 3-segmented; sometimes brachypterous; phytophagous; moderate or small in size **LYGAIDÆ** or **MYODOCHIDÆ**
- Membrane with numerous more or less anastomosing veins (fig. 7); antennae inserted high, usually above such a line (figs. 25, 30) 30
30. Metasternal orifices generally obsolete, when present placed between intermediate and hind coxae near median line, with two diverging furrows running outwards; ocelli present; rostrum 4-segmented; tarsi 3-segmented; phytophagous; colors for the most part light; moderate or small in size . . . **CORIZIDÆ**
- Metasternal orifices distinct, placed farther outward; colors usually dark; generally over 10 mm. in length 31
31. Head much narrower and shorter than the pronotum (fig. 26); bucculae extending posterior to insertion of antennae (fig. 25); ocelli present; rostrum 4-segmented; tarsi 3-segmented; generally phytophagous; moderate or large in size **COREIDÆ**
- Head much larger proportionally, the part between the eyes wider than the scutellum (fig. 27); bucculae anterior to insertion of antennae (fig. 30); ocelli present; rostrum 4-segmented; tarsi 3-segmented; form rather elongated; phytophagous (always?); moderate in size **ALYDIDÆ**
32. Scutellum generally moderate in size, more or less narrowed apically; scutellum rarely covering most of abdomen, in which case colors are bright and contrasting, or there is a prominent tooth just anterior to lateral angles of pronotum; tibiae not strongly spinose but sometimes bear very small spines or a more or less hairlike vestiture which may have a spinose appearance; ocelli present; membrane with many veins (fig. 19); rostrum 4-segmented; tarsi 3-segmented; phytophagous or predatory; moderate in size **CIMICIDÆ** or **PENTATOMIDÆ**
- Scutellum generally large, covering almost the whole of abdomen, usually very

- convex; when scutellum is reduced in size and flattened, tibiae are strongly spinose..... 33
33. Tibiæ thickly set with long strong dark colored spines; corium narrow, acute apically (fig. 20); ocelli present; rostrum 4-segmented; tarsi 3-segmented; phytophagous (always?); generally shining black or blue, sometimes with lighter peripheral markings; rarely brownish in color, in which case length is less than 5 mm.; moderate to minute in size

CYDNIDÆ or THYREOCORIDÆ

- Tibiæ not strongly spinose; corium broad, obtuse at apex; ocelli present; rostrum 4-segmented; tarsi 3-segmented; phytophagous; gray, brown or reddish species; moderate in size..... SCUTELLERIDÆ

NEW AMERICAN SPECIES OF ASTEIA AND SIGALSOËSA.¹

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The two genera named are readily distinguished from other Drosophilidæ by the shortness of the second longitudinal vein, which surpasses the first but slightly, as the accompanying sketches show. *Asteia* has been known from the time of Meigen as a European genus, of which four species are recorded in the Palæarctic Catalogue; it has no posterior cross-vein, and the arista is plumose as in *Drosophila*. *Sigaloëssa* was established by Loew for a Cuban species *S. bicolor* (Centuries, VI, 100, 1865); it has a posterior cross-vein, and the arista is only microscopically pubescent in most cases, although in *frontalis* described below it is short-plumose.

The wing figured by Williston, Manual, 1908, p. 300, fig. 7, as a doubtful member of *Sigaloëssa*, belongs to a fly of another genus; his figure on page 311, fig. 7, is correctly named as a *Sigaloëssa*.

The *Asteia tenuis* of Walker, Trans. Ent. Soc., n. ser., V, 331, must belong somewhere else; he mentions the posterior cross-vein, which being near the border would also exclude the fly from *Sigaloëssa*. Walker himself gave the genus with a question, but Osten-Sacken dropped the interrogation point, perhaps only a clerical error.

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