

# Studies in North American Delphacidae (Homoptera)

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The family Delphacidae has played an important part in the agricultural economy of the Territory of Hawaii. One species of this family (*Perkinsiella saccharicida* Kirk.), accidentally introduced from Australia into the Territory threatened to ruin the whole of the sugar industry and led to great losses. On this account this and allied species have been studied intensively and extensively by members of the staff of the H. S. P. A. Experiment Station. Kirkaldy published considerably on these and allied fulgoroïds,<sup>(1)</sup> and one of the present writers has continued the work.<sup>(2)</sup> It was the latter's intention to produce a monograph of the family, but to complete this on the lines that he desired would take more time than he could spare, as he desired to examine the male genitalia more closely than has hitherto been the custom. He therefore enlisted the help of the other writer who has now devoted considerable time and close study to the subject.

The first difficulty was to get together material. In this we were exceptionally fortunate so far as the North American species are concerned, as we were able to procure three of the most important collections in the country. Mr. E. P. Van Duzee loaned us his personal collection and gave us permission to dissect the genitalia. This is one of the most important and representative collections in the country and contains types and paratypes of a number of species and authentically determined specimens of many others. The California Academy of Sciences also loaned us its collection which was named and arranged by Mr. Van Duzee. The Pomona College collection together with Dr. D. L. Crawford's own collection are of great importance as upon them most of Dr. Crawford's work<sup>(3)</sup> was based. The Pomona College generously loaned us their collection and gave us permission to dissect the male genitalia. Dr. Crawford's collection came into the possession of one of the authors.<sup>(4)</sup> Through the kindness of Dr. E. D. Ball we were loaned the types belonging to the Iowa Agricultural College, Ames, Iowa, representing most of Van Duzee's species of 1897. The National Museum was unable to send us types, but Dr. L. O. Howard arranged to have drawings made of the male genitalia of such types as we required. These drawings were made by Mr. H. B. Bradford under the supervision of Mr. W. L. McAtee and have been of great help to us. Professor H. Osborn also loaned us certain types. But for the generosity and kindness of these Institutions and individuals the present work could not have been under-

(1) H. S. P. A. Exp. Sta. Bull. I, Part 9 (1900); H. S. P. A. Exp. Sta. Bull. III (1907).

(2) H. S. P. A. Exp. Sta. Bull. XII (1913); Can. Entomologist, p. 208 (1915), and elsewhere.

(3) Proc. U. S. Nat. Mus. 46 (1914).

(4) W. M. Giffard.

taken. We therefore wish to place on record our deep appreciation and thanks. Among other material that we have examined, some of which was undetermined, is a collection made by one of the writers in the Pacific States, partly determined by Mr. Van Duzee;<sup>(1)</sup> an interesting collection from Mr. W. L. McAtee; a small collection made by Mr. A. Koebele and another by Mr. O. H. Swezey.

As a monograph of even the North American species of this family would take a long time to prepare the writers have decided to publish on certain genera as they proceed. The present paper deals mainly with the North American species of *Delphacodes* Fieb. along with some allied species, as well as a table of genera and some remarks which are necessary for the sorting out of the species listed by Crawford under *Megamelus*.

We have based our specific work upon the male genitalia as experience has demonstrated that these are the most reliable characters to use in the family. It has been considered by some that while these characters are of some value for specific purposes they are not necessary, as the species can be distinguished by their external body characters. One has only to look at the list of synonyms to see how far this is incorrect, or to look through collections named by such careful and experienced workers as Van Duzee and Crawford. We maintain that unless the male genitalia be used a hopeless muddle will follow, and for the following reasons.

Most species of the genus *Delphacodes*, as well as allied ones, have two distinct forms, the macropterous and brachypterous, in both sexes, and these show certain differences in general build and in certain characters. They also differ very considerably in color, in some cases vastly so, both in the two forms and also in the two sexes. To associate these forms without some such characters as the genitalia could only be done by breeding, but the male genitalia reveals their relationship at once.

That the male genitalia will leave absolutely no uncertainty as to all species is too much to be expected. There are bound to be a few widely distributed species which show some variations which will lead to differences of opinion as to whether they should form one or more species. Such an one is *furcifer* Horvath.

We strongly object to either subspecific or varietal names being given to color differences. If such names be given then it follows logically that the sexes and the long and short winged forms should bear distinct names, and variations in these should again be named, which would only lead to a multiplicity of names without any advantage being gained.

While it is nearly impossible to separate some of the species by their chroitic characters the problem is reversed to a large extent when we turn to the phallic characters. Here we find the diversity often so great that the difficulty is to find what relationship they hold to one another. In a large genus one often finds two or three groups and a certain number of unconnected forms. We can often see to which group of a genus the species of an allied genus is nearest to, and in some cases a genus is shown to be of polyphyletic origin.

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(1) Pro. Calif. Ae. Se., 1917, VII, No. 2, 314-318.

The question arises whether some of these distinct group of species should be treated as genera or not. Although we have not used the genitalia to erect genera we have given them due weight in generic distinctions, and also in deciding to which genus an uncertain species should belong. It is possible that many of our difficulties over the genera will be settled eventually by basing them on the male genitalia. Such a procedure will necessitate a wider knowledge of these organs than we have at present.

One of the writers<sup>(1)</sup> has given the details of our method of treating the genitalia. After considerable experience we have decided that the card-cell mount is the most convenient as then the specimen and mount can be kept together in the collection. We have used the nomenclature proposed in that paper which we reproduce in figure 136 and in the explanation of figures of plate 6.

So far as the male genitalia are concerned we only deal with *Delphacodes* Fieb. and some allied genera, the others must await future studies.

The bibliography of the North American Delphacidae has been so recently and thoroughly dealt with by Van Duzee in his Catalogue that we have only given such references as are necessary to establish the identity of the species in question.

Both writers take equal responsibility for the new genus and species which should be quoted as Muir and Giffard (M. G.).

Measurements are from the apex of head to anus and from base to apex of one tegmen.

The two plates of half-tones were drawn by W. M. Giffard, the other figures were drawn from dissections made by both authors and they both have an equal responsibility for their correctness.

In all large or moderately large families there are generally a certain number of species which are difficult to place in any genus and which get moved from one genus to another. Their presence in a genus often breaks down the divisions between it and allied genera and so causes them all to be sunk into one. This is the case with *Megamelus* of Crawford and *Liburnia* of Fowler and others. Although we sympathise with the workers who are confronted with the difficulties arising from such inconvenient species yet we do not consider that the lumping of several genera helps matters, but rather the reverse. We consider that it is better to place these forms into one or more genera by themselves. The genus which appears able to receive some of these species at present standing under *Megamelus*, *Liburnia* and *Kelisia* is *Sagata* Distant. As its generic characters are weak, we have placed it in more than one position in our table so that it is more likely to be run down. Some other genera we have also placed in more than one position to allow for uncertainty regarding generic characters.

In our table we have tried to deal with all American genera which we have any knowledge of, and have also included one or two others.

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(1) W. M. Giffard, Ann. Ent. Soc. Am., Vol. XIV, No. 2, June, 1921. For the homologies of some of the structures see Kershaw and Muir, Ann. Ent. Soc. America XV. (3), p. 201 (1922).

## TABLE OF AMERICAN DELPHACIDAE.

- 1 (18) Spur subulate, cross section circular or angular, apex acute, without teeth on side.

## ASIRACINAE.

- 2 (3) Three mesonotal carinae. Antennae with both segments foliaceous . . . . . *Copicerus*  
 3 (2) Four or five mesonotal carinae.  
 4 (5) Four mesonotal carinae. . . . . *Idiosemus*<sup>1</sup>  
 5 (4) Five mesonotal carinae.  
 6 (11) Face with two median carinae.  
 7 (8) Face much longer than broad. . . . . *Ugyops*  
 8 (7) Face not or but little longer than broad.  
 9 (10) Clypeus without a median carina. . . . . *Pentagramma*<sup>2</sup>  
 10 (9) Clypeus with a median carina. . . . . *Idiosystatus*  
 11 (6) Face with one median carina, sometimes forked.  
 12 (17) Vertex distinctly longer than wide; antennae terete.  
 13 (14) Tegmina with a large stigma. . . . . *Eucanyra*<sup>3</sup>  
 14 (13) Tegmina without a stigma.  
 15 (16) Sc + R fork basad of Cu fork. . . . . *Canyra*<sup>4</sup>  
 16 (15) Sc + R fork distad of Cu fork. . . . . *Ugyops*<sup>4</sup>  
 17 (12) Vertex not longer than wide; first segment of antennae much shorter than second, second considerably flattened. . . . . *Punana*  
 18 (1) Spur not subulate; cultrate or subcultrate or thin, with or without teeth on hind margin.

## DELPHACINAE.

- 19 (24) Spur cultrate, thick, convex on each side or slightly concave on inner surface, with teeth on hind margin.

## ALOHINI.

- 20 (21) Antennae long, terete; disc of mesonotum flat. . . . . *Burnilia*  
 21 (20) First segment of antennae not terete, more or less flattened.  
 22 (23) First segment of antennae triangular or sagittate. . . . . *Stobaera*  
 23 (22) First segment of antennae long, narrow, parallel-sided, flat, with a longitudinal carina. . . . . *Sparnia*  
 24 (19) Spur thin, or if thick then with no teeth on hind margin.  
 25 (26) Spur thick, concave on inner surface, margin without teeth.

## TROPIDOCEPHALINI

- Antennae terete, first segment as broad as long, second about twice the length of first and slightly thicker. . . . . *Columbiana*<sup>5</sup>  
 26 (25) Spur thin, often tectiform, hind margin with or without teeth.

## DELPHACINI.

- 27 (32) Antennae with one or both segments distinctly flattened.  
 28 (29) First antennal segment long subparallel sided, semifoliaceous, antennae as long as face and clypeus together; head as wide or nearly as wide as pronotum. . . . . *Delphax*  
 29 (28) First segment of antennae subtriangular or sagittate.  
 30 (31) Length of face equal to width between eyes, fork of median carinae wide; clypeus angled in middle the median carina forming a keel at bend. . . . . *Bostaera*  
 31 (30) Length of face considerably more than the width between the eyes, no fork in median carina or very small; clypeus not angular in middle. . . . . *Stobaera*

<sup>1</sup> This may come into the Tropidocephalini.

<sup>2</sup> This may be the same as *Bergia* Scott (preoccupied) in which case it will supersede *Bergias* Kirk. In his table Muir reversed *Bergias* and *Idiosystatus*.

<sup>3</sup> *Ugyops latokensis* Muir comes into this genus.

<sup>4</sup> The distinctions between these two genera and *Epibidius* Fowl. are small and it may be necessary to place them all under *Ugyops* Guerin.

<sup>5</sup> If *Idiosemus* comes into the Tropidocephalini then it is separated from *Columbiana* by the four mesonotal carinae.

- 32 (27) Antennae terete or but slightly flattened.
- 33 (36) Head and pronotum with numerous "pits".
- 34 (35) Face with two median carinae.....Achorotile
- 35 (34) Face with one median carina.....Laccocera
- 36 (33) Head and pronotum without "pits".
- 37 (38) Anterior and intermediate femora and tibiae thin and foliaceous..Phyllodinus
- 38 (37) Legs simple, not foliaceous.
- 39 (44) Face with two median longitudinal carinae, separate or joined at extreme apex, but without a stalk.
- 40 (41) Apex of vertex subangular or broadly conical making vertex somewhat 5-sided; face widest at base which is much wider than apex .....Jassidaeus
- 41 (40) Apex of vertex truncate or but slightly rounded, vertex square or but little longer than wide, not 5-sided; base and apex of face subequal in width.
- 42 (43) Lateral pronotal carinae divergingly curved, not reaching hind margin . .....Criomorphus
- 43 (42) Lateral pronotal carinae straight, reaching hind margin.....Macrotomella
- 44 (39) Face with one median carina simple or furcate, or none.
- 45 (46) Medio-longitudinal carina of vertex with a small areolet in middle; first segment of antennae as broad as long.....Liburniella
- 46 (45) Vertex without such an areolet.
- 47 (48) Face almost semicircular; first segment of antennae as broad as long . .....Bakerella
- 48 (47) Face much longer than broad, not nearly circular.
- 49 (50) Hind basitarsus with one or more small spines on side; first segment of antennae longer than broad.....Nilaparvata
- 50 (49) Hind basitarsus without such spines.
- 51 (52) Apex of vertex and base of frons conical or subconical, often long and narrow; first segment of antennae as broad as long.Megamelanus
- 52 (51) Apex of vertex and base of face not conical, truncate or slightly rounded.
- 53 (56) Carinae of vertex and frons obscure, at least over the apex of vertex and base of frons; face broad at base; median frontal carina often missing.
- 54 (55) Antennae long, segments subequal in length.....Kormus
- 55 (54) Antennae not so long, first segment much shorter than second; width of vertex at base about double the width of an eye on the same line.....Eurysa
- 56 (53) Carinae of vertex and frons not obscure, or if so then frons not so wide at base.
- 57 (70) First segment of antennae short, as broad as long.
- 58 (67) Vertex distinctly longer than broad.
- 59 (60) Vertex long, narrow, produced considerably in front of eyes; medio-lateral carinae of vertex meeting together considerably before apex and continued as a single median carina; Y shape carina obscure or absent.....Saccharosydne
- 60 (59) Medio-lateral carinae of vertex meeting together at apex or continued onto the frons separately, vertex not produced so far before eyes.
- 61 (62) Width of apex of vertex subequal to base, apex rounded; fairly broad forms .....Kelisia
- 62 (61) Apex of vertex perceptibly narrower than base, more slender forms.
- 63 (64) Base of face half the width of apex, sides curved, broadest before apex .....Prokelisia
- 64 (63) Base of face more than half the width of apex, sides straight, not very distinctly narrowed at apex.
- 65 (66) Vertex produced considerably in front of eyes, apex considerably narrower than base.....Stenocranus
- 66 (65) Vertex produced only slightly in front of eyes, apex only slightly narrower than base.....Sogata
- 67 (58) Vertex not distinctly longer than broad, sometimes much shorter than broad.
- 68 (69) Median carina of frons simple or only forked at extreme base; carinae generally distinct, if not then width of vertex at base considerably less than twice the width of an eye on the same line.....Delphacodes

69	(68)	Median carina of frons forking about one-third from base or beyond . . . . .	Dicranotropis <sup>1</sup>
70	(57)	First segment of antennae longer, longer than broad.	
71	(90)	Second segment of antennae considerably longer than first.	
72	(79)	Vertex longer than broad.	
73	(74)	Lateral pronotal carinae not reaching hind margin, curved, not in same line with mesonotal carinae; apex of vertex narrower than base; sides of face curved. . . . .	Chlorione
74	(73)	Lateral pronotal carinae straight, reaching hind margin or very nearly.	
75	(76)	Head considerably narrower than pronotum; mesonotum as long or shorter than head and pronotum together; pronotal carinae often in line with mesonotal carinae; male pygofer complex . . . . .	Megamelus
76	(75)	Head not considerably narrower than pronotum; mesonotum longer than head and pronotum together; pronotal carinae not in line with mesonotal carinae.	
77	(78)	Fairly wide forms; vertex wide, flat, base much wider than eye on same line; pygofer often complex. . . . .	Kelisia
78	(77)	Narrower forms; base of vertex not wider or very slightly wider than eye on same line; pygofer simple. . . . .	Sogata
79	(72)	Vertex not longer than broad.	
80	(83)	Head comparatively narrow, narrower than thorax; lateral pronotal carinae straight, diverging, reaching hind margin or near it.	
81	(82)	Width of face more than half the length, or apex of vertex slightly wider than base. . . . .	Pissonotus
82	(81)	Width of face not more than half the length, or apex of vertex not wider than base. . . . .	Peregrinus
83	(80)	Head comparatively wide, as wide or nearly as wide as pronotum.	
84	(85)	Hind basitarsus much longer than other two together, legs fairly long and slender, front femora considerably longer than coxae; large species. . . . .	Euidella
85	(84)	Hind basitarsus not longer than other two together, or only slightly so; front femora only a little longer than coxae.	
86	(87)	Lateral pronotal carinae straight, reaching hind margin; slender forms . . . . .	Sogata
87	(86)	Lateral pronotal carinae curved, not reaching hind margin.	
88	(89)	Median carinae of face simple or only forked at extreme base. . . . .	Delphacodes
89	(88)	Median carinae of face forked a third or more from base; larger forms . . . . .	Dicranotropis
90	(71)	Antennae long, segments subequal in length.	
91	(92)	Vertex long and narrow. . . . .	Neomalaxa
92	(91)	Vertex square or only slightly longer than wide. . . . .	Pissonotus

#### Idiosemus Berg.

We are unable to locate this genus with any degree of certainty as the nature of the tibial spur is unknown to us. Berg refers it to *Tropidocephala* and if it belongs to the Tropidocephalini it comes next to *Columbiana* in our table, and is separated from it by its vertex being angular at apex with the base twice as wide as the length, and the frons lanceolate and without a median carina. The scutellum has four carinae. The description appears to place it near to *Megamelanus* Ball.

#### Lepticus Crawford.

This was erected on a nymph and so cannot be accepted as we cannot be sure of the condition of the antennae or of the carina of face in the adult.

<sup>1</sup> *Sogata cubana* (Crawf.) has the fork on face well distad but its small size and slender build distinguishes it.

## Sparnia Stal.

*Sparnia* Stal Sve. Vet. Sk. Hand. III, p. 6 (1862); type *S. praececellens* Stal; type locality Rio Janeiro, Brazil; type in Nat. Mus. Stockholm.

Head narrower than thorax, width including eyes about 1.8 times the length. Length of vertex slightly less than the width at base, apex half the width of base, sides straight; the Y carina obscure. Length of face twice the width at apex or slightly longer, sides straight, apex twice the width of base; median carina simple, lateral carinae large. Clypeus long, tricarinate, in lateral view straight in line with face, not angular. Antennae considerably longer than the face, first segment long, narrow, thin, subparallel-sided with a median longitudinal carina; second segment terete, slightly flattened at base, slightly more than half the length of first, sense organs large. Eyes reniform, broader than deep, the antennal emargination very deep. Pronotum slightly angularly emarginate behind, tricarinate, the lateral carinae reaching hind margin, everted anteriorly then straight; mesonotum tricarinate. Hind basitarsus longer than the other two together; spur about half the length of basitarsus, cultrate, thick, convex on both sides with seven teeth on hind margin and one at apex; legs long and slender, front femora flattened but not expanded.

The nature of the spur places this genus in the Alohini. It differs from *Burnilia* M. G. and *Vizcaya* Muir chiefly in the shape of the antennae.

This contains but one species at present, *S. praececellens* Stal. We have specimens from Banos, Or. Ecuador, 6,000 feet elevation (*F. X. Williams*, 26, X, 1922), living on sugar cane.

## Burnilia n. g.

Head narrower than thorax, width including eyes about 1.5 times the length. Length of vertex about 1.5 times the width at base, base about 1.5 times the width at apex, sides straight, lateral carinae large, the carinae on disc consisting of an inverted Y confined to apical half. Length of face twice the width of apex, apex 2.7 times the width of base, sides on basal half straight, diverging, on apical half slightly rounded, face strongly depressed across the middle, median carina simple. Antennae terete, reaching nearly to apex of clypeus, length of first segment twice the width, second segment 2.4 times the length of first. In lateral view the clypeus produced angularly in middle, tricarinate. Eyes reniform, considerably broader than deep. Pronotum tricarinate, lateral carinae straight, diverging, reaching hind margin. Mesonotum tricarinate, flat between the lateral carinae. Hind basitarsus considerably longer than the other two together; spur narrow, cultrate, thick, convex on both sides with about nine spines on the hind margin.

This genus comes next to *Iburnia* in the Alohini, but it is easily recognized by the shape of the head. It differs from *Proterosydne* Kirk. by the same characters and also by the shape of the mesothorax.

Type *Delphax pictifrons* Stal.

1. *Burnilia pictifrons* (Stal). *Delphax pictifrons* Stal Stettiner Ent. Zeit. 25 (1864), p. 50; *Proterosydne pictifrons* (Stal) Crawford. Pro. U. S. Nat. Mus. 46, p. 571 (1914).

Crawford has wrongly synonymized this species with *Hygops pictifrons* Stal, a Philippine delphacid belonging to the *Asiracinae*.

## Stobaera Stal.

We place this genus in the Alohini on account of its tibial spur, but as there is some doubt in some of the species we have included it in the Delphacini in our table.

*S. 4*—*pustulata* Van Duzee we move to *Pissonotus*.

### Phyllodinus Van Duzee.

*Platybrachys* Bierman, Notes Leyden Mus. XXXIII. 41, (1910), type *platypoda* Dammerman (name preoccupied).

This genus consists of two groups, the type *nerzatus* Van Duzee, which is like a *Dicranotropis* with expanded legs, and *nitens* Van Duzee, which is like a *Pissonotus* with expanded legs. The type of *Platybrachys* belongs to the *nerzatus* group.

### Macrotomella Van Duzee.

Crawford sunk this genus into *Jassidaeus*, but it, along with *Criomorpha*, can be distinguished from that genus by the shape of the face and vertex.

### Chloriona Fieber.

*Chloriona* Fieber, Verb. Zool. Bot. Ges. Wien XVI (1866), p. 519, Pl. VIII. f 5; type *Delphax unicolor* H-S.

1. *Chloriona slossoni* (Ball). *Liburnia slossoni* Ball. Can. Ent. 35 (1903), p. 231; type in Iowa College of Agriculture, Ames; type locality Biscayne Bay, Florida.

The type of this is a female. We consider that it should be placed in this genus.

### Kormus Fieber.

*Kormus* Fieber Verb. Zool. Bot. Ges. Wien XVI, p. 529 (1866).

We place *Liburnia apicimacula* Fowler in this genus.

### Eurysa Fieber.

*Eurysa* Fieber, Verb. Zool. Bot. Ges. Wien, XVI (1866), p. 520; type *lineata* (Perr.).

This genus is close to *Delphacodes* but is easily recognized from most of the species of that genus by the carinae of face and vertex being very obscure, especially over apex of vertex and base of frons. From those species of *Delphacodes* which have the carinae somewhat obscure it is recognizable by the wider base of the frons and its general appearance. The male genitalia are quite distinct.

1. *Eurysa magnifrons* (Crawford). Figures 52, 53. *Megamelus magnifrons* Crawford. Pro. U. S. Nat. Mus. 46 (1914), p. 614, Pl. 48, figs. J, O; type locality Colorado; type in the U. S. Nat. Mus. No. 25986.

There are two male specimens in the Van Duzee collection which agree with Crawford's description and figures, and with the figure supplied by Dr. Howard. We have used these for description and figures.

In lateral view the anal emargination and opening of pygofer are on about the same plane so that the anal angles are flattened out; on each side, in a latero-ventral position, the margin is produced into a small flat subquadrate process with rounded apex. The diaphragm is flush with the margins of pygofer, the middle projecting as a keel, but without any specialized armature. Anal segment large, each side produced into a large, flat process with its apex forming a strong spine which reaches to the apex of the small



genital styles. Genital styles small, in situ slightly diverging apically, broad at base gradually narrowing to apex, curved, the inner margin convex the outer concave. Aedeagus long, cylindrical, apex slightly enlarged, orifice on apex and continuing on ventral surface for about one-third of the length, a row of spines along the edge of orifice on each side, a row of about six small spines near apex on left side and one spine on right side.

2. *Eurysa kormusi* (Crawford). Figures 14, 50, 51. *Megamelus kormusi* Crawford, Pro. U. S. Nat. Mu. 46 (1914), p. 614; type in Pomona collection; type locality Ormsby County, Nevada. *Liburnia fluvialis* Van Duzee, Pro. Cal. Ac. Sci. VII (1917), p. 317; type in Cal. Acad. Sci.; type locality Stockton, San Joaquin Co., Cal.

The type of *kormusi* is a brachypterous male and the type of *fluvialis* is a macropterous male. We have compared these two specimens and find that they are the same species. Paratypes of *fluvialis* have been dissected.

Opening of pygofer wider than long, lateral margins rounded, ventral margin deeply emarginate, anal emargination shallow and wide, anal angles rounded and obscure. Anal segment large, short, each latero-ventral margin produced into a large, flat, angular production apically forming a strong, curved spine. Genital styles in situ flat, curved, the margins subparallel, the outer concave, the inner convex, apex truncate with the inner angle produced into a small spine. Diaphragm long, dorsal margin widely V shape, armature in shape of a sub-pyramidal production in middle extending nearly to orifice. Aedeagus subcylindrical, curved at base, then straight, slightly increasing in size to apex, orifice at apex, on each side of apex a V shape series of nine or ten teeth commencing on dorsal aspect of apex and ending on ventral aspect slightly before apex.

3. *Eurysa dorsilinia* (Van Duzee). *Liburnia* (?) *dorsilinea* Van D., Bull. Buff. Soc. Nat. Sci. 8 (1907), p. 50.

The face is slightly longer and narrower than in the type species.

### Saccharosydne Kirkaldy.

*Saccharosydne* Kirkaldy, Haw. Sugar Plts. Exp. Sta. Ent. Bull. III, p. 139 (1907); type *Delphax saccharivora* Westwood.

We have seen three species of this genus, *Delphax saccharivora* Westw. *Stenocranus rostrifrons* Crawford and specimens from Japan labelled by Matsu-mura *Orycranus procerus*. These all have very distinct genitalia which are different from those of all other species, except one, which we have examined. In these species the external aedeagus is reduced to a minute organ with a long, thin internal portion. The exception is *Neomalaxa flava* Muir from Porto Rico which has a similar aedeagus.

We are firmly convinced that these two genera are very closely allied in spite of the difference in the generic characters. They are both quite distinct from *Stenocranus*.

### Neomalaxa Muir.

*Neomalaxa* Muir, Pro. Haw. Ent. Soc. III, 5 (1918), p. 426. Type *N. flava* Muir l. c.

1. *Neomalaxa flava* Muir. *Neomalaxa flava* Muir l. c.; type in American Mus. Nat. Hist., New York; type locality Mayaguez, Porto Rico.

We have received specimens of this species from Mr. G. N. Walcott, from Ciales, P. R., on cohite grass, *Commelina elegans*, collected by F. Sein. At the time of describing this genus Muir did not recognize its close affinity to *Saccharosydne* Kirk.

## Megameilus Fieber.

The table gives the distinctions between this genus and allied ones. Some species have the first segment of antennae longer than in others and so we have placed the genus in two places. The general form of the typical species is easily recognized and the male genitalia are quite distinct.

*Stenocranus palactus* Van Duzee comes into this genus, the antennae and male genitalia being quite typical.

*Megamelus metzaria* Crawford we consider as typical of this genus.

## Prokelisia Osborn.

The table states the characters that we separate this genus on. All the species we have examined are distinct from *Delphacodes*. When the base of the face is a little wider than in the type it is not wide enough to be mistaken for *Delphacodes*. The long vertex, the straightness of the pronotal carinae and the shortness of the basal joint of the antennae as well as the slenderness of the species all serve to distinguish it.

The following species placed under *Megamelus* by Crawford we place in this genus.

*Megamelus marginatus* Van Duzee.

*Megamelus constrictus* Crawford. The base of frons is slightly wider than in the typical species.

*Megamelus constrictus minutus* Crawford.

## Euidella Puton.

*Euidella* Puton Cat. Hem. Pal. (1886) n. n. for *Euides* Fieber 1866.

The three species of this genus are all closely allied and very distinct from any other N. American Delphacid that we have seen, so far as the male genitalia are concerned.

1. *Euidella weedi* (Van Duzee), Figures 56, 57, 58. *Liburnia weedi* Van Duzee, Bull. Buf. Soc. Nat. Sci. V (1897), p. 352; type in Iowa College of Agric. Ames; type locality, Mississippi.

A specimen from Marksville, Mississippi, in the McAtee collection has been compared with the type and has been dissected and used for descriptions and drawings.

Opening of pygofer wider than long, margins entire, round; anal emargination wide, shallow, anal angles obscure, not projecting. Diaphragm long, dorsal margin nearly straight at the sides the median portion projecting as a complex armature which is round with a deep U shape emargination in the middle, the margins of which are thickened and produced into complex, bifurcate processes at the corners. Anal segment large with two very small, curved spines far apart. The genital styles are complex and best studied in the figure. Aedeagus slightly flattened laterally, in lateral view deepest at base, apex acute, slightly widened before apex, a number of small knobs over the dorsal aspect of apex.

2. *Euidella magnistylus* (Crawford), Figures 54, 55. *Megamelus magnistylus* Crawford, Pro. U. S. Nat. Mus. 46 (1914), p. 627, Pl. 48, fig. B; type in U. S. Nat. Mus. No. 15998; type locality Mexico.

A drawing of the male genitalia made from the type was supplied us by Dr. Howard. Our dissection and figures are of a specimen from Havana, Cuba, in the Pomona collection. The specimen from Jalapa, marked type, is *weddi*.

Opening of pygofer slightly wider than long, round, margins entire, ventral margin slightly emarginate; and emargination large, wide, anal angle nearly a right angle. Anal segment wide, the lateral angles produced into large, thick, spine-like processes with rounded apices, diverging and parallel to margin of pygofer. The armature of the diaphragm produced into a quadrate process deeply emarginate in the middle, each angle of the emargination produced into a stout, curved spine. Genital styles large, reaching to the anal segment, strongly curved, with a large bifurcation at apex, the apices of furcation complex. Aedeagus in lateral view with the basal half forming a bulb, the apical half a thin, curved tube with the orifice on the dorsal aspect of apex, a few small spines on the dorsal aspect near apex.

3. *Euidella vanduzeei* n. sp., Figures 64, 65.

Male. Macropterous; length 2.3 mm., tegmen 2.7 mm. Vertex as long as broad, apex slightly rounded, head nearly as wide as pronotum, second segment of antennae 1.6 times the length of first, first much longer than broad; lateral pronotal carinae diverging, not strongly curved, not reaching hind margin; hind basitarsus longer than the other two together, spur not so long as basitarsus, large, thin with 16-20 teeth on hind margin, front femora longer than coxae.

Stramineous, slightly darker over frons, abdomen darker. Tegmina hyaline, slightly stramineous, veins apical of cross veins fuscous.

Pygofer similar to *E. magnistylus* (Crawf.) but the anal angles much more produced and the curved spines on armature of diaphragm longer and more slender; the anal spines and aedeagus different (figured) and the genital styles thinner with the apex different (figured).

Female, Macropterous; length 3.3 mm., tegmen 3.7 mm. In color similar to male.

Described from one male from Sanford, Fla. (April 25, 1908, *Van Duzee*) and a female from Crescent City, Fla. (April, 1908, *Van Duzee*) standing under the name of *Liburnia weddi*. There is also a brachypterous female from Crescent City which we regard as a paratype.

#### *Pissonotus* Van Duzee.

Apart from any one particular character the general facies of this genus differs from *Dicranotropis*, and to anyone familiar with the species of these genera there is little difficulty in placing them. It comes near to *Euidella* from which it also differs in general appearance as it narrows very distinctly from the mesonotum to the head. *Stobaera 4-pustulata* Van Duzee comes into this genus both by its chroitic characters and genitalia.

The species identified as *Megamelus albicollis* Melichar by Crawford is a *Pissonotus*. This is not the species described and figured by Melichar as *Liburnia albicollis* Motsch.

#### *Peregrinus* Kirkaldy.

*Peregrinus* Kirkaldy, Entom. XXXVII (1904), p. 175; type *Delphax maidis* Ashmead.

Besides the lateral pronotal carinae the general shape and the genitalia separate this genus from *Dicranotropis*. The head is much narrower and the thorax not so wide or stout.

#### *Stenocranus* Fieber.

*Stenocranus* Fieber Verh. Zool. Bot. Ges. Wien XVI, p. 519 (1866), type *minutus* (Fab.); Dozier, Ohio, Jour. Sci. XXII (3) 69 (1922).

This genus appears to be of polyphyletic origin, as it stands at present. The American species have recently been worked by Dozier but we cannot agree with

some of his conclusions. Both *palactus* and *longicornis* appear to belong to *Megamelus*, and *hinci* (*aurantii* Crawf.) we place in *Sogata*; *breviceps* also may find a better resting place in *Sogata*. The genus wants revising from a world-wide standpoint.

*Delphax luteivitta* Walker is a *Stenocranus*. The pygofer is about as long as broad, round with a shallow emargination on ventral margin. The genital styles are flat, subparallel-sided, straight, the apices rounded and slightly enlarged. The anal segment has two long, slender spines, their bases near the middle of the ventral edge and close together, spines slightly curved divergingly towards their apices. The type material, consisting of a single male, in the British Museum has been examined by one of the writers.

### Sogata Distant.

*Sogata* Distant Faun. Brit. Ind. Rhyn. III, p. 471 (1906); type *S. dohertyi* Distant l. c. fig. 258. (?) *Liburnia* Stal Hem. Afr. IV pp. 176, 179 (1866); type *Delphax vittacollis* Stal; type locality Cape Colony, South Africa; type in Nat. Mus. Stockholm.

One of the authors has examined Stal's material of *Liburnia* in the Stockholm Museum. *L. vittacollis* (Stal) consists of one male specimen which is congeneric with *Sogata dohertyi* Dist. The type material of *L. lautipes* (Stal) consists of one female which appears to be the female of *L. vittacollis*. *L. maculigera* (Stal) can also be placed in *Sogata* although it is not quite typical. If we do not consider *Liburnia* to be a synonym of *Embolophora* Stal, and if we consider the fixation of *vittacollis* as its type to be valid, then it is the same as *Sogata* and must take precedence.

This genus is a convenient home for a certain number of species with weak and uncertain generic character, which, if placed in other genera, break down their characters. This has led Fowler, Crawford and others to sink certain genera into one, thereby bringing together some totally different groups of insects and making their generic characterization very difficult. With a large group of species like we have in *Delphacodes*, it is much the best plan to eliminate all such as do not conform to the genotype as far as possible, even if we have to recognize one or more small, weak genera. It approaches *Prokelisia* Osborn very closely.

1. *Sogata cubanus* (Crawford), Figure 119. *Dicranotropis cubanus* Crawford, Pro. U. S. Nat. Mus. 46 (1914), p. 595; type locality Habana, Cuba; type in Pomona collection. *Megamelus flavolineatus* Muir. Bul. Ent. Research X, 2 (1920), p. 143, figs. Sa, b, c; type locality Nigeria, West Africa; type in H. S. P. Experiment Station, Honolulu.

Although the frontal carina is forked towards the middle of frons yet its slender build, narrow and long vertex and the pronotal carinae places it in this genus.

One male from Patillas, one female and one without abdomen from Quayanilla, Porto Rico (*G. N. Wolcott*, March, 1920), on sugar cane.

The West Indian specimen differs slightly from the African by having the spines on the aedeagus slightly stouter and the inner apical corner of the genital styles slightly more produced. But we do not consider this as justifying a specific or varietal name.

2. *Sogata paludum* Kirkaldy, Figures 133, 134, 135. *Kelisia paludum* Kirkaldy. Faun. Hawaiiensis II (7), p. 579 (1910); type in British Museum; type locality Waikiki, Oahu, T. II.

A brachypterous male from Kingston, Jamaica (*Van Duzee*, 1906), marked as paratype of *L. culta* V. D. This is a little darker than the ordinary Hawaiian specimens but not darker than specimens from other parts of the Pacific. It is to be expected that it will be taken on the mainland.

The opening of the pygofer wider than long, round, anal emargination large, anal angles angular and produced; diaphragm short, dorsal margin U shape with a conical projection in middle which has a curved line of small teeth running from apex to each basal corner and a few scattered around the base. Anal segment large, with two large, laterally flattened spines which in lateral view have their bases projecting considerably beyond anal segment. Genital styles flat, fairly broad, apex truncate with the outer corner round and the inner corner produced, basal angle rounded, curved round and with a few minute teeth on the margin, apical of basal angle the inner margin concave, outer margin nearly straight or slightly sinuate. Aedeagus small, straight, tubular, orifice at apex, at the base on dorsal half produced and striated as if composed of laminae.

This species has a wide distribution in the Pacific, being known from Hawaii, Laysan, Fiji, Australia, Philippines, Java, Ceylon. This is the first record from the Atlantic and it is probably cosmopolitan.

3. *Sogata wallacei* sp. n. Figures 17, 117.

Male. Macropterous; length 1.7 mm.; tegmen 2.5 mm. Length of vertex slightly longer than the width at base, which is wider than the apex. Length of face twice the width, sides very slightly arcuate, narrowest between the eyes, median carina simple, very slightly thickened at base. Antennae reaching slightly beyond base of clypeus, second segment twice the length of first, first much longer than wide. Lateral pronotal carinae diverging posteriorly, nearly straight, reaching hind margin. Hind basitarsus as long as the other two together, spur as long as basitarsus, wide, thin, about twenty small teeth on hind margin.

Stramineous; face and clypeus between carinae black; apex of first and base of second segment of abdomen brown; a lighter white mark down the middle of base of vertex, pronotum and mesonotum; carinae of thorax lighter. Abdomen brown, base, pleura and hind margins yellow, legs yellow. Tegmina hyaline, slightly stramineous, veins basal of cross-veins same color as membrane, distal of cross-veins brown, a small dark mark at apex of claval vein, fuscous over cross-veins and more lightly over cubital apical cells.

Opening of pygofer a little wider than long, lateral margins entire, rounded, ventral margin slightly emarginate with a very minute spine in the middle; anal emargination large, wide, shallow; anal angles not produced. Diaphragm fairly long, the dorsal margin widely W-shape, the armature in the middle projecting well forward, subovate, the sides shagreen. Anal segment small with two fairly large, acute spines with their bases fairly near together. Aedeagus short, subtubular, in lateral view widest on basal half, orifice at apex, three comparatively large spines on right side and three on left and one or two smaller ones at apex on dorsal aspect. Genital styles flat, the outer margin slightly sinuous, the inner margin with a rounded projection near middle, the apex narrowed and rounded.

Described from one male, the type, from Belize, British Honduras, one male from Cayamas, Cuba, and one from Havana, Cuba, in the Crawford collection, and one from Cayamas, Cuba, in the Pomona collection (*C. F. Baker*), all standing under *albolinosa* Fowler.

This species is named after Wallace, the Scotch buccaneer. The name Belize is supposed to be a Spanish interpretation of his name.

4. *Sogata furcifer* (Horvath), Figures 9, 114, 115, 116. *Delphax furcifer* Horvath, Termes Fuzotek, p. 372 (1899); type in Hungarian National Museum; type locality Japan. *Liburata albolinosa* Fowler, Bio. Cent. Amer., Homop. I, p. 135, Pl. 13, Fig. 14 (1905); type in British Museum; type locality Teapa, Mexico. "*Delphax*" *kolophon* Kirkaldy, Haw. Sug. Pers. Exp. Sta. Ent. Bul. III, p. 157, Pl. XV, Figs. 9-11 (1907); type in U. S. P. Exp. Sta. coll.; type locality Fiji. *Sogata distincta* Distant, Ann. Mag. Nat. Hist. 81, IX, p. 191 (1912); type in Brit. Mus.; type locality British India. *Sogata pallescens* Distant t.c., p. 192 (1912); type in

British Museum; type locality British India. *Megamictus (?) furcifer* (Muir) Ann. Pro. Haw. Ent. Soc. III, p. 328 (1917). *Opiconsira insularis* Distant, Trans. Linn. Soc. Lond., XVIII (2) Zool., p. 361 (1917); Muir, Can. Entom. Li. p. 7 (1919). *Opiconsira derelicta* Distant (1917) l. c.; Muir (1919) l. c. *Opiconsira bellifera* Distant (1917) l. c.; Muir (1919) l. c. *Opiconsira colorata* Distant (1917) l. c.; Muir (1919) l. c. *Opiconsira gloriosus* Distant (1917) l. c.; Muir (1919) l. c. The types of the above five species of *Opiconsira* are in the British Museum and the type locality is Seychelles Islands. *Delphac nigripennis* Jacobi, Voelt. Reise in Ostafri. III, p. 530, foot note; type locality Pemba, East Africa; type in Dresden Zool. Mus. 12. *Megamictus furcifer* var. *nigeriensis* Muir Bull. Ent. Research X, p. 142, Figs. 5, 6, 7 (1920).

We have to thank Dr. G. Horvath of the National Museum, Budapest, for his kindness in sending the type of this insect for our examination, and so disposing of certain doubts which one of the writers had regarding it.

It is nearly a cosmopolitan species and is likely to be found eventually in eastern or southern Europe. We have seen specimens from Japan, the type locality, Formosa, Philippines, South China, India, Amboina, Ceram, Fiji, Mexico, Florida, Cuba, Bermuda, Brazil, Central America, Nigeria, Egypt and Seychelles. It is therefore not surprising to find more variation in both structure and color than in any other species that we have examined. The proportional length of the vertex and the condition of the lateral pronotal carinae are both variable. But this does not justify us in sinking a lot of quite different groups of delphacids into one genus. There is also variation in the pygofer and genital styles. Specimens from the west and northwest Pacific have the apex of the genital style fairly narrow and the two prongs near together, whereas those from the southwest Pacific, the American continent and adjoining Atlantic Islands and Africa, have the apex much wider and the prongs wider apart. There is also a slight difference in the armature of the diaphragm and in a small projection on the ventral edge of the foramen of the diaphragm. It may be possible to recognize three subspecies, *furcifer*, *kolophon* and *nigeriensis*.

One of the authors has examined the type of *albolincosa* Fowl. It is a male specimen gummed to a card, and the genitalia cannot be very critically examined, but there is no doubt that it is *furcifer* Horv. Specimens in the Van Duzee collection standing under *albolincosa* Fowl. from Kingston, Jamaica, are *Chloriona fuscipennis* Muir, and others from Florida and Bermuda are *furcifer* Horv. Crawford's specimens under *albolincosa* Fowl. are *furcifer* Horv. *wallacei* M. G. and *havanae* M. G.

The authors cannot protest too strongly against erecting species in this group on color, or even slight structural characters. Such species not only lead to confusion, but lead to totally wrong conceptions as to relationship and geographical distribution.

Pygofer round, slightly wider than long, margins entire; anal emargination large, anal angles not prominent; diaphragm short, middle of dorsal margin roundly emarginate, the edge thickened and suberose shape with the horns rounded and projecting above the margin; there is a small projection on the basal margin of the foramen of the diaphragm. The armature is liable to slight variation, so is the projection on the foramen. Anal segment medium size, two large, strong spines on the ventral margin with their bases fairly wide apart. The genital styles are flat, short, broad, the apex bilobed. The lobes vary in the manner stated above and in the development of the basal angle. Aedeagus slightly flattened laterally, slightly curved, in lateral view base broadest, apex pointed, orifice on side at apex, a row of fourteen to seventeen small teeth running from the dorsal aspect near apex across the left side to ventral aspect near base; a few small teeth along the middle of ventral aspect.

5. *Sogata mexicana* (Crawford), Figures 127, 128, 129. *Megamelus puellis mexicanus* Crawford, Pro. U. S. Nat. Mus. 46, p. 626 (1914); type stated to be in U. S. Nat. Mus. No. 15995; type locality Jalapa, Mexico.

This was described from a male from Jalapa, Mexico, and the type stated to be in the U. S. Nat. Mus. No. 15995, but Dr. Howard was unable to find it. In the Pomona collection there is a male specimen from Jalapa, marked type, bearing this name which is probably the type. It has been dissected and the drawings made from it. It is specifically quite distinct from *L. puella* Van Duzee and must be considered as a good species.

Opening of pygofer wider than long, round, margins entire, anal emargination large, anal angles not produced, rounded. Diaphragm short, the dorsal margin U shape with the bottom squarely emarginate with the margins in the middle portion thickened. Anal segment with a pair of large, slightly curved spines, their bases wide apart. Genital styles with the outer margin shallowly concave, inner margin above basal angle more deeply concave, apex truncate, the inner angle considerably produced, outer angle rounded, basal angle fairly large, quadrate; this looks somewhat like the head of a bird. Aedeagus flattened laterally, in lateral view widest at base where it is strongly curved, with a sub-conical dorso-basal process, apex rounded, orifice on ventral aspect of apex, a row of teeth runs down the dorsal aspect of apex, then curves to left side and ends about one-third from base on ventral aspect, a somewhat similar row transversally across the right side.

6. *Sogata approximata* (Crawford), Figures 61, 130. *Megamelus approximatus* Crawford, Pro. U. S. Nat. Mus. 46, p. 622, Pl. 49, Fig. F; type in coll. Pomona College; type locality Managua, Nicaragua.

The figures have been made from the type specimen which has been dissected, the second specimen in the Pomona collection has no abdomen. We also have specimens from Porto Rico (*G. N. Wolcott*, February, 1920, November, 1921).

Opening of pygofer about as broad as long, margin entire, rounded; anal emargination large, wide, shallow, anal angles not produced or only slightly. Dorsal margin of diaphragm W shape, the armature forming the middle portion; on each side of the armature the diaphragm very short. Anal segment with two long, laterally flattened, acutely pointed spines with their bases fairly near together. Genital styles flat, nearly reaching to anal segment, curved toward apex, outer margin convex, inner margin concave, apex pointed. Aedeagus tubular, straight, of equal size throughout, orifice at apex, six or seven small spines at apex on right side and a similar set on left side.

We have not seen *Liburnia venosa* (Germ.), but judging from figures it appears to be somewhat like *approximata*.

7. ~~*Sogata*~~ <sup>*Liburnia*</sup> *pseudoseminigra* sp. n., Figures 121, 122, 123. *Liburnia seminigra* Van Duzee not Stal, Bull. Buf. Soc. Nat. Sci. IX, p. 203.

Described from two males and two females from Crescent City, Fla. (*Van Duzee*, April, 1908), standing under the name of *Liburnia seminigra* Stal.

Male. Brachypterous; length 1.4 mm.; tegmen .7 mm. Tegmina reaching to posterior margin of fifth abdominal tergite. Head nearly as wide as thorax, width of base of vertex greater than length. Length of face twice the width, lateral margins slightly arcuate, median carina simple. Antennae scarcely reaching to base of clypeus, second segment double the length of the first, first about as long as broad. Hind basitarsus as long as the other two together, spur shorter than basitarsus, not very broad, slightly thickened, concave on inner surface, hind margin with about a dozen distinct teeth.

Opening of pygofer wider than long, margins entire, round; anal emargination large, wide; anal angles moderately rounded. Anal segment moderately large; anal spines long, thin, curved, their bases some little distance apart. Diaphragm short, dorsal margin V shape with a large armature arising from the bottom in the shape of a quadrate pro-

duction, a little longer than wide, with the lateral margins curved dorsad. Genital styles flat, broad, inner margin slightly concave in middle, outer slightly sinuate, apex truncate, basal angle rounded and slightly roughened. Aedeagus small, tubular, cribrate at apex; in lateral view slightly sinuous dorsally and ventrally.

Yellow; abdomen slightly fuscous, pygofer and genitalia dark brown or black. Tegmina shiny black.

Female. Brachypterous; length 1.9 mm., tegmen 1 mm. Body and tegmina yellow, ovipositor light brown, tubercles on veins very minute, bearing black macrochaetae.

8. *Sogata aurantii* (Crawford), Figure 59. *Megamelus aurantii* Crawford Pro. U. S. Nat. Mus. 46, p. 628, Plate 48, Figs. C, G (1914); type in Pomona collection; type locality Para, Brazil. *Stenocranus hincii* Dozier, Ohio Jour. Sci. XXII (3), p. 78, Pl. 1, Figs. 6a, b, c (1922); type in Prof. Osborn's collection; type locality Los Amates, Guatemala.

This species approaches the genus *Prokelisia* Osborn, but we consider it best placed in *Sogata*. We cannot consider it as a *Stenocranus*.

The male genitalia are very distinctive; the pygofer has a strong spine on its medio-ventral margin and one on each lateral margin, all three curving inward; the anal segment has a single strong spine at its apex arising from the middle of the apical ventral margin and nearly at right angles to the anal segment. The genital styles are long, slender, nearly straight, with the apex rounded and slightly enlarged; the aedeagus is laterally flattened, thin, in lateral view slightly curved ventrally, apex pointed.

*Liburnia paludata* Fowler appears to be best placed in this genus.

#### Nilaparvata Distant.

*Nilaparvata* Distant Faun. Brit. Ind. Rhyn. III, p. 473 (1906); type *greeni* Dist. *Kalpa* Distant (1906), t. c., p. 474; type *aculeata* Dist.

This genus was erected by Distant for a Ceylon species, but with the exception of one or more spines on the hind basitarsus it does not differ from *Delphacodes* Fieb. As this character is constant in a long series that I have examined, I think it best to retain the genus, as any good character separating one or more species from the bulk of the species of *Delphacodes* is of value.

The specific name of the type species of this genus is uncertain. The type material of *Delphax lugens* Stal is a female belonging to this genus and agrees with the female of *Dicranotropis anderida* Kirk. The latter is the same as the Ceylon species identified by Melichar as *Delphax sordescens* Motschoulsky and is the same as Distant's *N. greeni*. The following are the synonyms as known to us at present.

*Delphax lugens* Stal Ofv. Kongl. Vet. (1854).

*Delphax sordescens* Motsch. Bull. Soc. Nat. Mosc. XXXVI (3), p. 109, (1863).

*Nilaparvata greeni* Distant Faun. Brit. Ind. Rhyn. III, p. 473 (1906).

*Kalpa aculeata* Distant (1906) t. c., p. 474.

*Dicranotropis anderida* Kirkaldy H. S. P. Exp. Stn. Ent. Bul. III, p. 133 (1907).

"*Delphax*" *orderix* Kirkaldy t. c., p. 152.

"*Delphax*" *parysatis* Kirkaldy t. c., p. 153.



The four species at present included in this genus are *greeni* (or one of its synonyms) *Delphacodes bakeri* Muir, *myersi* Muir and *wolcottii* Muir. Judging by the male genitalia the genus is polyphyletic.

1. *Nilaparvata wolcottii* sp. n., Figures 124, 125.

Male, Macropterous: length 2.4 mm.; tegmen 3.3 mm. Length of vertex about equal to width at base, apex narrower than base, projecting beyond eyes, base well in front of middle of eyes; length of face 2.5 times the width, narrowed between eyes, median carina simple. Antennae reaching beyond base of clypeus, first segment much longer than wide, second segment 1.6 times the length of first. Lateral pronotal carinae divergently curved, not reaching hind margin. Hind basitarsus equal to the two others together, with two small spines, one near base and the other slightly beyond middle. Spur large, thin, with many small teeth on hind margin.

Opening of pygofer wider than long, lateral and ventral margins rounded, a slight angle between lateral and ventral margins; anal emargination large; anal angles slightly produced and curved over, angular. Diaphragm fairly long, dorsal margin shallowly concave, no distinct armature. Anal segment small, no distinct armature, but the ventral corners angular and slightly produced. Genital styles large, flat, reaching beyond dorsal margin of diaphragm, basal angle large, acute, inner margin beyond basal angle concave, outer margin slightly sinuate, apex broad, truncate, from the inner surface of inner apical angle arises a curved process, longer than wide and rounded at apex. Aedeagus small, tubular; about one-third from apex on dorsal aspect there is a ridge on right side curving round to near apex, the ridge bears three teeth and on its inner margin several small teeth, the dorsal surface of aedeagus apical of ridge excavate, bearing orifice, apex acute.

Head dark brown, carinae and antennae lighter brown; pronotum dark brown on sides, lighter in middle and along basal margin; mesonotum brown, lighter over carinae and basal angle; abdomen dark brown, yellow along pleura and margins of pygofer; legs light brown, front and middle coxae dark brown. Tegmina hyaline, veins brown, tubercles small, sparse, a small dark mark at apex of clavus. Wings hyaline, veins brown.

Female. Length 2.5 mm.; tegmen 3.6 mm. Much lighter in color than the male, nearly all yellow or light brown. This female has only one spine on hind basitarsus near the base.

Described from one male and one female (types) from Pt. Congrejos, Porto Rico (*G. N. Wolcott*, February, 1920), and one male from Barceloneta, Porto Rico (*G. N. Wolcott*, April, 1920), on sugar cane.

This species comes very close to *Nilaparvata myersi* Muir from New Zealand.

### Dicranotropis Fieber.

1. *Dicranotropis incerta* (Van Duzee). *Liburnia* (?) *incerta* Van Duzee, Bul. Buf. Soc. Nat. Sci. V (1897), p. 258; type in Iowa Agric. College, Ames; type locality, Buffalo, New York.

The type of this species was not among the material received from the Iowa Agriculture College. The description is taken from specimens in the collection of O. H. Swezey taken at Newark and Peebles, Ohio. They agree with the original description. The frontal carina forks towards the middle of frons.

Pygofer on the same plan as *Delphacodes pellucida*. Opening much wider than long, the margins nearly flush with diaphragm making the outer chamber shallow; anal emargination small; anal angle rounded and obscure leaving the anal segment well exposed; ventral emargination small. Diaphragm long, dorsal emargination U shape, the armature slightly produced in the middle and forming an obscure keel down the middle to near orifice. Anal segment large, anal spines strong, curved, diverging, wide at base, apex acute. Genital styles in situ strongly diverging, thin, acuminate, the apical half slightly twisted. Aedeagus large, straight, subcylindrical, slightly flattened laterally, apex pointed, one-fourth from apex the dorsal surface is produced into a flat, angular spine curved to the left; between this spine and the apex there are two irregular circles of small spines; orifice on ventral aspect of apex. When at rest the apex of the aedeagus projects above the armature of diaphragm between the bases of the anal spines.

We consider this species best placed in *Dicranotropis*, but by its genitalia it is associated with *Delphacodes kilmani*. The genus *Dicranotropis* is polyphyletic.

*Liburnia basifusca* Fowler is a *Dicranotropis*.

#### Delphacodes Fieber.

*Delphacodes* Fieber subgenus of *Delphax*. Lectotype *mulsanti* Fieb., Verb. Z. b. Ges. Wien XVI (1866), p. 524, Pl. VIII, Fig. 32. *Liburnia* Stal, 1866 Hem. Afr. IV, pp. 179, in part. *Delphax* Fab. Ent. Syst. Suppl. (1798), p. 511, in part. *Toya* Distant Faun. Brit. Ind. Rhyn. III, p. 472; type *T. attenuata* Dist.

Elsewhere<sup>1</sup> one of the writers has stated his reasons for not using the generic name *Liburnia* Stal for this group of species. He regrets that he cannot agree with such competent authorities as Bergroth and Van Duzee, but after having reconsidered the question he still finds that he is unable to do so. He therefore restates his views upon the subject.

1796. Latreille (Precis, p. 91) describes *Cercopis* which he changes to *Asiraca* both in the Preface XII and in the Additions et Corrections. This work mentions no species and so the generic name is invalid.

1798. Fabricius (Ent. Syst. Suppl., p. 511) describes the genus *Delphax* with two species, *crassicornis* and *clavicornis* (p. 522).

1801. Latreille (Hist. Nat. Crust. Ins. III, p. 259) again describes *Asiraca* with three species, *clavicornis*, *crassicornis* and *longicornis*.

1803. Fabricius (Syst. Rhyn. pp. 83-84) again describes it as *Delphax* and adds eight other species: *cylindricornis*, *opposita*, *limbata*, *pellucida*, *flavescens*, *striata*, *marginata* and *minuta*.

1804. Latreille (Hist. Nat. Crust. Ins. XII, p. 316-318) calls the genus *Asiraca*, and mentions nine species: *clavicornis*, *crassicornis*, *grisea*, *limbata*, *pellucida*, *flavescens*, *striata*, *marginata* and *minuta*.

Up to this point the two authors conceived all these species as belonging to one genus so the names are synonymous and *Delphax* takes precedence. No type had been fixed either directly or indirectly. Strictly judged *Asiraca* should be considered as a synonym of *Delphax*.

1807. Latreille (Gen. Crust. Ins. III, 167-168) places *clavicornis* and *angulicornis* under *Asiraca* and remarks that *dubia*, *crassicornis* and *cylindricornis* are congeneric. Under *Delphax* he places *pellucida flavescens*, *striata*, *marginata* and *minuta*.

This is the first recognition that this collection of species forms two genera.

1810. Latreille (Consid. Genl., p. 434) chooses *clavicornis* as the type of *Asiraca* and *striata* as the type of *Delphax*.

This is the first definite fixation of types. By the selection of *clavicornis* as the type of *Asiraca* Latreille it automatically leaves *crassicornis* as the type of *Delphax* Fab. If we consider that there be a genus *Delphax* Latreille not Fabricius, then *striata* must be its type.

1853. Stal describes *Embolophora* with a haplotype *monoceros*.

For some years Stal and others described species allied to *pellucida* under *Delphax* Fab. In 1866 Stal recognized that these species were not congeneric

<sup>1</sup> Muir. Pro. Haw. Ent. Soc. III (4), p. 332 (1917).

with *crassicornis*, the type species of this genus, and erected *Liburnia* to receive them (1866 Hem. Afr. IV, p. 679); as synonymy he quoted *Delphax* auctor and *Embolophora* Stal, thereby making *Liburnia* a synonym of the older genus.

Two contentions have been put forward: First, that Stal was not erecting a new genus but only giving a new name to *Delphax* Latreille not Fabricius, and second that his genus was divided into two subgenera, *Embolophora* and *Liburnia*.

In regard to the first contention it must be recognized that Stal made no such statement and as we can only act upon what was actually printed, and not what his intentions may have been, this view cannot be accepted.

In reply to the second contention it must be recognized that he used *a*, *aa*, *b*, *bb*, etc., to divide his species and not to indicate subgenera. In the same work we find *Tibicen* divided into subgenera and named and the species of the subgenera arranged under *a*, *aa*, etc. He used this method to separate his species elsewhere in the same work and in other works.

The type of *Liburnia* must be one of the species mentioned at the time the genus was erected and this was fixed by Muir in 1917 as *vitticollis*. This species was compared with *smaragdula* Stal and is placed by the present writers in *Sogata* Dist.<sup>1</sup>

From whatever angle the matter be viewed it does not appear possible to retain the name *Liburnia* for the *pellucida* group.

Not being able to recognize two subgenera among the Fieber's species of *Delphax* the name *Delphacodes* is available for them all, otherwise *Delphacissa* Kirk. (Can. Ent. 1906, p. 155) must be used.

No one regrets alterations of names more than the writers, but unless we have nomina conservanda there appears to be no way of retaining the name *Liburnia* for the genus under discussion.

This genus as conceived by the writers has the head fairly broad, the vertex not longer than broad but often broader than long; the antennae are not very long and the first segment longer than broad, although we have also placed it in our table as being as long as broad to take in any uncertain species. The lateral pronotal carinae are not straight but divergently curved and do not reach the hind margin; the median frontal carina is simple or only forked at the extreme base. So far as the American species herein dealt with there is little uncertainty as to their generic position.

As we have previously remarked, the difficulty is not to separate the species but to recognize the relationship between them. The forty-four species of which we have examined the males we arrange in the following order:

The first eleven species appear to form a group which we call the *pellucida* group. Of this group *pellucida* and *kilmani* are somewhat isolated, *consimilis*, *lineatipes*, *occlusa*, *neoocclusa* and *forcata* are closely allied and *gillettei* comes near to them; *koebelsi*, *lutulenta* and *lutulentella* are allied but somewhat isolated from the others. The two species, *analis* and *nigrigaster*, are both isolated. The following seven species are called the *campestris* group; *lateralis* being somewhat isolated, *campestris*, *mcateei*, *detecta*, *indistincta*, *montezumae* and *basivitta* being more closely allied. The species *nitens* stands somewhat alone and so does

<sup>1</sup> See remark under that genus, page 12.

*uhleri*; *havanensis* and *albidens* are closely related. Both *cayamensis* and *magna* are isolated. The following thirteen species appear to belong to one group which we call the *propinqua* group; *testimorci* and *propinqua* appear to be allied; *nigripennis* and *humilis* come near together; *puella*, *nigra* and *balli* are allied; *crayfordi* and *nigrifacies* are isolated; *pacificca* and *bellicosa* are allied and *teapa* comes near to them; the remainder stand somewhat alone.

In the descriptions we have remarked upon the relationship of some of the species to European species. We regret that we did not have more European species at our disposal, but we hope that European workers will take up the work and give us fuller knowledge of the male genitalia of their species.

1. *Delphacodes pellucida* (Fabr.), Figures 1, 66. *Fulgora pellucida* Fabr., Ent. Syst., IV, p. 7 (1794); type locality Europe. *Liburnia semicineta* Van Duzee, Pro. Cal. Acad. Sci. No. 381; type locality Portland, Ore. *Liburnia yezoana* Matsumura Entom. Nachrichten XXVI (17), p. 265; type in coll. Matsumura; type locality Sapporo, Japan. *Delphax bicolor* Fitch ms.; type in U. S. Nat. Mus. No. 594.

Specimens from various parts of America agree with European specimens from England. We have not seen the type of *L. yezoana* Mats, but we have specimens from Hokkaido determined by Dr. Matsumura, which we must take as typical. We have examined the type and paratypes of *L. semicineta* Van D. and consider it only a color variation which, for reasons already stated, we do not consider should bear a name.

In a species which extends over the whole of the Palaearctic and Nearctic Regions there is bound to be some variation both in structure and color. We find this in the number of spines on the aedeagus, but in no case have we found it sufficient to justify us in erecting even a subspecies.

Opening of pygofer wider than long, shallow; lateral margins rounded, ventral margin roundly emarginate; anal emargination large, wide; anal angles rounded, very slightly produced. Diaphragm fairly long, dorsal margin narrowly U shape or V shape with rounded apex. Anal segment medium size with two well developed laterally flattened curved spines with their bases near together. Genital styles slightly flattened, widest at base and very gradually narrowed for two-thirds then more rapidly narrowed to apex, which is slightly expanded and twisted, slightly curved and recurved. Aedeagus flattened laterally, in lateral view curved into nearly a semicircle on apical two-thirds, functional orifice large, forming a long, narrow cleft on apical third; a few minute spines near dorsal end of functional orifice stretching across the left side, and a few near the other end of the functional orifice continuing along the dorsal surface and on the right side. These small spines are irregular and variable.

The drawing supplied by Dr. Howard of *Delphax bicolor* Fitch is evidently this species.

2. *Delphacodes kilmani* (Van Duzee), Figures 19, 67. *Liburnia Kilmani* Van Duzee, Bull. Buff. Soc. Nat. Sci., V, p. 253 (1897); type in Iowa Agr. Col., Ames; type locality Buffalo, N. Y.

The type of this species is a macropterous female. Our description and figures are taken from brachypterous males in the Van Duzee and Swezey collections.

Opening of pygofer subtriangular, broadest across base, about as long as broad, ventral margin emarginate in middle; anal emargination deeper than wide; anal angles angular, not produced. Diaphragm short, dorsal margin V shape, middle slightly elevated but without distinct armature. Anal segment compressed laterally, anal spine strong, clawlike, flattened laterally, with their bases near together. Genital styles in situ acuminate, slightly curved at apex, strongly diverging and laying along the ventral edge of pygofer,

in flat view side at base tapering to a curved, pointed apex, straight on outer margin, slightly sinuate on inner. Aedeagus flattened laterally, in lateral view slightly curved, apex rounded, orifice forming a cleft at apex; on each side at apex there are two small rows of teeth; starting from each end of orifice they converge towards the middle but do not meet.

3. *Delphacodes consimilis* (Van Duzee). Figures 15, 72, 73. *Liburnia consimilis* Van Duzee, Bull. Buff. Soc. Nat. Sci. V, p. 249 (1897); type in Iowa Agric. Coll., Ames; type locality Los Angeles, Cal., or Northwest Colorado.

The type specimen is a macropterous male marked 344. Whether this be one of the specimens from Los Angeles, Cal., or one of the pair taken in north-west Colorado mentioned in the original description, we are unable to say. This specimen has been compared very carefully with the specimens dissected and appears to be the same.

Opening of pygofer a little longer than wide, lateral margins rounded, not produced, medio-ventral margin slightly emarginate, anal emargination large, anal angle small, very slightly produced. Diaphragm fairly long, dorsal margin shallowly concave the middle produced into a small lip. Anal segment short, sunk well into anal emargination, anal spines very small, curved, fairly far apart, in some specimens they are blunt in others acute at apex. Genital styles in situ narrowly lanceolate, in flat view nearly straight on outer margin and strongly convex on inner, broad at base and tapering to acute apex. Aedeagus in lateral view subtubular with a large baso-dorsal, rounded process projecting beyond the middle, slightly curved, on the left side there is a large, dorsally curved, flange from the apex to middle bearing small teeth along its edge, on the right side there is a small ridge with a few irregular teeth at its basal extremity.

4. *Delphacodes lineatipes* (Van Duzee). Figures 2, 79, 80. *Liburnia lineatipes* Van Duzee, Bull. Buff. Soc. Nat. Sci. V, p. 255 (1897); type in Iowa Agric. Col., Ames; type locality Muskoka, Ont.

The type of this species is one of three brachypterous females mounted on one pin. One male from Hamburg, N. Y., in the Van Duzee collection agrees with the original description. One specimen from Buffalo, N. Y., and another from Columbus, Ohio, have been dissected and the description and drawings made from them.

Opening of pygofer wider than long, ventral edge deeply emarginate; anal emargination large, anal angles rounded, not produced. Diaphragm fairly long, dorsal margin shallowly rounded, middle produced into a small lip which continues as a ridge to near orifice. Anal segment large, sunk into the emargination, spines small, more like small knobs, far apart. Genital styles nearly reaching anal segment, sublanceolate, apex acute; in flat view wide, short, basal angle slightly produced, outer margin straight, sides subparallel to near apex when it narrows off steeply to acute apex. Aedeagus similar to *occlusa* but more curved in lateral view, the flange on left side much larger and the teeth on right side smaller and not extending as far basad.

5. *Delphacodes oclusa* (Van Duzee). Figures 10, 74, 75. *Liburnia oclusa* Van Duzee, Bull. Buff. Soc. Nat. Sci. V, p. 256 (1897); type in Iowa Agric. Col., Ames; type locality Los Angeles, Cal.

Besides the type we have seen long series from California.

Opening of pygofer wider than long, ventral margin deeply emarginate, lateral margins rounded, anal emargination large, broad, the anal segment sunk within emargination; anal angles hardly recognizable. Diaphragm fairly long, dorsal margin shallowly concave with the armature forming a small lip or spout in the middle. Anal segment short, spines wide apart, small, curved. In full view the genital styles are sublanceolate, the inner edge being slightly more rounded than the outer, the base shows the projecting angle. In flat view the styles are concave on the inner and convex on the outer edge, more strongly so at the base, slightly narrowed to near apex and then suddenly narrowed into an acute apex. Both lateral margins of pygofer and styles bear fine hairs. Aedeagus slightly flattened laterally, the orifice large, long, on ventral aspect of apex; in lateral view

curved at base, nearly straight beyond to orifice then narrowing to apex, a row of teeth on each side reaching to about middle, the one on the left forming a flange.

In the type specimen the pygofer has apparently shrunk in drying and is more angular than in fresher material.

6. *Delphacodes necoclusa* sp. n., Figures 81, 82.

Described from one brachypterous male from Fort Collins, Col. (Van Duzee, July 13, 1900), standing under the name *Liburnia seminigra* Stal in the Van Duzee collection.

Length 2 mm.; tegmen 1.1 mm.

Vertex as broad as long, base about middle of eye, apex slightly rounded with median carina standing out slightly above surface; length of face twice the width, sides slightly arcuate, median carina simple or but slightly thickened at base. Antennae reaching to base of elypeus, second segment twice the length of first. Lateral pronotal carinae diverging posteriorly, slightly curved, not reaching hind margin. Hind basitarsus as long as the other two together; spur not quite so long as basitarsus, thin, with a minute tooth at apex but none on hind margin. Tegmina reaching to apex of fourth abdominal tergite.

Genitalia externally similar to *occlusa* Van Duzee; the anal spines are larger, the genital styles narrower and more evenly narrowed to apex, the aedeagus is thinner and more evenly curved in lateral view, there are three similar rows of teeth on the apical half, one on right side, one on left and one dorsal.

Head, thorax and legs light yellow, fuscous between carinae of face and elypeus. Tegmina and abdomen shiny black.

7. *Delphacodes foveata* (Van Duzee), Figures 83, 84, 88, 89, 91, 92. *Liburnia foveata* Van Duzee, Bull. Buff. Soc. Nat. Sci. V. p. 257 (1897); type in Iowa Agri. Col., Ames; type locality Muskoka, Ont.

The type is one of two brachypterous females mounted on the same pin. There is one brachypterous male from Johnstown, N. Y., in the Van Duzee collection, which agrees with the type in structure, which we have used for our description and figures.

Opening of pygofer wider than long, lateral margins rounded, ventral margin slightly emarginate, anal emargination large, wide, shallow; anal angles rounded, not prominent. Diaphragm long, dorsal margin produced in middle into a quadrate, lip-like projection and the middle raised down to the orifice. Anal segment with a pair of short, laterally flattened, curved, clawlike spines with their bases far apart. Genital styles in flat view straight on outer margin to near apex and then slightly curved outward, inner margin squarely produced on basal angle, straight apically for some distance then narrowing to acute apex. Aedeagus long, subtubular, slightly flattened laterally, largest at base, orifice on ventral aspect near apex, three small rows of spines at apex, one dorsal comb of four teeth, four small teeth on right side and a small flange with eight teeth on left side.

We have a series from Mexico Valley (*Kochale* 1907) which we include in this species, the armature of diaphragm is slightly larger, the four dorsal teeth at apex of aedeagus smaller, the flange on left side not so large and the style more gradually tapering to apex. This appears to be distinct enough to form a subspecies which we name *subfoveata* new. (figures 88, 89, 92).

8. *Delphacodes gillettei* (Van Duzee), Figures 4, 85. *Liburnia gillettei* Van Duzee Bull. Buff. Soc. Nat. Sci. V, p. 258 (1897); type in Iowa Agric. Col., Ames; type locality Colorado.

The type specimen is a macropterous male marked No. 633. There is a male in the Osborn collection bearing a similar number in the same handwriting and on a similar label which we consider must have belonged to the type series and which we have dissected. There is one brachypterous male from Colorado (*Baker* No. 1593) which has been dissected and from which the figure of the aedeagus has been drawn.

Opening of pygofer slightly wider than long, lateral margins rounded, slightly produced and entire; ventral margin emarginate; anal emargination large, wide; anal angles rounded, not prominent. Diaphragm long, dorsal margin broadly and roundly concave, middle of margin produced into an angular lip and runs down the middle gradually decreasing to orifice. Anal segment large, anal spines fairly large, far apart, slightly curved. Genital styles in situ reaching to the anal segment, narrow, apex pointed, acute, basal angle produced. Aedeagus slightly compressed laterally, in lateral view broadest at base, gradually narrowing to rounded apex, slightly curved and recurved, orifice on ventral aspect near apex, two small spines on right side near apex, four or five on dorsal aspect and a small row of six spines on left side.

9. *Delphacodes koebelei* sp. n., Figures 8, 87.

Male. Macropterous: length 1.9 mm.; tegmen 2.9 mm. Width of base of vertex slightly greater than length, base about middle of eyes, head nearly as broad as pronotum, carinae distinct. Frons twice as long as broad, narrowest between eyes, sides subparallel beyond eyes or very slightly curved. Antennae reaching to base of clypeus, first segment half the length of second. Length of hind basitarsus equal to the other two together, spur not so long as first tarsal joint, thin, many minute teeth on hind margin.

Opening of pygofer wider than long, sides rounded, slightly produced, anal emargination large, wide; anal angles not prominent. Diaphragm moderately long, dorsal margin reaching nearly to anal segment, in the middle there is a deep U emargination, the margin on each side sloping upwards to the edge of the emargination, the median portion of the diaphragm thickened to the orifice and along the side of the emargination forming a thick, stumpy Y. Genital styles long, narrow, subcylindrical, slightly curved, apex rounded, reaching anal segment, in situ diverging but remaining some distance from margin of pygofer. Aedeagus small, tubular, in lateral view curved, base slightly larger than apex, three or four small spines on right side and three or four on left.

Light brown or yellow; shiny black or dark brown between carinae of clypeus, face and apex of vertex, also over greater portion of mesonotum and pleura of thorax and on pronotum behind eyes. Abdomen brown, pygofer and styles dark brown, anal segment light. Tegmina hyaline, slightly fuscous over basal half, veins same color as membrane, tubercles minute, bearing fine black macrochaetae; wings hyaline, veins light brown or yellow.

Male. Brachypterous: tegmina 2 mm. long, reaching slightly beyond the apex of abdomen; slightly lighter in color.

The holotype is a male from Mexico Valley and the allotype a female from Chapultepec. Described from fifteen males and one female from Mexico Valley and Chapultepec, Mexico (*A. Koebeler*, 1907). Type in H. S. P. A. Experiment Station collection.

10. *Delphacodes lutulenta* (Van Duzee). Figures 23, 69, 71. *Liburnia lutulenta* Van Duzee, Bull. Buff. Soc. Nat. Sci. V, p. 252 (1897); type in Iowa Agric. Col., Ames; type locality Portage, N. Y.

The type is a brachypterous female from Portage, N. Y. (*Van Duzee*, May 30). The specimen dissected is a brachypterous male from Lake Placid, N. Y. (*Van Duzee*, Sept. 22, 1902).

Pygofer sunk into, and overlapped by preceding segment, width of opening slightly greater than length, lateral edges rounded, entire, a shallow emargination on ventral edge, anal emargination large, shallow, anal angles rounded, slightly incurved. Diaphragm fairly long, dorsal margin widely V shape, armature Y shape, the forks projecting slightly above dorsal margin and the stalk forming a raised keel nearly to foramen. Anal segment large, short, without spines. Genital styles in situ thin, slightly diverging, reaching nearly to anal tube, in flat view they are narrow, strongly curved or bent before middle, slightly widest at base, apex rounded. Aedeagus small, subtubular, compressed laterally, in lateral view slightly widest at base, narrowing slightly to rounded apex, strongly curved near middle, without spines.

This species and *lutulentella* have the carinae of the apex of vertex and base of frons somewhat obscure, but the face is not wide enough to cause them to go into *Euryssa*.

11. *Delphacodes lutulentella* sp. n., Figures 22, 26.

Male. Brachypterous; length 2 mm.; tegmen 1.3 mm. Vertex as long as wide, apex slightly rounded, base slightly behind the middle of eye, carinae on vertex distinct except at apex; length of face 1.7 the width, sides slightly arcuate, median carina simple, somewhat obscure at base. Antennae reaching to base of clypeus, first segment slightly longer than wide, second twice the length of first. Lateral pronotal carinae divergently curved, not reaching hind margin. Tibial spur shorter than basitarsus, thin, with minute teeth on hind margin. Tegmina reaching apex of sixth tergite.

Opening of pygofer wider than long, margins entire, round; anal emargination wide, shallow, anal angles rounded, not produced; diaphragm short, dorsal margin squarely emarginate. Anal segment medium size with two spines with their bases fairly near together. Genital styles long, narrow, slightly sinuous, apex rounded. Aedeagus small, tubular, slightly compressed laterally, in lateral view slightly widest at base, the apical half curved about 90 degrees, a few very minute spines near apex on dorsal and ventral aspect.

Light brown, slightly lighter over carinae of head and thorax; abdomen brown with three lighter longitudinal marks. Tegmina ochraceous with dark veins, costal margin lighter.

Described from one male from Alameda, Cal. (*Koebele*, February, No. 2221); type in the collection of the Academy of Sciences, San Francisco.

This species runs near to *lutulenta*. Both of these species approach the genus *Eurysa* but the carinae of face, vertex and thorax are too distinct to place them into that genus.

12. *Delphacodes analis* (Crawford), Figures 18, 68. *Megamelus analis* Crawford, Pro. U. S. Nat. Mus. 46, p. 620, Pl. 49, H. A. (1914); type in Pomona College; type locality, Polk County, Wisconsin.

The type specimen is without an abdomen. The drawings are from a specimen which is evidently a paratype.

Opening of pygofer longer than broad, anal emargination wide, but not very deep, anal angles produced and rounded, lateral margins curved, entire, ventral margin in middle produced angularly and curved dorsad. Diaphragm long, the dorsal margin V shape in middle, produced into a lip, with longitudinal ridge down middle to foramen. Anal segment large, short, median ventral margin produced into a small knob. Genital styles small, in situ not reaching half way to anal segment, narrow, in lateral or flat view broadest at basal half, the outer margin concave, inner margin nearly straight apical of basal angle, apex rounded. Aedeagus flattened laterally, in lateral view ventral margin nearly straight, the dorsal margin forming two convexes, the smaller at base, apex rounded with orifice slightly on one side, from the dorsal apical third arise two subequal, large spines reaching back to nearly the middle.

This species is near to *D. spinosa* (Fieb.) of Europe; it may be nearer to *D. denticauda* (Boh.) which we have not examined. The *D. denticauda* (Boh.) of Fieber and of Melichar are distinct species.

13. *Delphacodes nigrigaster* (Crawford), Figures 27, 90. *Megamelus nigrigaster* Crawford, Pro. U. S. Nat. Mus. 46, p. 621, Pl. 47, Fig. u. (1914); type in U. S. Nat. Mus. No. 15991; type locality Colorado, collector's No. 2158.

There is a male specimen from Colorado in the Crawford collection which bears the same collector's number and is evidently the paratype. It agrees with the drawing of the male genitalia of the type supplied by Dr. Howard. It is this specimen which we have dissected and made our drawings from.

Opening of pygofer about as long as wide; anal emargination large, shallow; anal angles rounded, not produced; lateral and ventral margins shallowly emarginate. Diaphragm without armature. Anal segment thick set with a pair of short, stout spines on ventral edge fairly far apart and turned inward. Genital styles short, diverging apically; in situ fairly slender, sinuate on outer margin, less so on inner margin; in flat view broad on basal two-thirds, apical third narrower, apex rounded and very slightly dentate, outer edge slightly concave, inner edge convex. Aedeagus in lateral view curved, subcylindrical, slightly flattened dorsally near apex, slightly widest at base, apex rounded, on each side there is a row of



small teeth reaching from near the apex to one-third from base. Our figure (90) may show the aedeagus with the apex slightly twisted to the right.

This species appears to be closely related to *D. albostriata* (Fieb.) of Europe.

14. *Delphacodes lateralis* (Van Duzee). Figures 3, 99. *Liburnia lateralis* Van Duzee, Bull. Buff. Soc. Nat. Sci. V, p. 253 (1897); type in Iowa Agri. Col., Ames; type locality Lancaster, N. Y.

The type specimen is a male on the same pin as two others, one a female and the other without an abdomen; all three are brachypterous. The specimens dissected and figured have been compared with the type.

Opening of pygofer longer than wide; lateral margins cut back to the diaphragm, ventral edge slightly emarginate in middle, anal emargination large, anal angles produced and rounded at apex and, owing to the lateral margin being cut back, are very prominent in lateral view. Diaphragm moderately long, no armature, dorsal margin wide U shape. Anal segment large, short, without armature. Genital styles large, reaching to anal segment, broad, flat, apex subtruncate or slightly rounded, margins sub-parallel, the apical half of inner margin slightly produced. Aedeagus subtubular, strongly curved ventrad, the orifice on dorsal surface before apex, the edges of which are drawn out into a short, wide, funnel which is membranous, a strong, curved spine on left side beside the funnel, another strong spine on dorsal aspect slightly before middle and curved over to right side.

The pronotal carinae of this species are not quite typical.

This species is closely related to *D. fairmairci* (Perr.) of Europe. In the European species the spine on the left near the orifice is a little more basad and the spine in the middle of the dorsum is bifurcate from the base, or two spines.

15. *Delphacodes campestris* (Van Duzee). Figures 5, 70. *Liburnia campestris* Van Duzee, Bull. Buff. Soc. Nat. Sci. V, p. 254 (1897); type in Iowa Agric. Col., Ames; type locality Lancaster, N. Y.

The holotype of this species is one of two males and the allotype one of three females from Lancaster, N. Y., all mounted on the same pin. Numerous specimens have been dissected and carefully compared with the type.

Opening of pygofer a little wider than long, lateral and ventral margins rounded, anal emargination large, anal angles rounded not produced but stand out as the lateral margins are cut back to the diaphragm. Anal segment, large, short, without armature. Dorsal margin of diaphragm shallowly concave, armature in form of two suberoseent shaped ridges running from near dorsal margin to near orifice, their convex sides inward and touching, a few minute teeth on ventral half of ridge; a slight ridge surrounds the middle area separating it from the rest of the diaphragm. Genital styles nearly reaching to anal segment, flat, broad, inner margin slightly concave on apical half and convex on basal half, basal angle roundly produced and slightly curved over, outer and inner margins subparallel, apex truncate with the inner angle slightly projecting. Aedeagus in lateral view subtubular and narrow on apical half, wide and flattened laterally on basal half, dorsal margin convex, ventral margin concave on apical half, straight on basal half, a row of five small spines along right side of apical half, and a similar row on left. In some specimens there are a few minute spines on the dorsal aspect of apex.

The vertex in this species is inclined to be slightly longer than broad, but the general appearance of the insect shows its position in this genus.

16. *Delphacodes mcateeii* sp. n., Figures 38, 94.

Male. Brachypterous; length 1.7 mm.; tegmen 1 mm. Length of vertex equal to the width at base, projecting very slightly beyond eyes, base slightly behind middle of eyes. Length of face twice the width, slightly widest in middle, median carina simple, slightly thickened at base. Spur on hind tibia thin, numerous small teeth on hind margin and one at

apex. Lateral pronotal carinae diverging posteriorly, very slightly curved and not reaching hind margin. Head nearly as broad as thorax. Antennae reaching to base of clypeus, second segment slightly longer than first.

Pygofer wider than long, and angles considerably produced, the lateral margins sloping basad, margins entire; diaphragm long in middle, the dorsal margin W shape with the median projection produced into two rounded, small projections and flattened laterally. Anal emargination wide. Anal segment sunk into emargination, spines large, nearly straight, wide apart. Genital styles not reaching to anal segment, broad at base where basal angle is well developed, apex rounded with a small, angular projection before apex on inner margin. Aedeagus flattened laterally, in lateral view deepest on basal half, curved, some irregular teeth scattered over the dorsal and lateral aspects of apical half, orifice apparently at apex.

Light brown; darker over pronotum, mesonotum, pleura, coxae and abdomen, antennae and legs lighter. Tegmina shiny black.

Described from one male from Bladensburg, Md. (*W. L. McAtee*, August 17, 1913), in a bad condition but quite complete enough to recognize, and with the genitalia intact. Type in U. S. Nat. Mus.

This species we consider comes near to *D. indistinctus* (Crawford).

17. *Delphacodes detecta* (Van Duzee), Figures 39, 102. *Liburnia detecta* Van Duzee, Bull. Buff. Soc. Nat. Sci. V, p. 248 (1897); type in Iowa Agric. Col., Ames; type locality New York City. *Liburnia circumcincta* Van Duzee, Bull. Buff. Soc. Nat. Sci. IX, p. 203 (1909); type in Van Duzee col.; type locality Crescent City, Florida. *Megamelus vanduzeei* Crawford, Pro. U. S. Nat. Mus. No. 15992; collector's No. 1603; type locality Massachusetts.

The type of *detecta* is a macropterous male and the type of *circumcincta* a brachypterous male. We have a drawing of the male genitalia of *vanduzeei* supplied by Dr. Howard, which agrees with *detecta*, we also have a specimen bearing the same locality and collector's number in the Crawford collection, which is evidently a paratype, which we have dissected.

Opening of pygofer considerably wider than long, the sides rounded, ventral margin slightly emarginate; anal emargination large, anal angles slightly produced, rounded and incurved. Diaphragm fairly long, dorsal margin subquadrate, slightly concave in middle, armature forming a slightly raised portion in the middle. Anal segment large, short, with two long, strong spines on ventral edge with curved tips. Genital styles reaching to the anal segment, flat, outer margin slightly concave on basal portion, inner margin nearly straight, apex truncate, outer corner rounded, inner corner angular. Aedeagus in lateral view tubular on apical third which is curved ventrad, flattened laterally and wide on basal two-thirds, a few irregular, small spines on apical third on right side and a more regular line on left.

18. *Delphacodes indistincta* (Crawford), Figures 12, 93. *Megamelus indistinctus* Crawford, Pro. U. S. Nat. Mus. 43, p. 619 (1914); type in U. S. Nat. Mus. No. 15989; type locality Pagosa Springs, Col.

We have not seen the type but the figure of the male genitalia drawn from the type enabled us to be sure that the macropterous male from the type locality in the collection of the Pomona College is typical, and is evidently part of the type series. This specimen has been dissected and figured.

Opening of pygofer broader than long, round; anal emargination wide, shallow; anal angles rounded, obscure. Diaphragm short, foramen large, dorsal margin broadly U shape with the middle produced into a large lip much longer than wide, curved ventrad, with the margin set with teeth. Anal segment large, set well within anal emargination, with large, curved spines far apart, the margin of the anal segment between the spines straight, the spines in situ rest over the diaphragm. Genital styles in flat view nearly straight on the outer margin, concave on the inner margin apical of the rounded basal angle, apex truncate; basal angle large, roundly produced and slightly curved. Aedeagus subcylindrical, laterally slightly flattened, curved, with a basal quadrate projection on the ventral aspect, orifice near apex on dorsal aspect, apex rounded, a row of teeth runs each side from a ventral point slightly before apex along the side and down the dorsal aspect about one-third from base, the row on the left side being slightly more dorsal than the one on the right.

19. *Delphacodes montezumae* sp. n., Figures 30, 36.

Male. Brachypterous; length 1.5 mm.; tegmen .6 mm.

Head nearly as wide as the thorax; vertex slightly wider than long, apex very slightly rounded with the median carina projecting, base slightly in front of the middle of eyes; frons narrowest between eyes, sides slightly arcuate, median carina not very distinct, length nearly twice the width; antennae reaching slightly beyond the base of clypeus, first segment half the length of second, longer than broad. Lateral pronotal carinae slightly divergently curved, not reaching the hind margin. Tegmina reaching to apex of fifth abdominal segment. Hind basitarsus equal to the other two together, spur large, as long as first tarsus, broad, thin, concave on inner surface, the hind margin with many minute teeth.

Opening of pygofer a little wider than long, margins entire, rounded; anal emargination large, not well defined as the anal angles are obscure. Diaphragm fairly short, dorsal margin roundly and shallowly emarginate in middle, the corners of the emargination forming small, widely angular projections. Anal segment fairly large, bearing two small, curved spines with their bases near together but not touching. Genital styles in situ diverging when at rest, base broad narrowing to apex which is slightly expanded and truncate; in flat view squarely produced at basal angle. Aedeagus flattened laterally, orifice at apex, in lateral view dorsal margin convex, on the ventral margin a large, acutely angular projection which nearly reaches the apex of aedeagus forming a deep sinus, three or four small teeth along the sides of apical half.

Shiny black, carinae of head, antennae and legs dark brown.

Described from one male from Mexico Valley (*Kocbele*, 1907). Type in the collection of the H. S. P. A. Experiment Station, Honolulu.

20. *Delphacodes basivitta* (Van Duzee), Figures 6, 93. *Liburnia basivitta* Van Duzee, Bull. Buff. Soc. Nat. Sci. IX, p. 202 (1909); type in Van Duzee collection; type locality Milan, O.

The holotype is a male mounted on the same pin as the allotype, both brachypterous. The material dissected was carefully compared with the type, and the drawings also compared with the holotype.

Opening of pygofer slightly broader than long, anal emargination large, anal angles rounded, not produced, lateral margins round, entire or very slightly sinuous, ventral margin emarginate in middle. Diaphragm fairly long, dorsal margin produced into a curved plate rounded at apex and projecting a little above the diaphragm. Anal segment slightly compressed laterally, spines large, strong, curved, bases near together but not touching. Genital styles in situ broad at base, decreasing to apex which is rounded, slightly curved and recurved, basal angle produced into a strong, curved spine. Aedeagus in lateral view narrow and curved on apical two-thirds, considerably flattened ventrally on base and produced into a semicircular plate; the orifice is a long slit from a dorso-apical point to about the middle of the ventral aspect, a row of five or six teeth runs along each side, at first on the margin of the orifice but basally on the side of the aedeagus.

21. *Delphacodes nitens* sp. n., Figures 20, 21, 76. *Liburnia nitens* Van Duzee. Ms. name.

Male. Brachypterous; length 2.3 mm.; tegmen 1.2 mm. Vertex square, apex projecting very slightly beyond the eyes, base at middle of eyes. Length of face 1.6 times the width, median carina simple, obscure at base where it meets the carinae of vertex. Antennae reaching base of clypeus, second segment 1.7 times the length of first. Lateral pronotal carinae diverging posteriorly, not reaching hind margin. Hind basitarsus slightly longer than the other two together, spur nearly as long as basitarsus, wide, thin, tectiform, about 20 minute teeth on hind margin somewhat obscured by short fine hairs along the margin on the outer surface. Tegmina reaching to base of seventh tergite.

Opening of pygofer much wider than long, margins entire, lateral margins slightly curved, ventral margin cut back considerably; anal emargination wide, very shallow; anal angles not projecting. Diaphragm short, dorsal margin widely V shape, middle of diaphragm to near orifice projecting as an armature, lip shape, the surface shagreen. Anal segment large, anal spines laterally flattened, broad at base, strongly curved, apex acute, bases far apart. Genital styles flat, fairly narrow, slightly broadened on basal half, apical half of inner margin concave, basal half convex, outer margin sinuous, apex subaruncate, inner apical corner subacute, outer corner rounded. Aedeagus flattened laterally, in lateral view deepest at base, apex subconical, orifice at apex, four small teeth on dorsal aspect slightly apical of middle, a row of teeth from a ventral point at apex along left side to near middle, a small row on right side.

Shiny black; antennae, clypeus, legs, base of abdomen and anal style yellow.

Female. Brachypterous; length 2 mm.; tegmen .9 mm.

Tegmina reaching to base of sixth tergite. Uniformly yellow, ovipositor slightly brownish.

Described from three males and one female from Columbus, O. (*Koebele*, No. 2201), and thirteen males and four females in the McAtee collection from Plummers Island, Md. (*McAtee*, July 13, 1913); the type and allotype being a pair from Koebele's series in the collection of the H. S. P. A. Experiment Station, Honolulu.

22. *Delphacodes uhleri* sp. n. Figures 28, 98.

Male. Brachypterous; length 1.8 mm.; tegmen 1 mm.

Vertex as long as broad, base in front of middle of eyes, apex projecting slightly beyond eyes. Length of face twice the width, lateral margins very slightly arcuate, slightly narrowed between eyes. Antennae reaching to base of clypeus, first segment longer than broad, second twice the length of first. Lateral pronotal carinae diverging posteriorly, not reaching hind margin. Hind basitarsus as long as the other two together, spur nearly as long as basitarsus, wide, thin, with about twenty small teeth on hind margin. Stramineous; dark brown between carinae of face and clypeus. Tegmina shiny black.

Opening of pygofer about as long as wide, margins entire, round; anal emargination wide, shallow; anal segment large with two stout, strong, curved spines, slightly flattened laterally. Genital styles comparatively large, basal angle fairly prominent, apical of the basal angle the inner margin is concave, then gradually curved convexly to apex, outer margin slightly sinuous, apex bluntly rounded. Aedeagus tubular, curved and recurved, orifice at apex, the apical half beset with numerous irregular small spines.

Described from one male from Virginia (September 6, 1881) standing under *seminigra* Stal ? in the Crawford collection. It bears a label "*Liburnia* sp. n. Uhler." This species is difficult to place.

23. *Delphacodes albidens* (Crawford), Figures 36, 37, 77. *Megamelus albidens* Crawford, Pro. Nat. Mus. 46, p. 622 (1914); type in Pomona College; type locality Campinas, Brazil.

The type is a macropterous male which we have dissected, and from which our drawings have been made.

Opening of the pygofer about as wide as long, the lower portion of the lateral margins produced into a flat, rounded process; ventral margin cut back, entire; anal emargination large, wide, anal angles broadly rounded, not produced. Diaphragm very short, middle of dorsal margin V shape, the angles of the emargination being considerably produced. Anal segment medium size, spines small, curved, bases moderately near together. Genital styles long, reaching beyond anal angles, diverging, flat, widest at base, narrowing to acute apex which is slightly bent outward, outer margin concave on apical third and convex on basal two-thirds, inner margin slightly sinuate, basal angle slightly produced, inner margin slightly and irregularly dentate. Aedeagus flattened laterally, in lateral view widest at base, bent at more than a right angle about middle, narrowing to the bluntly pointed apex, orifice before apex on dorsal aspect, slightly basad of the bend on the central aspect a stout spine arises.

This species comes into the same group as *D. striatella* (Fall). The pronotal carinae of this species are straighter than in the genotype.

24. *Delphacodes havanensis* (Crawford), Figures 31, 32, 78. *Megamelus albidens havanensis* Crawford, Pro. Nat. Mus. 46, p. 622 (1914); type in Pomona College collection; type locality Habana, Cuba. *Delphacodes martininae* Muir, Pro. Ent. Soc. III, 5 (1918); type in Amer. Mus., New York; type locality Martinique, B. W. I.

The type of this insect is a macropterous male which we have dissected and from which our drawings have been made.

The pygofer is of the same type as *albicans*, but the lateral projections subspatulate; the armature of the diaphragm projects as a lip below the edge of the foramen, the V shape emargination of the dorsal margin is smaller and the lateral angles are not produced. The anal segment is without spines. Genital styles shorter and stouter with rounded apices. The aedeagus is more slender on apical half and broader at base and the spine is apical of the bend.

The genitalia fully justifies us in considering this a distinct species.

Three male specimens from Kingston, Jamaica (*Van Duzee*, April, 1906), standing under *L. terminalis* Van D.

The pronotal carinae of this species are straighter than in the genotype.

25. *Delphacodes cayamensis* (Crawford). Figures 24, 25. *Megamelus cayamensis* Crawford, Pro. U. S. Nat. Mus. 46, p. 614 (1914); type in Pomona collection; type locality Cayamas, Cuba.

This was described from one specimen from which our drawings and description are made.

Opening of pygofer round, slightly broader than long, margin entire; anal emargination large, wide, anal angles small not produced. Dorsal margin of diaphragm slightly produced in middle, surface slightly raised to near orifice. Anal segment fairly large, without armature. Genital styles flat, fairly broad, curved, nearly reaching to anal segment, outer margin slightly concave near middle, inner margin more deeply concave, basal angle considerably developed, rounded; apex broad, rounded.

By an unfortunate accident the aedeagus was lost before a full description or drawings were made. It is quite unique in structure, comparatively small, flat laterally, broadest at apex with a strong spine as long as the aedeagus, arising at the base and applied closely to the side. It is hoped that some collector will procure locotypes and give us drawings of the aedeagus.

26. *Delphacodes magna* (Crawford). Figures 35, 95. *Megamelus magnus* Crawford Pro. U. S. Nat. Mus. 46, p. 627, Pl. 48, Fig. P.; type in U. S. Nat. Mus. No. 15997, collector's No. 2158; type locality Colorado. *Liburnia muiri* Van Duzee ms. name.

We have not examined this type, but the drawing of the male genitalia supplied to us by Dr. Howard, and Crawford's figures show that it comes near to *D. collina* (Boh.).

*D. muiri* (Van D.), ms. name, appears to be the same and it is from the specimen so labelled that the figures and descriptions are taken. We have described it so that those accessible to the type can verify the synonymy.

Male. Brachypterous: length 2.7 mm.; tegmen 1.4 mm.

Head slightly wider than long, apex slightly rounded, base slightly behind the middle of eye; length of frons 1.7 times the width, sides slightly arcuate, widest in middle, median earina simple, slightly thickened at base. First segment of antennae slightly longer than wide, second segment 2.5 times the length of first, reaching to base of clypeus. Lateral pronotal carinae diverging, slightly curved, not reaching hind margin. Hind basitarsus as long as the other two together, spur not as long as basitarsus, thin, tectiform, about twelve teeth on hind margin and one at apex. Tegmina reaching to base of sixth tergite.

Opening of pygofer about as long as broad, shallow; anal emargination large, anal angles rounded, not produced. Diaphragm fairly long, dorsal margin broadly V shape, just above the foramen the middle is produced into a small, pointed armature; on each side of the diaphragm near the dorsal margin there is a comparatively large fovea with the wall on their outer margins thin and bearing small pores. The diaphragm was covered with wax secretion which may be from these areas. Anal segment short with a pair of inwardly turned, small spines at its base. Genital styles short, broad and flat, inner and outer margins slightly concave, apex rounded with a sharp spine curved outward from the inner apical angle. Aedeagus tubular, slightly largest at base, slightly curved, apex rounded, with orifice on dorsal aspect, the ventral half of apex compressed laterally into a flange, a small spine on dorsal aspect just basad of orifice, three more on right side and one on left.

Stramineous, a lighter line down the middle of vertex and thorax, fuscous between the carinae of face and genae, abdomen darker brown with a lighter mark down middle of dorsum, tegmina hyaline, slightly stramineous.

Described from one male from Portland, Ore. (*W. M. Giffard*, July 3, 1917), in the California Academy of Science. No. 380, bearing type label of *Lithornia muiri*.

This species comes into a group near *D. collina* (Boh.).

27. *Delphacodes wetmorei* sp. n.. Figures 33, 104. *Meamulus terminalis* Crawford and Van Duzee, Crawford, Pro. U. S. Nat. Mus. 46, p. 623, Pl. 48, Fig. F. K.

Male. Macropterous; length 2 mm.; tegmen 2.3 mm. Vertex square, projecting slightly in front of eyes, base at middle of eyes; length of face twice the width, sides slightly arcuate, broadest in middle, median carina simple. Antennae reaching base of clypeus, second segment twice the length of first. Lateral pronotal carinae straight, diverging, not reaching hind margin. Length of hind basitarsus equal to the two others together, spur as long as basitarsus or a little longer, broad, thin with many (about 30 or more) minute teeth on hind margin.

Opening of pygofer broader than long, margins entire, rounded; anal emargination large, anal angles large, produced into a large, flat, quadrate process with a flange produced into a broadly pointed process on the inner surface. Diaphragm fairly long, the middle of dorsal margin produced into a large armature in the shape of a trough, V shape in section, longer than wide in ventral view with truncate apex. Anal tube fairly large, somewhat flattened horizontally, two long, slightly curved, laterally flattened anal spines with their bases in contact and slightly diverging apically. Genital styles straight, subparallel-sided, slightly contracted before apex which is slightly bifurcate through the apical corners being slightly produced and rounded, basal angle very slightly produced into a small spine. Aedeagus subtubular, slightly flattened laterally, apical third slightly curved ventrad, apex rounded, orifice dorsal slightly before apex, a few scattered teeth on curved apical portion.

Ochraceous yellow, black or dark brown between carinae of face and clypeus; carinae of thorax lighter than ground color, abdomen fuscous; Tegmina hyaline, veins same color as membrane basad of cross-veins, slightly darker distad of cross-veins, granules minute, sparse, same color as veins.

Female. Macropterous; length 2 mm.; tegmen 2.5 mm. Similar to male in coloration.

Described from one male holotype from Fort Lauderdale, Fla. (*A. Wetmore*, February 19, 1919), in the McAtee collection, and three males and thirteen females, one of them the allotype, from San Marcos, Nicaragua (*Baker* 1506) in the Pomona College collection, also one male from Alabama (*Baker* 2361) and one male from San Marcos, Mexico, in the Crawford collection.

All the San Marcos specimens and the Alabama specimens stood under *terminalis* and apparently it is from one of these that Crawford's figures were taken.

28. *Delphacodes balli* n. sp.. Figures 34, 40, 105.

Male. Brachypterous; length 2.6 mm.; tegmen .9 mm. Vertex wider than long, apex slightly rounded, projecting slightly beyond eyes, base slightly behind middle of eyes. Length of frons about double the width, median carina simple, slightly thickened at base. Antennae reaching slightly beyond base of clypeus, first segment longer than wide, second segment about twice the length of first. Tegmina reaching to base of fourth abdominal tergite.

Opening of pygofer wider than long, margins entire; anal emargination large, anal angles produced and slightly bilobed; diaphragm not very long, dorsal emargination U shape, the armature is in the form of a small tongue which projects over the orifice. Anal segment short, spines large and stout with their bases well apart. Genital styles fairly large, short, broad, inner margin concave, outer margin angular in middle, apex broad and slightly convex, apical angles produced. Aedeagus subtubular, slightly curved, orifice at apex, in lateral view slightly widest at base; several small spines around apex.

Dark brown, carinae of head, antennae, legs and pleura of abdomen lighter. Tegmina dark brown, veins without tubercles.

Described from one male from New Haven, Conn. (*B. H. Walden*, May 13, 1911), in the Van Duzee collection. This is named after Dr. E. D. Ball. This species is near to *D. wetmorei*.

29. *Delphacodes propinqua* (Fieber), Figures 11, 108. *Delphax* (*Delphax*) *propinqua* Fieber, Verh. d. k. k. zool. bot. Ges. Wien. XVI, p. 525, Pl. VIII, Fig. 24; ? type in Mus. Vienna; type locality Trieste. *Liburnia terminalis* Van Duzee, Bull. Buff. Soc. Nat. Sci. VIII, p. 49 (1907); type in Cal. Acad. Sci.; type locality Kingston, Jamaica. *Liburnia tuckeri* Van Duzee, Bull. Buff. Soc. Nat. Sc. X, p. 506; type in coll. Van Duzee; type locality St. Petersburg, Fla. *Delphacodes neopropinqua* Muir, Pro. Haw. Ent. Soc. VII, p. 335, Fig. 38 (1917); type in col. Haw. Sugar Planters' Experiment Station; type locality Los Banos, Philippine Islands. *Delphacodes subfusca* Muir, Can. Ent. 1919, p. 38, Fig. 12; type locality Demerara River, British Guiana.

We have examined specimens from several places in Europe determined by European workers which agree with Fieber's description and figures, so that there is every possibility that we are correct in our synonymy. In this widely distributed insect there is some difference in the genitalia, but after careful comparison of all the types (except *propinqua*) we conclude that it is better not to try and keep such slightly different forms as *neopropinqua* and *subfusca* apart.

The case of *erectus* is complicated. The material contained in the Pomona College and Crawford collections, which forms part of the type material, consists of two species. All the Havana, Cuba, material is *propinqua*, the Mexican specimens being mostly *humilis* with a few *propinqua*. The figure of the male genitalia drawn from the type specimen supplied by Dr. Howard is evidently *humilis*. One specimen in the Pomona College collection from Havana is marked type. If this be considered as the type then *erectus* = *propinqua*, but if the Nat. Mus. specimen be considered as the type then *erectus* = *humilis*. In the original description the type is stated to be in the U. S. Nat. Mus. We consider the latter synonymy to be correct.

Crawford's figures<sup>1</sup> of *terminalis* are not of that species but apparently of *wetmorei* M. G.

Opening of pygofer wider than long, margins entire, lateral and ventral margins rounded with a small angle where they meet; anal emargination large, anal angles large, produced, curved downward and inward and broadly rounded at apex. Diaphragm short, dorsal margin V shaped, broad at bottom and produced into a small bifurcation. The middle of the diaphragm raised to near foramen, the armature being slightly roughened or shagreen along the sides. Anal segment small, sunk deeply into anal emargination, anal spines large, straight, acuminate, bases near together, diverging to apex. Genital styles in situ flat, fairly broad, slightly narrowed in middle, apex truncate, basal angle projecting; in flat view inner margin concave, outer sinuate, broadest at base. Aedeagus small, subtubular, largest at base, straight, orifice at apex, a few small spines on dorsal aspect near apex. There is some variation in the number and position of the minute spines at apex, the size of the basal angle of the genital styles and the size of the furcation of the armature of diaphragm.

We have specimens of this species from Porto Rico (*Wqlcott*).

30. *Delphacodes nigripennis* (Crawford), Figures 41, 42, 126. *Megamelus erectus nigripennis* Crawford, Pro. U. S. Nat. Mus. 46, p. 625 (1914); type in Pomona College Collection; type locality, Managua, Nicaragua.

The type of this species has been dissected and our drawings made from it. It is specifically quite distinct from *erectus* Crawf. (= *humilis* Van D.) and so must stand as a distinct species. It is so closely related to *D. matanitu* (Kirk.) of Fiji and Papua that we have kept them apart with some doubt. There is one male specimen in the Van Duzee collection from Mandeville, Jamaica, under *Liburnia seminigra* (Stal).

<sup>1</sup>Pro. U. S. Nat. Mus. 46 (1914), Pl. 48, Figs. F. K.

Opening of pygofer as broad as long, round, anal emargination large, anal angles forming a right angle and well developed (but not narrowly and curved as in *propinqua*). Diaphragm short, dorsal margin V shape with a long, narrow, subspatulate or sublanceolate projection from the middle. Anal segment small, fitting well down into anal emargination, bearing a pair of long, slender, laterally flattened spines with their bases near together, curved outward towards their apices. Genital styles large, reaching nearly to anal segment, flat, outer margin slightly sinuous, inner margin very slightly convex apical of basal angle which is slightly rounded and produced, apex truncate. Aedeagus long, slender, tubular, slightly largest at base, orifice at apex where there is a slight projection dorsally.

31. *Delphacodes humilis* (Van Duzee). Figures 43, 44, 45, 111. *Liburnia humilis* Van Duzee, Bull. Buff. Soc. Nat. Sci. VIII, p. 48 (1907); type in Van Duzee coll.; type locality Mandeville, Jamaica. *Liburnia scminigra* Van Duzee not Stal, 1907, t. e. p. 45. *Megamelus erectus* Crawford, Pro. U. S. Nat. Mus. 46, p. 624, Pl. 48, Figs. D, E (1914); type in U. S. Nat. Mus. No. 15994; type locality Mexico, collector's No. 2499. *Delphacodes erectus nigripennis* Muir not Crawford, Pro. Haw. Ent. Soc. III, p. 427, Fig. 2 (1918).

Among the type material of *humilis* are three males from Kingston, Jamaica. Two of these are *M. magnistylus* Crawf. and one is *D. propinqua* (Fieb.). The type of *erectus* is in the U. S. Nat. Mus. so we have not examined it, but the drawing of the male genitalia supplied by Dr. Howard shows that it is this species. In the series of type material of *erectus* that we have examined all the specimens from Havana, Cuba, are *propinqua*, the specimens from Mexico being *humilis* and *propinqua*.

Opening of pygofer about as long as broad, round, margins entire, anal emargination large, anal angles not produced. Diaphragm short, dorsal margin V shape with a large armature arising from the bottom in the form of a wide, sublanceolate plate with a short, wide stem. The lateral margins curved upward forming a shallow trough, a slight ridge down the middle. Anal segment small with a pair of small spines, curved and recurved, their bases some distance apart. Genital styles broad, flat, inner margin nearly straight with a very slight, rounded basal angle, outer margin sinuate, apex truncate, slightly curved. Aedeagus subtubular, slightly compressed laterally, in lateral view swollen in middle, orifice on left side near apex, a few small spines on right side near apex and a few smaller ones on left nearer to the middle.

One male specimen from Mandeville, Jamaica, under *scminigra* Stal.

Among the drawings of types supplied us by Dr. Howard is one marked U. S. N. M. type No. 12313 *Liburnia humilis* Van Duzee. A specimen in the Van Duzee collection marked holotype agrees with the drawing and we have based our conclusions upon it.

32. *Delphacodes puella* (Van Duzee). Figures 16, 110. *Liburnia puella* Van Duzee, Bull. Buff. Soc. Nat. Sci. V, p. 250 (1897); type in Iowa Agri. College, Ames; type locality Miss.

We have examined the type of this species and compared it with the specimens dissected.

Opening of pygofer broader than long, margins entire, anal emargination large, anal angles rounded, not produced. Diaphragm short, dorsal margin widely concave, armature arising in the middle of margin as a small, bilobed projection with slightly shagreen surface. Anal segment small, the ventral margin forming a small lip, anal spines arising some slight distance apart, curved, thick at base, tapering to acute apex, diverging apically. Genital styles flat, fairly broad, broadest across basal angle, apex truncate, on the inner margin slightly before apex there is a small subangular process. Aedeagus small, slightly compressed laterally, base curved, apex bluntly pointed, orifice on left side near apex, there are a number of small spines on the apical half which extend along the ventral aspect beyond the middle, more numerous on right side than on left.

33. *Delphacodes nigra* (Crawford). Figures 47, 48, 101. *Megamelus erectus niger* Crawford, Pro. U. S. Nat. Mus. 46, p. 624 (1914); the specimen marked type in U. S. Nat. Mus. No. 15993; locality of this specimen, Mexico. (Baker 2499.)



We have not examined the specimen marked type in the U. S. Nat. Mus. but from the drawing of the male genitalia supplied to us by Dr. Howard we can clearly see that it does not agree with the original description, but is a specimen of *consimilis* or an allied species. There is one male specimen in the Pomona Collection marked type from Havana, Cuba, one marked Mexico (*Baker* 2499) and one from Jalapa, Mexico (*Crawford*) in the Crawford collection. These three specimens are evidently paratypes and they agree with the original description. In the case when the specimen marked type does not agree with the original description, and one or more of the paratypes do, we consider it necessary to select one of the specimens from which the description was evidently made and to disregard the specimen marked type. We therefore select the specimen from Mexico (*Baker* 2499), which was evidently collected at the same time as the specimen originally marked type, as the true type specimen of *nigra*.

This species has no specific relationship to *erectus* and must stand as a distinct species.

Opening of pygofer wider than long, round, margins entire, anal emargination large, anal angles rounded, produced and curved. Diaphragm fairly long, dorsal margin U shape with a small, quadrate projection in middle which is much wider than long. Anal segment comparatively small, sunk well into emargination, two fairly long, thin, slightly curved spines with their bases near together. Genital styles flat, broad at base, narrowing to apex which is produced into two projections, the apex between being slightly concave, the outer margin very slightly sinuate. The inner margin with a slight projection near middle making the outline two shallow concavities. Aedeagus subcylindrical, slightly flattened laterally, apex rounded with orifice on right side, a row of about eight spines runs from a dorsal spot near apex across the left side to one-third from base another small row on right side about the middle.

34. *Delphacodes floridae* sp. n., Figure 102. *Liburnia seminigra* Van Duzee not Stal, Bull. Buff. Soc. Nat. Sc., VIII, p. 45 (1907), op. c. IX, p. 203 (1909).

Male. Brachypterous; length 1.6 mm.; tegmen .7 mm.

Tegmina reaching to the middle of the sixth abdominal segment. Vertex as long as broad, base slightly anterior to the middle of the eyes, carinae distinct, head nearly as wide as pronotum. Length of frons double the width, sides slightly curved, narrowest between eyes, median carina simple. Antennae small, hardly reaching to base of clypeus, second segment twice the length of the first. Lateral carinae of pronotum diverging, slightly curved, not reaching the hind margin. Length of hind tibiae about equal to femora, length of hind tarsus nearly equal to tibia, hind basitarsus equal to the other two together; spur nearly as long as basitarsus, fairly broad, thin, concave on inner surface with 5 to 8 teeth on hind margin.

Opening of pygofer about as long as broad, margin round, entire, anal emargination large, wide, anal angle not produced. Diaphragm fairly long, dorsal margin U shape with two small angular projections in middle forming an armature. Anal segment fairly small, two short, stout, laterally flattened spines on ventral margin with their bases fairly wide apart. Genital styles fairly broad, flat, basal angle large, quadrate curved outward, outer margin nearly straight, inner margin slightly concave, apex slightly concave with the outer angle produced and flattened slightly and the inner angle subacute. Aedeagus laterally flattened, in lateral view wide at base, apical half subparallel sided, strongly curved dorsally at base, the ventral margin on basal half forming two angular projections, orifice at apex, a few spines along the dorsal aspect to about the middle and a few on the right side.

Yellow; slightly fuscous between carinae of face and more so between carinae of clypeus; coxae and pleura fuscous, legs slightly fuscous, pygofer and styles dark brown. Tegmina dark, shiny brown or nearly black, sometimes with a slightly lighter apical margin.

Described from one male holotype from Biscayne Bay, Fla. (*Mrs. Swenson*), one from Estero, Fla. (*Van Duzee*, May 6-12, 1908), and five from Kingston, Jamaica, in the Van Duzee collection. These have been recorded under *seminigra* Stal. There is also one specimen from Kingston without an abdomen which has

the margin of tegmina nearly white and a light mark on clavus and is most likely a different species.

35. *Delphacodes crawfordi* sp. n., Figures 29, 97.

Male. Macropterous: length 1.3 mm.; tegmen 2 mm. Head nearly the width of thorax; vertex square or the base slightly wider than long, base considerably in front of the middle of eyes. Length of face twice the width, sides subparallel, slightly narrowed at base, median carina simple. Antennae reaching base of clypeus, second segment twice the length of first. Hind basitarsus slightly shorter than the other two together, spur as long as basitarsus, broad, thin, margin with about 16 small, black teeth.

Opening of pygofer wider than long, margins entire, rounded; anal emargination large, wide, shallow. Diaphragm short, dorsal margin V shape with the middle produced into a large lip about as broad as long with the sides curved upward. Anal segment of moderate size, spines large, flattened laterally, their bases moderately far apart, in full view slightly sinuate. Genital styles large, flat, basal angle small, rounded, inner margin slightly concave, outer margin nearly straight, apex truncate with the inner angle produced into a small acute angle. Aedeagus small, subtubular, slightly flattened laterally, in lateral view basal third straight, apical two-thirds strongly curved, orifice at apex, a few scattered small teeth on apical third.

Black or very dark brown, carinae of head and thorax yellow, antennae and legs lighter. Tegmina hyaline, slightly whitish, veins on basal half slightly yellowish, apically darker, a small fuscous mark at apex of claval vein; tubercles small, sparse, bearing black macrotrichae. Wings hyaline, veins brown.

Described from one specimen from Mexico Valley (*Koebele*, 1907), in the collection of the H. S. P. A. Experiment Station collection, Honolulu. Named after Dr. David Crawford whose contribution to our knowledge of North American Delphacidae is considerable.

36. *Delphacodes nigrifacies* Muir, Figures 60, 131. *Delphacodes nigrifacies* Muir, Pro. Haw. Ent. Soc., III, 5, p. 428, Figs. 5, 5a; type in Amer. Mus. Nat. Hist., New York; type locality, Fort de France, Martinique, B. W. I. *Liburnia andromeda* Van Duzee, in part, Bull. Bur. Soc. Nat. Sci., VIII, p. 46 (1907).

Opening of pygofer wider than long; margin entire, round, anal emargination large, wide, shallow; anal angles rounded, not produced. Diaphragm short, dorsal margin widely U shape, the middle portion straight with a small projection on each side, Anal segment sunk well into emargination, armature forming two laterally flattened plates curved and pointed at apex, their bases being wide apart and towards base of anal segment. Genital styles flat, broad, apex truncate, broad, angles produced, the outer angle more than the inner. Basal angle produced, angular and roughened; inner margin distad of basal angle concave, outer margin nearly straight. Aedeagus small, subtubular, slightly flattened laterally, in lateral view widest on basal half, orifice at apex, a small row of teeth along middle on ventral aspect, another on sides nearer apex and a few near apex on dorsal aspect.

The paratype of *L. andromeda* Van Duzee from Demerara, British Guiana (*R. J. Cress*, April 2, 1921) is this species.

37. *Delphacodes pacifica* (Crawford), Figures 13, 63, 106. *Megamelus pacificus* Crawford, Pro. U. S. Nat. Mus. 46, p. 626 (1914); type in U. S. Nat. Mus. No. 15996; type locality, California, collector's No. 2351.

We have not examined the type of this species but the drawing of the male genitalia made from the type agrees with specimens in the Pomona collection and in the Crawford collection. In the latter are two specimens which do not appear to belong to the type material which we have placed into two different species; one from Three Rivers, California (*Clorton*), under *bellicosa* and the other from Jalapa (*Crawford*) under *balboae*.

All of the typical *pacifica* are from California (*Baker* No. 2329) except one which is from Morelos (*Crawford*).

Opening of pygofer a little wider than long, margins entire, round; anal emargination wide; anal angles rounded, not produced. Diaphragm short, dorsal margin V shape, wide at bottom from which arises an armature in the shape of a bifurcate process, the forks forming slender, curved spines. Anal segment small with two small, rounded knobs on ventral edge as armature. Genital styles reaching near to anal segment, flat, broad, apex truncate or slightly convex, outer margin concave, inner margin with basal angle produced slightly, both inner and outer apical corners slightly produced. Aedeagus sub-tubular, in lateral view base slightly larger gradually narrowing to apex, orifice at apex slightly dorsad, a row of five or six small teeth from apex across to ventral aspect on apical third of right side, several other small teeth running from apex to near base on dorso-lateral aspect of left side. The vertex is fairly long in this species.

38. *Delphacodes bellicosa* sp. n., Figures 112, 113.

Male. Brachypterous; length 1.6 mm.; tegmen 1 mm. Tegmina reaching to base of seventh abdominal tergite. Vertex as long as wide or slightly wider, base slightly anterior to middle of eyes. Length of face twice the width, sides slightly arcuate, median carina simple. Antennae reaching slightly beyond base of clypeus, second segment twice the length of first. Lateral pronotal carinae divergently curved, not reaching hind margin. Length of hind basitarsus equal to other two together; spur not quite so long as basitarsus, broad, thin, concave on inner surface, with many fine teeth on hind margin.

Opening of pygofer wider than long, shallow, margins entire, round; anal emargination wide, shallow anal angles rounded, not produced. Diaphragm short, dorsal margin U shape with a short, broad production in middle produced into two strong, short curved spines. Anal segment very short, without armature. Genital styles flat, broad, outer margin concave in middle, inner margin concave on apical half, basal angle rounded, apex truncate, inner angle slightly produced, outer angle rounded. Aedeagus flattened laterally, in lateral view slightly angularly bent on dorsal margin, slightly concave on ventral margin, sub-equal in width to near apex which is narrowed slightly and rounded, orifice on dorsal aspect of apex; a large flange along the left side of the dorsal margin from near apex to about one-third from base with a serrated edge of eight teeth; a small, stout spine at apex on right side.

Carinae of head and the antennae light brown, dark brown between carinae; pronotum light brown in middle and laterally darker behind eyes; mesonotum dark brown with lighter carinae; abdomen dark brown; legs light brown with slightly darker longitudinal marks. Tegmina hyaline, light brown, slightly darker at apex of clavus, margins lighter, veins same color as membrane with many fine tubercles slightly darker.

Described from one male from Three Rivers, Cal. (*Clorton*) in the Crawford collection where it stood under *M. pacificus*.

39. *Delphacodes teapae* (Fowler), Figures 7, 132 *Liburnia teapae* Fowler, Bio. Cent. Amer. Rhy. Hem. Hom. 1. p. 135, Pl. XIII, Figs. 13, a, b (1905); type in British Museum, type locality, Teapa, Mexico.

We have not examined<sup>1</sup> the type of this species, but we have examined specimens from Mexico, Central America, Jamaica, Porto Rico and Brazil and they all agree with the original description and figures. Fowler's figure 13 b shows the genital styles more foreshortened than ours, hence the difference.

Opening of pygofer about as long as broad, margins entire, round, anal emargination large, wide; anal angles obscure, not produced. Diaphragm long, the middle slightly raised and projecting on dorsal margin; the sides of the raised armature slightly shagreen. Anal segment fairly large, the ventral margin produced into two flat, rounded projections with four or five teeth along the edge. Aedeagus flattened laterally, in lateral view widest on basal half, apex rounded, orifice on ventral aspect of apex, a small flange set with teeth runs along the dorsal aspect of apical half, slightly turned to the side; three or four teeth around orifice and a few irregular teeth on ventral aspect near middle. There is a slight difference in the number of the smaller teeth in specimens from different localities. Genital styles broad, flat, inner margin slightly concave apical of basal angle which is slightly produced, outer margin slightly concave in middle, rounded on basal half, apex truncate, the inner corner slightly produced.

<sup>1</sup> One of the writers later examined the type, and it agrees with the specimens described above.

40. *Delphacodes balboae* sp. n., Figure 169.

Male. Macropterous; length 1.7 mm.; tegmen 2.4 mm. Head narrower than thorax, vertex wider than long, apex slightly in front of eyes, base in front of middle of eyes, carinae distinct. Length of face 2.3 times the width, sides very slightly arcuate, median carina simple. Antennae reaching slightly beyond base of clypeus, second segment slightly longer than first (1 to .69). Hind basitarsus longer than other two together; spur large, thin, many minute teeth on hind margin.

Dark brown; carinae of head and antennae lighter brown, posterior half of pronotum white or dirty white, basal angle of mesonotum yellow, legs and base of abdomen yellow. Tegmina hyaline, slightly yellowish, a small fuscous mark at apex of clavus, veins yellowish, tubercles very sparse, small.

Opening of pygofer wider than long, lateral margins slightly excavate, anal emargination large, wide, shallow, anal angles rounded, not produced. Diaphragm fairly long, dorsal margin widely U shape, a small, semibilobed process in middle. Genital styles reaching beyond dorsal margin of diaphragm, flat, broad, outer margin concave on apical two-thirds, inner margin concave on apical half, convex on basal half, apex truncate, inner angle slightly produced, outer angle rounded. Aedeagus comparatively thin, cylindrical, slightly curved at base, orifice at apex where there is a small tooth; on the left side slightly before apex there is a small toothlike spine, on the right side near apex there is a small flange, the apical corner of which is produced into a narrow curved process with truncate apex and the basal corner into a stout spinelike process.

Described from one male from Jalapa, Mexico (*Crawford*), in the Crawford collection standing under *pacificus* Crawford.

41. *Delphacodes albinotata* (Crawford), Figures 46, 100. *Megamelus teapae albinoatus* Crawford, *Pro. U. S. Nat. Mus.*, 46, p. 619 (1914); type in U. S. Nat. Mus. No. 15988; type locality, Jalapa, Mexico.

This species was described from two males from Jalapa, Mexico, one in the U. S. Nat. Mus. and the other in the Pomona collection. The latter has been used for our drawings and dissections and it agrees with the figure drawn from the type supplied by Dr. Howard. It is quite distinct from *teapae* and must stand as a species.

Opening of pygofer about as long as broad, margins entire, round, anal emargination large, wide, anal angles round, not produced. Diaphragm short, dorsal margin widely U shape with slightly sinuous sides, no armature but the middle slightly projecting lip-shape. Anal segment fairly large and long, the armature in the form of a flat, rounded plate arising on each side near base. Genital styles reaching nearly to anal tube, flat, broad at base, basal angle rounded, inner margin slightly concave on apical half, convex on basal half, apex truncate with the inner angle produced, outer angle rounded. Aedeagus tubular, thin, curved dorsad, orifice at apex, two small spines near dorsal margin of orifice and a small one on left side slightly before apex, a row of some nine spines on right side about middle.

42. *Delphacodes andromeda* (Van Duzee), Figures 49, 107. *Liburnia andromeda* Van Duzee, *Bull. Buf. Soc. Nat. Sci.*, VIII (1907), p. 46; type in Van Duzee col.; type locality, Mandeville, Jamaica.

The specimen marked paratype of this species from Demerara, British Guiana, is not this species, but *D. nigrijacis* Muir. There is one male specimen of this species from Wallops Id., Va. (*McAttee*, May 29, 1913). Our dissection and description is of a specimen from Tampa, Fla.

Opening of pygofer slightly wider than long, lateral margins rounded, entire, ventral margin slightly emarginate; anal emargination wide but shallow, only about half surrounding anal segment; anal angles not produced, obscure. Diaphragm fairly long, dorsal emargination somewhat W shape, the median portion forming a rounded projection which continues as a wide ridge nearly to orifice, apical portion slightly shagreen as well as the dorso-lateral portion of the diaphragm. Anal segment large, projecting well beyond the anal emargination, each ventro-lateral corner produced into a large projection, the rounded

apices of which reach to the middle of the opening of pygofer; from the ventral base of the anal segment arise two long, acute, bayonet-like spines reaching to the anal armature. Genital styles reaching to anal segment, outer margin slightly sinuous, inner margin produced, subquadrate on apical third, concave in middle, the basal angle produced into a rounded projection with a coarse shagreen surface. Aedeagus straight, tubular, in lateral view broadest at base, slightly narrowed to near apex where it is slightly enlarged on dorsal margin, orifice at apex with a few small spines around it, three spines along middle of ventral aspect.

A specimen of this species stands under *nigricaps* Stal in the Stockholm Museum.

43. *4-spinosa* sp. n., Figures 59, 103.

Male. Macropterous; length 1.8 mm.; tegmen 2.3 mm. Head nearly as wide as thorax, vertex square, base slightly behind middle of eyes; length of face twice the width, narrowest between eyes, sides very slightly arcuate. Antennae reaching slightly beyond base of clypeus, first segment much longer than wide, second segment 1.7 times the length of first. Lateral pronotal carinae divergingly curved, not reaching hind margin of pronotum. Hind basitarsus longer than other two together; spur not as long as basitarsus, thin, many minute teeth on hind margin.

Opening of pygofer wider than long, margins entire, rounded; anal emargination large, anal angles rounded, not produced. Diaphragm short, dorsal margin U shape, middle produced into small lip with the corners slightly projecting. Anal segment fairly large with two pair of spines, one pair on ventro-apical margin which are flattened laterally, stout, the other pair nearer base, longer and more slender. Genital styles flat, in flat view broadest at base, outer margin slightly concave, basal angle rounded, distad of basal angle inner margin slightly sinuous, apex truncate, outer angle slightly produced, inner angle larger and more considerably produced. Aedeagus flattened laterally, broadest on basal half, apical half curved dorsad, and narrower and semitubular, orifice at apex, a row of spines runs down the left side from near apex on dorsal aspect to near base on ventral aspect, a similar row runs down the right side.

Dark shiny brown, nearly black, antennae, carinae of face, legs except coxae, tegulae, posterior angle of mesonotum, hind margins of abdominal segments and pleura yellow, lateral portion of pronotum white. Tegmina hyaline, veins yellow, tubercles small, sparse, same color as veins. A small fuscous mark at apex of elavus.

Female. Macropterous; length 2 mm.; tegmen 2.7 mm. In color similar to male.

Described from two males, seven females and six specimens without abdomens from San Marcos (types), Chinandega and Managua, Nicaragua (*Baker*). There is also one female specimen from Havana, Cuba, that appears to be this species but is not included in type series. These specimens were standing under the name of *culta* Van Duzee in the Pomona and Crawford collections. Holotype and allotype in Pomona collection.

44. *Delphacodes havanae* sp. n., Figures 62, 118.

Male. Macropterous; length 1.9 mm.; tegmen 2.5 mm. Width of vertex equal to length, base about middle of eyes, apex slightly in front of eyes. Length of face twice the width, sides very slightly arcuate, narrowest between eyes. Antennae reaching slightly beyond base of clypeus, first segment longer than broad, second segment 1.7 times length of first. Lateral carinae of pronotum divergingly curved posteriorly, not reaching hind margin. Hind basitarsus as long as the other two together, spur as long as basitarsus, large, thin, about twenty small teeth on hind margin.

Carinae of head light brown, between carinae black or dark brown; antennae and legs light brown, front and middle coxae brown; pronotum white or soiled white, the anterior margin behind eyes being more soiled; mesonotum shiny brown, carinae lighter. Abdomen brown, pleura and hind margins yellowish, anal segment lighter. Tegmina hyaline slightly stramineous, veins before cross-veins same color as membrane, beyond cross-veins brown, a dark mark at apex of elaval vein, very slightly fuscous in cubital apical cells.

Opening of pygofer wider than long, shallow, margins entire, round, anal emargination wide, shallow anal angles rounded, not produced. Diaphragm fairly short, dorsal margin widely V-shape, armature projects as a semi-turbinate process. Anal segment small, without armature. Genital styles flat, basal angle large, outer margin concave on apical half, convex on basal half, apex truncate, outer angle large, rounded, inner angle

smaller. Aedeagus small, laterally compressed, in lateral view deepest at base, gradually narrowing to apex, orifice at apex, from the base on dorsal side projects a long, thin, slightly sinuous, acuminate spine, longer than the aedeagus.

Described from two specimens from Havana in the Crawford collection standing under *puella* Van D., one specimen from Champerico, Guatemala, in the Pomona collection, under *albolincosa* Fowler (*Baker*) and one specimen from Demerara River, British Guiana (*C. B. Williams*, March 31, 1913).

The peculiar aedeagus makes this species hard to place.

45. *Delphacodes culta* (Van Duzee). *Liburnia culta* Van Duzee, Bull. Buf. Soc. Nat. Sci., VIII, p. 47 (1907); type in Van Duzee coll.; type locality, Mandeville, Jamaica.

This species was described from a macropterous female, of which two were taken in the type locality. The specimens mentioned as from Rock Fort near Kingston consist of four males and three females all brachypterous; of the males one is *Kelisia paludum* Kirk., one *D. propinqua* (Fieb.) and the others have abortive genitalia. Until the male of *culta* has been taken in the type locality in company with the female the species cannot be correctly placed.

46. *Delphacodes seminigra* (Stal). *Delphax seminigra* Stal, Ofvers. af. k. Vet. Ak. Forh., p. 246, 10 (1854); type in Mus. Holm.; type locality, Rio Janero, Brazil.

The type material of this species consists of a single male which is gummed onto a card and the genitalia cannot be properly examined. It is near to *nigripennis* (Crawf.).

See under *humilis*, *nigripennis*, *floridac*, *pseudoseminigra*, *neocclusa* and *uhleri*.

47. *Delphacodes furcata* (Prov.). *Delphax furcata* Provancher Nat. Canadian, IV, p. 320, 1872.

We have seen no specimens which we can associate with this name. Van Duzee suggests that it may be a synonym of *L. avensis* (Fitch).

48. *Delphacodes steinegeri* (Ashmead). *Delphax steinegeri* Ashmead. Fur Seals and Fur Seal Ids., IV, p. 340 (1899).

One male specimen in the Van Duzee collection from Unalaska, but it has the genitalia abortive.

49. *Delphacodes laminalis* (Van D.). *Liburnia laminalis*, Van Duzee, Bull. Buf. Soc. Nat. Sci., V, p. 251 (1897).

We can find no specimens in the collections before us which we can identify as this species, those standing under this name being *lateralis* or *campestris*. Mr. Hartzell informs us that there are no specimens of this species in the Iowa College of Agriculture. We must leave it to Mr. Van Duzee to suggest how this name should be dealt with.

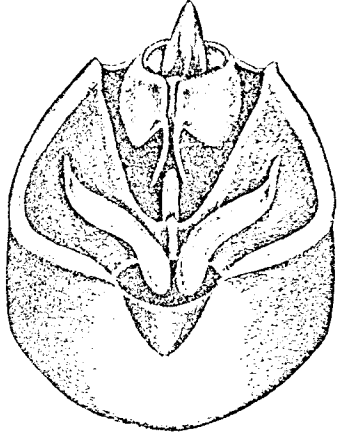
#### Calbodus Blanchard.

*Calbodus* Blanchard in Gray's Hist. de Chile (7) (1852), p. 261.

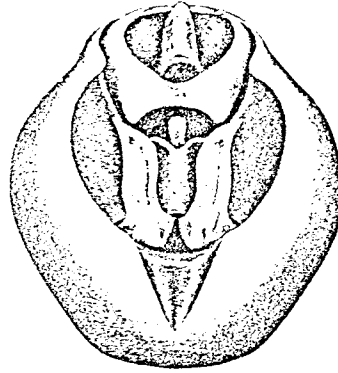
After studying the description and figure of this genus we are unable to place it in our table.

PLATE I.

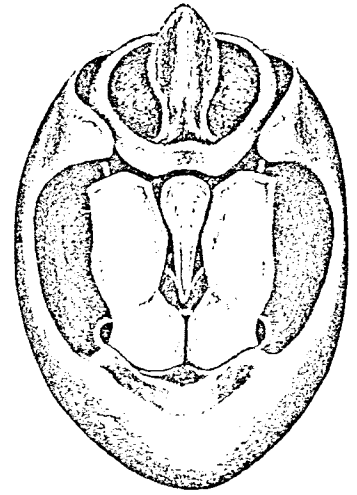
1. *Delphacodes pellucida*, full view pygofer.
2. *Delphacodes lineatipes*, full view pygofer.
3. *Delphacodes lateralis*, full view pygofer.
4. *Delphacodes gillettei*, full view pygofer.
5. *Delphacodes campestris*, full view pygofer.
6. *Delphacodes basivitta*, full view pygofer.
7. *Delphacodes teapae*, full view pygofer.
8. *Delphacodes koebeli*, full view pygofer.
9. *Sogata furcifer*, full view pygofer.



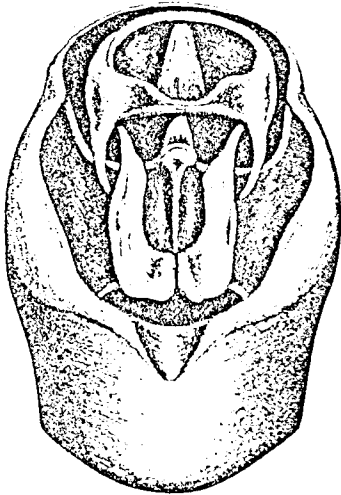
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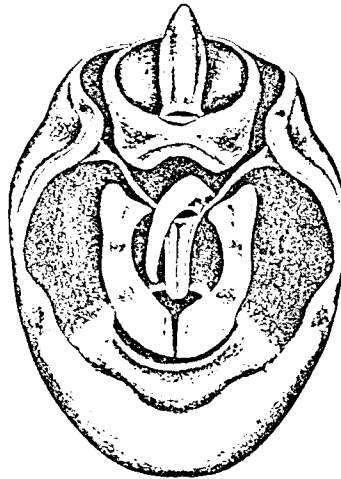
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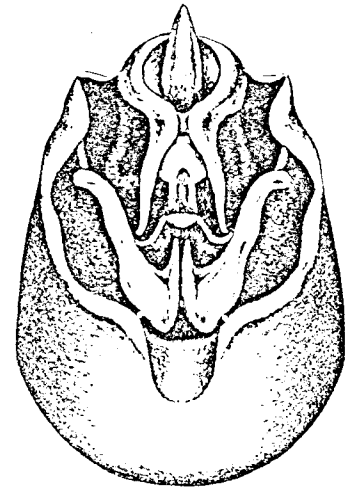
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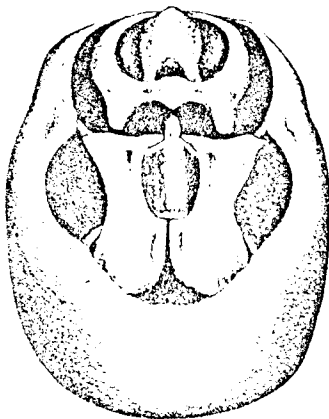
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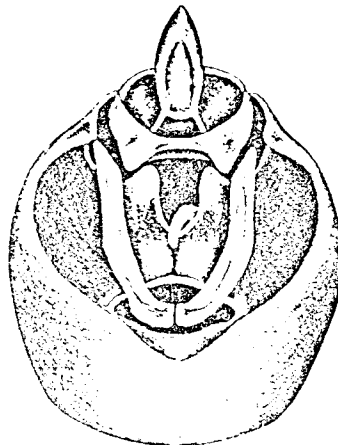
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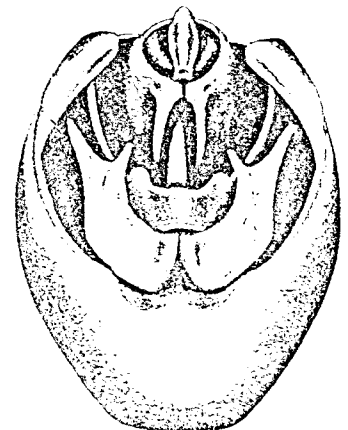
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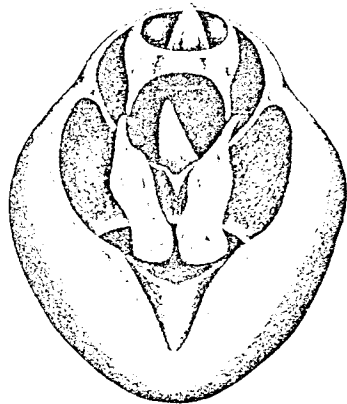


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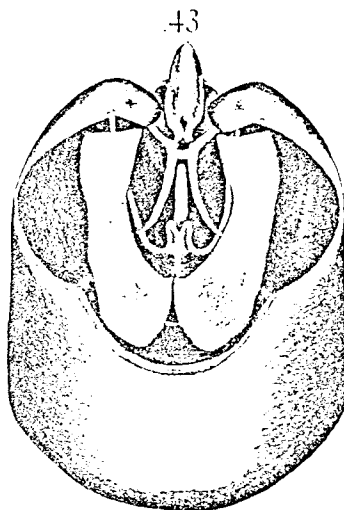


## PLATE II.

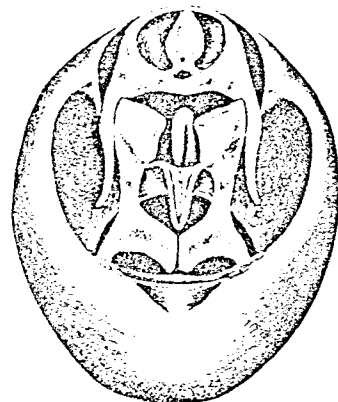
10. *Delphacodes occulsa*, full view pygofer.
11. *Delphacodes propinqua*, full view pygofer.
12. *Delphacodes indistincta*, full view pygofer.
13. *Delphacodes pacifica*, full view pygofer.
14. *Eurysa kormosi*, full view pygofer.
15. *Delphacodes consimilis*, full view pygofer.
16. *Delphacodes puila*, full view pygofer.
17. *Sogata wallacci*, full view pygofer.
18. *Delphacodes anabis*, full view pygofer.



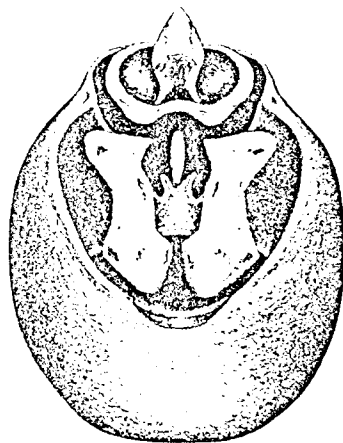
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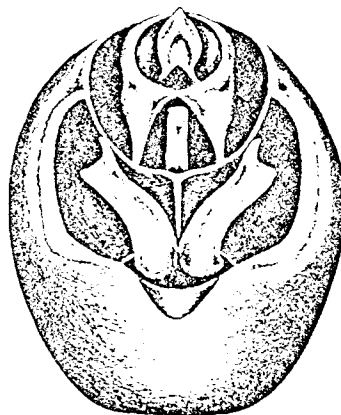
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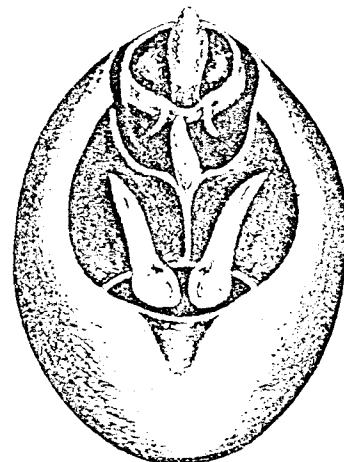
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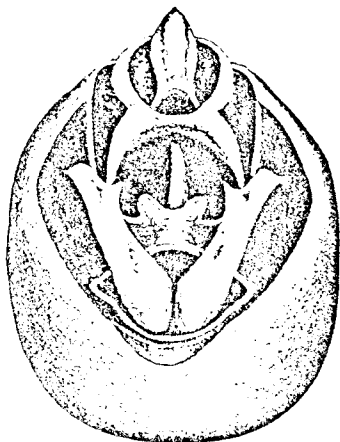
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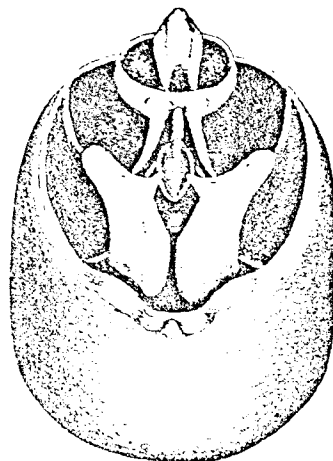
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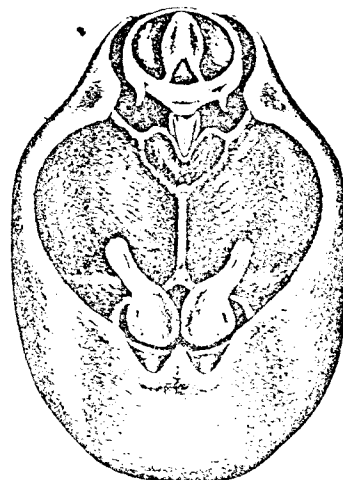
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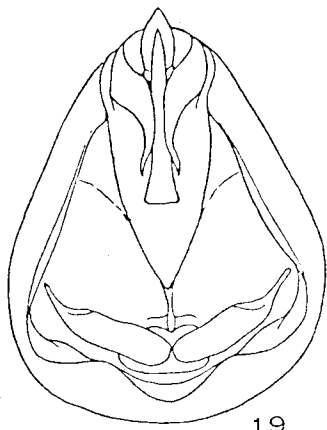
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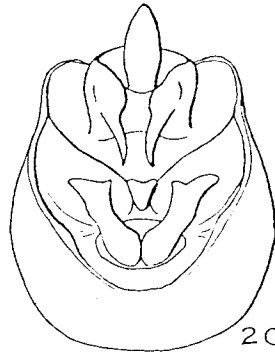
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## PLATE III.

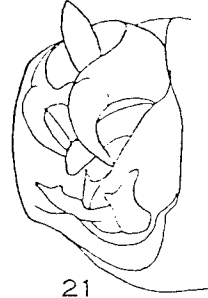
19. *Delphacodes kilmani*, full view pygofer.
20. *Delphacodes nitens*, full view pygofer.
21. *Delphacodes nitens*, three-fourths view pygofer.
22. *Delphacodes lutulentella*, full view pygofer.
23. *Delphacodes lutulenta*, full view pygofer.
24. *Delphacodes cayamensis*, full view pygofer.
25. *Delphacodes cayamensis*, three-fourths view pygofer.
26. *Delphacodes lutulentella*, lateral view of aedeagus.
27. *Delphacodes nigriaster*, full view pygofer.
28. *Delphacodes uhleri*, full view pygofer.
29. *Delphacodes crawfordi*, full view pygofer; left genital style not shown.
30. *Delphacodes montezumae*, full view pygofer.
31. *Delphacodes harauensis*, full view pygofer.
32. *Delphacodes harauensis*, three-fourths view pygofer.
33. *Delphacodes wetmorei*, full view pygofer.
34. *Delphacodes balli*, view of dorsal emargination.
35. *Delphacodes magna*, full view pygofer.
36. *Delphacodes albidens*, full view pygofer.
37. *Delphacodes albidens*, three-fourths view pygofer.
38. *Delphacodes meatei*, three-fourths view pygofer.
39. *Delphacodes detecta*, full view pygofer.



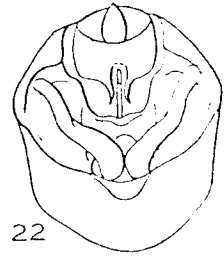
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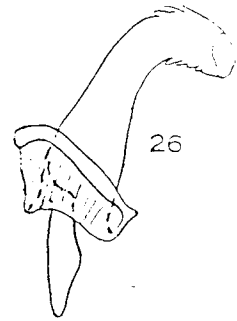
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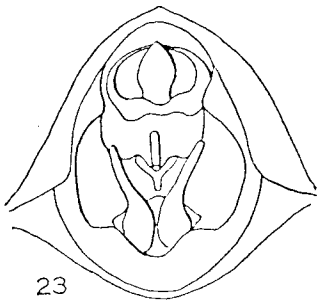
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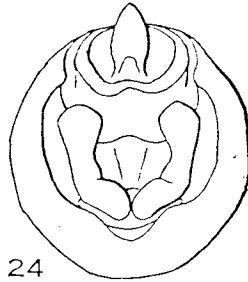
22



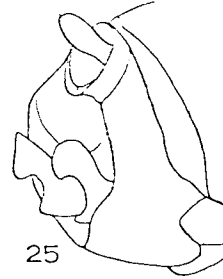
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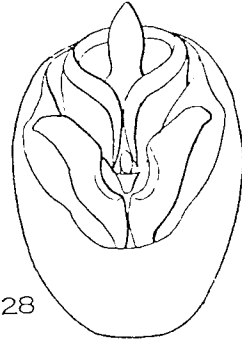
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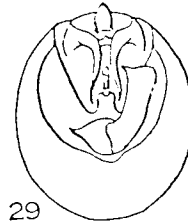
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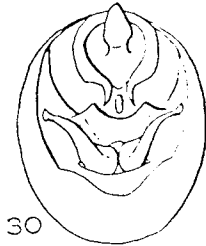
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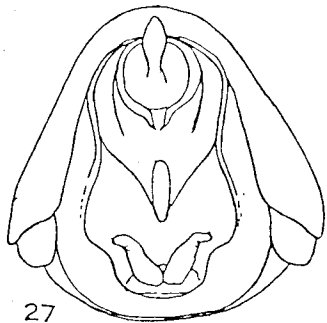
28



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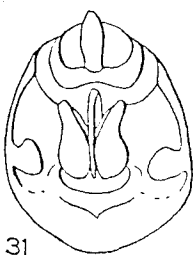
30



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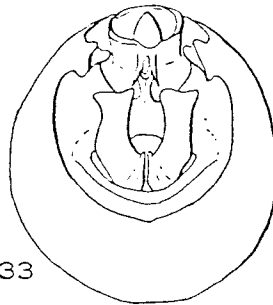
34



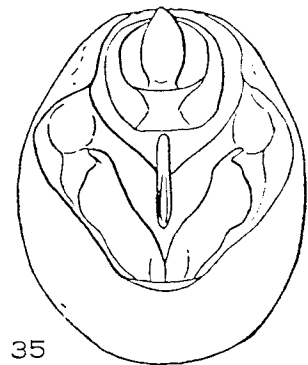
31



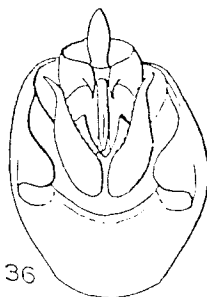
32



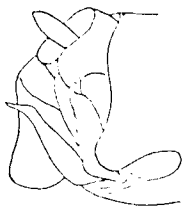
33



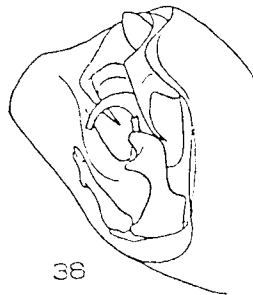
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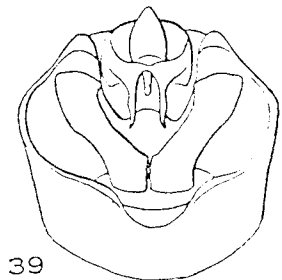
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PLATE IV.

40. *Delphacodes balli*, full view pygofer.
41. *Delphacodes nigripennis*, armature of diaphragm.
42. *Delphacodes nigripennis*, genital styles.
43. *Delphacodes humilis*, full view of pygofer.
44. *Delphacodes humilis*, side view pygofer.
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46. *Delphacodes albinotata*, full view pygofer.
47. *Delphacodes nigra*, full view pygofer.
48. *Delphacodes nigra*, three-fourths view pygofer.
49. *Delphacodes andromeda*, full view pygofer.
50. *Sogata aurantii*, lateral view pygofer.
51. *Eurysa kormusa*, lateral view aedeagus.
52. *Eurysa magnifrons*, full view pygofer.
53. *Eurysa magnifrons*, lateral view aedeagus.
54. *Euidella magnistylus*, full view pygofer.
55. *Euidella magnistylus*, lateral view aedeagus.
56. *Euidella weedi*, full view pygofer.
57. *Euidella weedi*, lateral view aedeagus.
58. *Euidella weedi*, armature of diaphragm.
59. *Delphacodes f-spinosa*, full view pygofer.
60. *Delphacodes nigrifacies*, full view pygofer.
61. *Sogata approximata*, full view pygofer.
62. *Delphacodes haranae*, full view pygofer.
63. *Delphacodes pacifica*, full view pygofer.
64. *Euidella vanduzeei*, left genital style.
65. *Euidella vanduzeei*, lateral view anal segment and aedeagus.

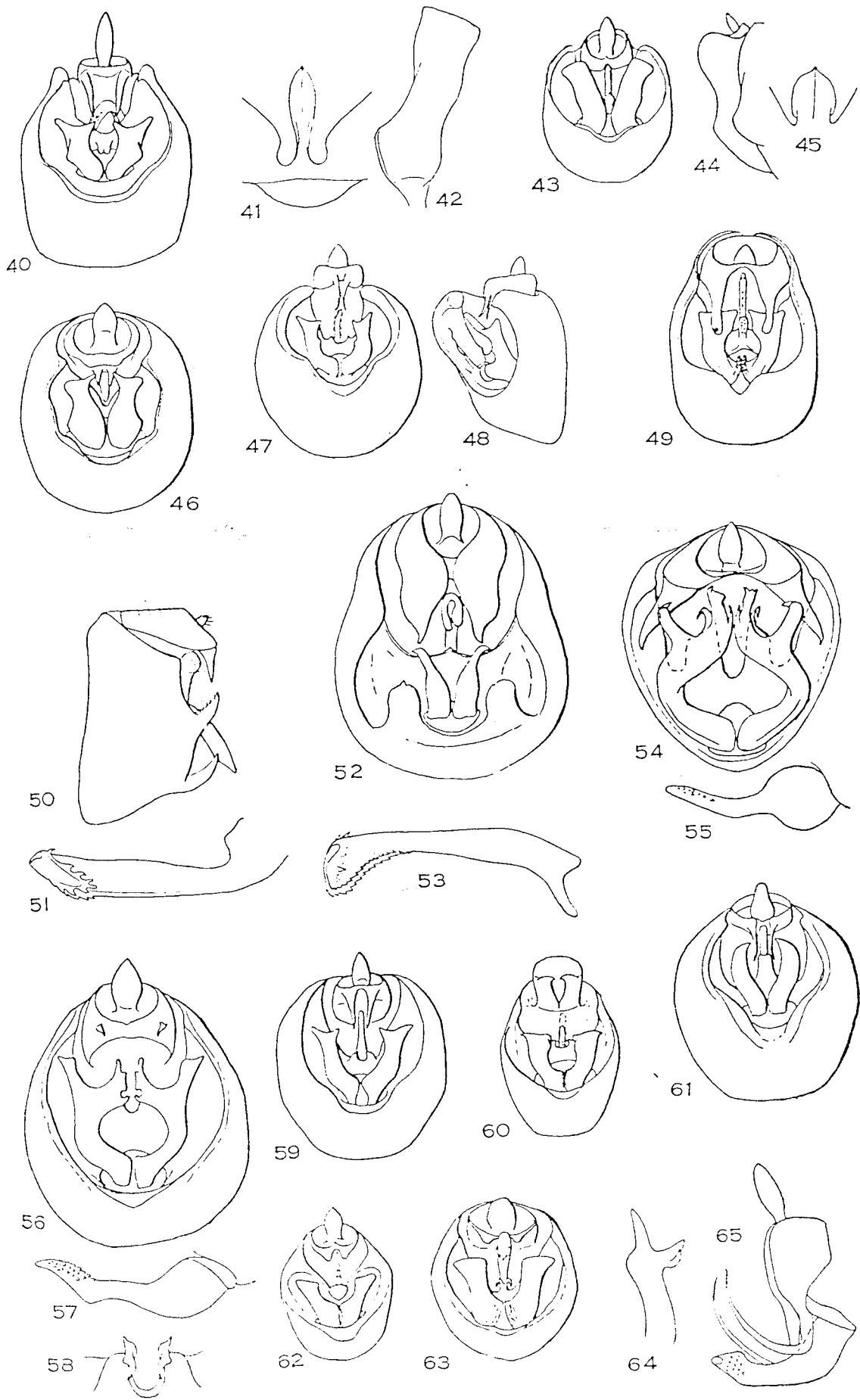
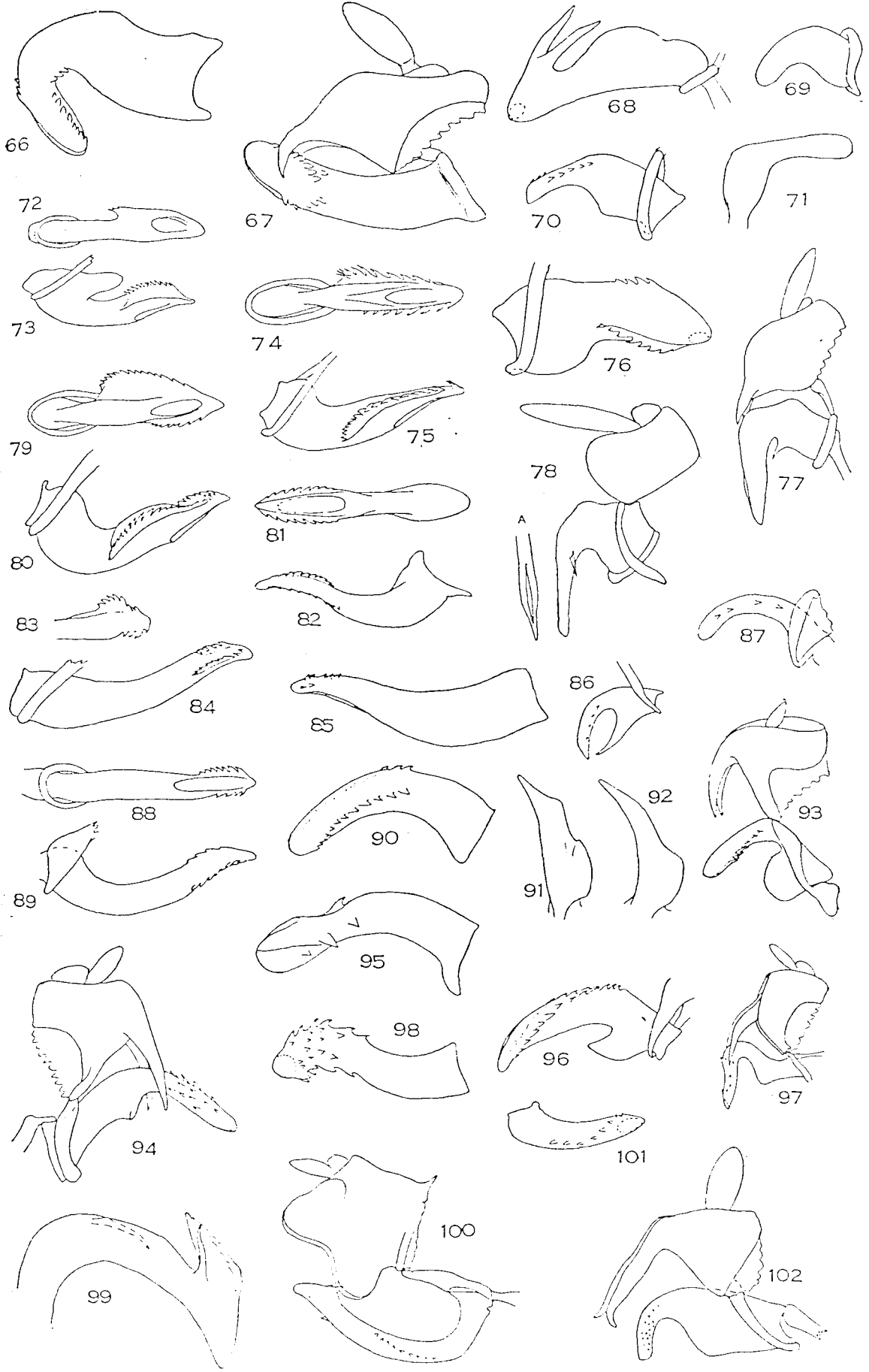


PLATE IV.

PLATE V.

66. *Delphacodes pallidus*, lateral view aedeagus.
67. *Delphacodes kilmani*, lateral view anal segment and aedeagus.
68. *Delphacodes analis*, lateral view aedeagus.
69. *Delphacodes lutulenta*, lateral view aedeagus.
70. *Delphacodes campestris*, lateral view aedeagus.
71. *Delphacodes lutulenta*, right genital style.
72. *Delphacodes consimilis*, ventral view aedeagus.
73. *Delphacodes consimilis*, lateral view aedeagus.
74. *Delphacodes oclusa*, ventral view aedeagus.
75. *Delphacodes oclusa*, lateral view aedeagus.
76. *Delphacodes nitens*, lateral view aedeagus.
77. *Delphacodes albidens*, lateral view of anal segment and aedeagus.
78. *Delphacodes havancensis*, lateral view of anal segment and aedeagus, (a) dorsal view of apex of aedeagus.
79. *Delphacodes lineatipes*, ventral view aedeagus.
80. *Delphacodes lineatipes*, lateral view aedeagus.
81. *Delphacodes neoclusa*, ventral view aedeagus.
82. *Delphacodes neoclusa*, lateral view aedeagus.
83. *Delphacodes forcata*, ventral view aedeagus.
84. *Delphacodes forcata*, lateral view aedeagus.
85. *Delphacodes gillettei*, lateral view aedeagus.
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89. *Delphacodes subforcata*, lateral view aedeagus.
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91. *Delphacodes forcata*, left genital style.
92. *Delphacodes subforcata*, left genital style.
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97. *Delphacodes crawfordi*, lateral view anal segment and aedeagus.
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99. *Delphacodes lateralis*, lateral view aedeagus.
100. *Delphacodes albonotata*, lateral view anal segment and aedeagus.
101. *Delphacodes nigra*, lateral view of aedeagus.
102. *Delphacodes detecta*, lateral view anal segment and aedeagus.





## PLATE VI.

103. *Delphacodes*, *4-spinosa*, lateral view anal segment and aedeagus.
  104. *Delphacodes* *uctmorei*, lateral view aedeagus.
  105. *Delphacodes* *balli*, lateral view aedeagus.
  106. *Delphacodes* *pacifica*, lateral view aedeagus.
  107. *Delphacodes* *andromeda*, lateral view anal segment and aedeagus.
  108. *Delphacodes* *propinqua*, lateral view anal segment and aedeagus.
  109. *Delphacodes* *balboae*, ventral view aedeagus.
  110. *Delphacodes* *puella*, lateral view anal segment and aedeagus.
  111. *Delphacodes* *humilis*, lateral view anal segment and aedeagus.
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  115. *Sogata* *furcifer*, left genital style (Formosa specimen).
  116. *Sogata* *furcifer*, left genital style (Bermuda specimen).
  117. *Sogata* *wallacci*, lateral view anal segment and aedeagus.
  118. *Delphacodes* *havanac*, lateral view anal segment and aedeagus.
  119. *Sogata* *cubanus*, lateral view anal segment and aedeagus.
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  122. *Sogata* *pseudoseminigra*, armature of diaphragm.
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  124. *Nilaparvata* *walcotti*, left genital style.
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  126. *Delphacodes* *nigripennis*, lateral view anal segment and aedeagus.
  127. *Delphacodes* *mexicana*, armature of diaphragm.
  128. *Delphacodes* *mexicana*, right genital style.
  129. *Delphacodes* *mexicana*, lateral view anal segment and aedeagus.
  130. *Sogata* *approximata*, lateral view aedeagus.
  131. *Delphacodes* *nigrifacies*, lateral view anal segment and aedeagus.
  132. *Delphacodes* *tecapac*, lateral view anal segment and aedeagus.
  133. *Sogata* *paludum*, right genital style.
  134. *Sogata* *paludum*, lateral view anal segment and aedeagus.
  135. *Sogata* *paludum*, armature of diaphragm.
  136. Full view of pygofer showing:  
*a*, pygofer; *a1*, *a2*, opening of pygofer (*a1* length, *a2* breadth); *b*, anal angle of pygofer; *c*, anal emargination of pygofer; *d*, diaphragm; *e*, margin of diaphragm; *f*, armature of diaphragm; *g*, anal segment; *h*, anal style; *i*, anal process or spine; *k*, genital style; *l*, inner margin of genital style; *m*, outer margin of genital style; *n*, aedeagus (or penis); *o*, ventral margin of pygofer; *p*, lateral margin of pygofer; *q*, base of pygofer; *r*, orifice or foramen of diaphragm; *s*, basal angle of genital style.
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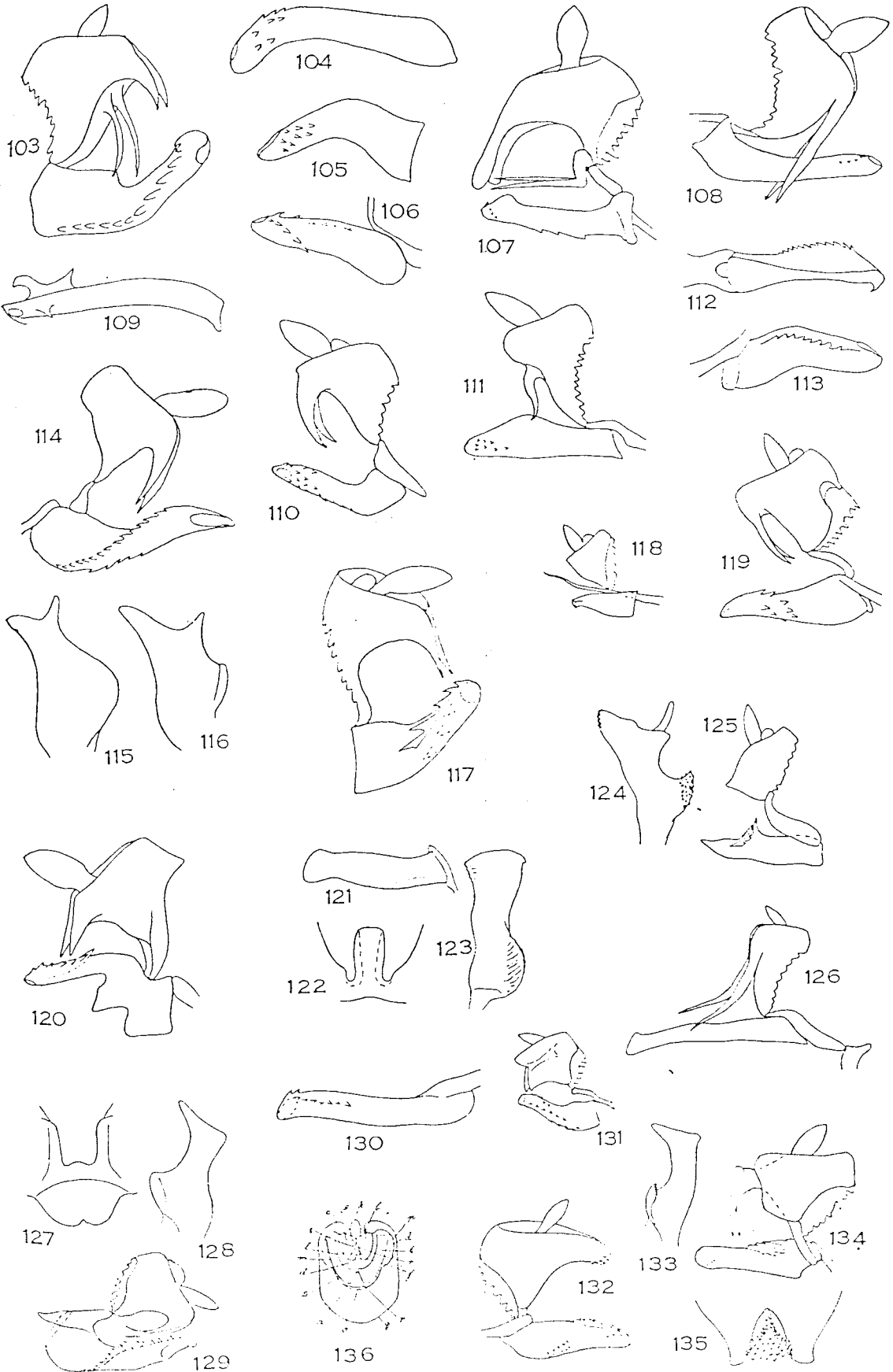


PLATE VI.

## INDEX.

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## SPECIES

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