

## STUDIES IN NORTH AMERICAN FULGORIDÆ.

BY E. P. VAN DUZEE.

The following studies on the Fulgoridæ refer solely to material from the United States and Canada now in my collection or which has recently passed through my hands. The most practical and useful work in this family has been done by Dr. Stal, and even now we must go back to the synoptical tables published in 1866 in Volume IV of the *Hemiptera Africana* for the determination of new or difficult generic forms. The key to the subfamilies given below is intended only for the forms known to inhabit the United States and Canada, and would be of little use with the complicated Fulgorid faunas of the tropics, especially of the Old World. Mr. G. W. Kirkaldy has recently<sup>1</sup> given us a new arrangement of these subfamilies that in some respects is probably more in accord with the biological relationship of these closely related groups, but my knowledge of the tropical Fulgoridæ is much too limited for me to attempt an adjustment of our genera to the groups there laid down; so for the present I prefer to follow Stal's classification as closely as possible.

This paper is not at all monographic in its character, as I touch only on genera and groups I have had occasion to study in working out certain undetermined material in my collection. I have added a few synoptical tables in the hope that they may assist students in locating some of the new or little known forms.

## KEY TO THE SUBFAMILIES OF THE FULGORIDÆ.

- Anal area of the wings reticulated, sides of the clypeus carinate, . . . . . 1, FULGORIDA.  
 Anal area of the wings rarely reticulated, clypeus in this case without lateral carinae, . . . . . 1.  
 1. Posterior tibiæ armed with a movable spur, . . . . . 11, DELPHACIDA.  
 —. Posterior tibiæ without a movable spur, . . . . . 2.  
 2. Clavus granulated; costa dilated, the costal membrane transversely venose, . . . . . 8, FLATIDA.  
 —. Clavus rarely granulated; costa in this case not dilated, . . . . . 3.

<sup>1</sup> Hawaiian Sugar Planters' Assoc., *Ent. Bul.* No. 111, p. 91, 1907.

3. Veins of the clavus not attaining the apex, but united with the commissural margin before the apex, . . . . . 4.
- Veins of the clavus either continued to the apex or united with the claval suture before the apex, . . . . . 5.
4. Apex of the front without an ocellus; elytra reticulated toward their apex, . . . . . 2, DICTYOPHARIDA.
- Apex of the front usually with a third ocellus; elytra not reticulated apically, . . . . . 5, CIXIIDA.
5. Elytra ample, held vertical with the costal margin meeting below the abdomen, closely reticulated over the whole surface; the costal and apical margins without transverse veins; front continued over on to the superior aspect of the head without a transverse carina, . . . . . 7, ACANALONIIDA.
- Elytra when broad held more horizontal, not meeting below nor closely reticulated over the whole surface, and the front usually distinguished from the vertex by a transverse carina at the apex of the head, . . . . . 6.
6. Head broad, with the eyes nearly or quite as wide as the mesonotum; pronotum without carinae or with a median carina only, . . . . . 7.
- Head usually much narrower than the mesonotum; if as wide the pronotum emarginate behind and tricarinate, . . . . . 8.
7. Pronotum truncated behind or at most with a shallow rounded sinus, . . . . . 6, ISSIDA.
- Pronotum angulately emarginate behind, . . . . . 9, RICANIIDA.
8. Elytra distinctly amplified within and overlapping beyond the apex of the clavus, . . . . . 4, ACHILIDA.
- Elytra not amplified within nor overlapping at apex, . . . . . 9.
9. Elytral membrane strongly differentiated from the corium with numerous simple longitudinal nervures, . . . . . 3, TROPIDUCHIDA.
- Elytral venation simple, without a distinct closely veined membrane; pronotum very short, deeply angularly emarginate behind, . . . . . 10, DERBIDA.

Subfamily FULGORIDA Stål.

This subfamily is largely tropical in its distribution; but four genera and five species have thus far been reported from our territory. Doubtless, however, many of the subtropical forms inhabiting Mexico and the West Indies extend their range across our southern border and must eventually be included in our faunal lists.

Subfamily DICTYOPHARIDA Stål.

This subfamily is better represented in our fauna than the preceding; the large genus *Scolops* being almost precinctive. Our genera may be distinguished as follows:

- Elytra as long as the abdomen or longer, . . . . . 1.
- Elytra much abbreviated, not attaining the middle of the abdomen, . . . . . 5.

1. Vertex produced and angulated before or frequently forming a long cephalic process, . . . . . 2.
- Vertex transverse, anterior edge feebly arcuated; elytra in the short-winged form scarcely exceeding the abdomen, convex; anterior femora foliaceous, . . . . . PHYLLOSCELIS Germ.
2. Vertex triangularly produced, rarely more than twice as long as its width between the eyes, with a distinct median carina in our species; pronotum deeply and acutely emarginate behind; color usually green with long greenish-hyaline elytra, . . . . . DICTYOPHARA Germ.
- Vertex produced in a linear cephalic process, without a distinct median carina; elytra shorter, opaque; pronotum truncated or broadly, obtusely emarginate behind, . . . . . 3.
3. Cephalic process abruptly contracted before the eyes; pronotum broadly, obtusely emarginate behind, . . . . . 4.
- Cephalic process not narrowed before the eyes, its sides corrugated; pronotum truncated behind, . . . . . SCOLOPSELLA Ball.
4. Rather stout insects of some shade of pale green or testaceous, becoming fuscous brown in certain species, but not black, . . . . . SCOLOPS Schaum.
- Slender black insects with smoky translucent elytra; inhabit California, . . . . . BELONCHARIS Uhler.
5. Vertex flat, triangularly produced, as long as broad and attaining the apex of the head; pronotum concavely arcuated behind, . . . . . ORGERIUS Stål.
- Vertex short, transverse, occupying hardly one-half of the superior aspect of the head; pronotum very obtusely angularly emarginate behind, . . . . . LOXOPHORA n. gen.

Genus **DICTYOPHARA** Germ.

*Dictyophara curviceps* Stål I have not yet seen. The three species known to me may be separated as follows:

- Vertex fully twice as long as its basal width, median carina extending a little more than halfway to its apex, the three frontal carinæ almost parallel throughout their length, . . . . . *microrhina* Walk.
- Vertex scarcely longer than its width at base, its median carina almost attaining the apex; frontal carinæ more widely separated above, forming a spatulate compartment, . . . . . 2.
  2. Lateral carinæ of the front meeting in an acute angle on its base, concolorous at that point; plates of the female long and slender, ligulate and curved upward, attaining the apex of the pygofers, . . . . . *lingula* Van D.
  - Lateral carinæ of the front meeting at the base in an obtuse angle, together with the marginal carinæ lined with black around the apex of the head; plates of the female short, oblique, and oblong in form, not attaining the apex of the pygofers, . . . . . *florens* Stål.

*Dictyophara microrhina* Walker.

In this species the vertex is much longer than in the two other

species known to me. It is a little more than twice as long as its basal width, or judging only by the eye it appears much longer; the three frontal carinæ are straight and parallel throughout their length, converging to a point on the subacute base. The plates of the female are ferruginous, ligulate, but not quite as slender as in *lingula*, and scarcely attain the apex of the green superior pieces. The elytra are the same pale greenish hyaline with green nervures that we find in *lingula*, but in some examples they show a distinct brownish tinge toward their apex; the stigma has three or four areoles. Length 13-14 mm.

I took this species at Woodbine, New Jersey, in August, 1902, and on Staten Island in August, 1904.

*Dictyophara florens* Stål.

Vertex a little longer than its basal width; median carina precurrent, on either side of this is a short lateral carina which is scarcely indicated in Mexican specimens. Front broad, the margins strongly reflexed and a little expanded before the eyes and next the clypeus; three discal carinæ very prominent, the lateral almost attaining the clypeal margin, diverging toward the base where they roundedly converge and meet in an obtuse angle, and together with the marginal carinæ are marked with a black line. Carinæ of the pronotum and mesonotum distinct, the latter converging and meeting before attaining the pronotal margin. Valve of the female short, transverse, oblique within; plates oblong, rounded at apex, oblique, not attaining the apex of the pygofers. Sides of the genital segment of the male slightly oblique at apex, the dorsal angle very obtusely rounded.

I took a good series of this species from a coarse grass at Effingham, Kansas, in July, 1900. They agree in every respect with Mexican material in my collection, except that the base of the vertex is distinctly tricarinate. This would throw the species into another section in Stål's synopsis (*Rio Jan. Hemip.*, p. 64), but they certainly are not distinct.

*Dictyophara lingula* n. sp.

Closely allied to *florens*. Pale green, lighter beneath and tinged with rufous on the tibiæ. Vertex a little more produced, carinæ distinct. Front somewhat broader than in *florens*, its sides almost rectilinear, the three discal carinæ prominent, slightly diverging to a point before the anterior angle of the eyes, then deflected and running straight to the apex where they unite in an acute angle; apically they run straight to the clypeal suture. Rostrum longer than in *florens*, distinctly surpassing the posterior trochanters. Pro- and mesonotum substantially as in *florens*, but the former a little broader and more truncated between

the eyes; the mesonotal carinæ more parallel, almost continuous with those of the pronotum. Elytra a little narrower and more slender, with a closer venation at apex. Valves of the female longer than broad, parallel at base within; plates long and strap-shaped, curved upwards and reaching the apex of the pygofers. Sides of the genital segment of the male very oblique, extended to a subacute angle dorsally, the plates long, ovate, obtuse at apex and attaining the tip of the pygofers.

Described from one female and two male examples taken by me at Cape May and Anglesea, New Jersey; one male taken at Wildwood, New Jersey, by Prof. C. W. Johnson; one female from Anglesea, New Jersey, received from Prof. J. B. Smith; and Mrs. Slosson has sent me a specimen from Florida. This species is very close to *florens*, but the genital characters are very different and the apex of the front is more acute with concolorous carinæ.

Genus **SCOLOPSELLA** Ball.

*Scolopsella reticulata* Ball.

Dr. E. D. Ball has described both this genus and species in the *Proceedings of the Biological Soc. of Wash.*, Vol. XVIII, p. 118, 1905. I have recently received from Prof. J. B. Smith a fine pair of this interesting insect taken in the Colorado Desert. Dr. Ball's type was collected in Arizona by Prof. F. H. Snow. This insect is dark fuscous varied or tessellated all over with pale fulvous-brown. It has much the appearance of a *Dictyophara*, but the long cephalic process is linear or a little spoon-shaped at apex and corrugated along the sides. I would place the genus in our fauna between *Dictyophara* and *Scolops*.

Genus **SCOLOPS** Schaum.

Of this peculiar genus sixteen species have been described from our country, not counting *pungens* of Germar, which may prove to be identical with some one of our eastern forms described by our later entomologists. Of these, thirteen species are now represented in my collection. For a synoptical arrangement they require a more thorough study than I am now able to give them.

Genus **PHYLLOSCELIS** Germ.

This genus is readily distinguished by its short vertex and foliaceous anterior femora. Two species have been described:

*Phylloscelis pallescens* Germ.

Described from Pennsylvania, but it is common in New Jersey. The

macropterous form has a very simple elytral venation; the longitudinal nervures fork near their base and run straight to the apex, before which they are connected by one series of transverse veins; in the center of each areole is a longitudinal carina simulating a supernumerary nervure.

***Phylloscelis atra* Germ.**

Described from Pennsylvania, and I have taken it in New Jersey and Kansas. In the macropterous form of this species the radial and outer ulnar nervures run straight and unforked to near the apex, the inner ulnar is forked near the apex; thus making three large subapical and seven or eight very small apical areoles. The elytra are opaque, impunctate, but minutely shagreened, and want the longitudinal carinae found in *pallescens*.

Dr. Melichar has described a variety, *albovenosa*, of this species that seems always to be found with the typical form. It is piceous, with pale legs, scutellum and elytral nervures.

Genus **ORGERIUS** Stål.

The only North American species of this genus, *rhyparus* Stål, was described from California. Dr. Ball and I took this species in numbers at Rifle and Grand Junction, Colorado, in July, 1900. No long-winged form has yet been recorded.

**LOXOPHORA** n. gen.

Related to *Orgerius* and *Phylloscelis*. Head much narrower than the pronotum. Vertex short, transverse, foveate, not attaining the apex of the head. Front long and parallel, its base returned over on to the superior aspect of the head, anteriorly with a raised tricarinate linear median compartment. Clypeus roundly narrowed to the apex, distinctly tricarinate. Antennae placed some distance below the lower angle of the eye. Pronotum short, roundedly produced between the eyes, hind edge broadly angularly emarginate, carinate on the middle line; sides with one carina behind the eye; pectoral flap very large. Mesonotum rather small, tricarinate. Elytra short, truncated, reaching the apex of the second tergal segment, with three longitudinal carinae, the inner forked before the apex, surface with a few reticulations. Tergum carinate. Posterior tibiae with four spines in the male.

This genus has the short and broad form of *Orgerius* and the short vertex of *Phylloscelis*. The tricarinate compartment of the front is narrower and the pronotum is shorter and more emarginate than in

either of those genera. I cannot agree with Melichar in placing *Phylloscelis* in the *Issida*. It is closely allied to *Orgerius* and *Scolops*. In the macropterous examples the claval nervure is united with the commissural and not continued to the apex as in the *Issida*.

*Loxophora transversa* n. sp.

Form of *Orgerius rhyparus* Stål. Vertex transverse, about half the length of the superior aspect of the head, differentiated from the base of the front by a transverse, slightly angled carina. Linear tricarinate compartment of the front attaining the apex of the head, not continued on the reflexed superior base, its lateral carinae diverging at apex on the basal suture of the clypeus. Pronotum scarcely longer than the vertex, a little wider behind the eyes, distinctly produced anteriorly between the eyes. Mesonotum short, tricarinate, the lateral widely divergent, following the hind edge of the pronotum for half their length and leaving but a small compartment at either lateral angle. Elytra feebly reticulated between the longitudinal nervures. Tergum with three broken carinae on either side of the median, one marginal and two intermediate. Length to tip of the abdomen 4 mm., greatest width  $2\frac{1}{2}$  mm.

Color testaceous brown, base of the vertex with a transverse black line; base and sides of the front, pronotum, lateral angles of the mesonotum and the lateral disks of the tergal segments ornamented with large distinct round black punctures. Face and sides of the chest crossed by a broad creamy white transverse band between two black ones; the lower of these latter is varied with paler, the upper is deep black and on the disk of the inferior pronotal flap is intensified and brilliantly polished; median compartment of the front above the black transverse band black with white carinae. Anterior edge of the pronotum beneath the eyes black, the lower edge of the inferior flaps whitish. Disk of the mesonotum between the lateral carinae creamy white with the apex black. Elytra piceous brown with a broad subapical creamy white band. Tergum black at base of the apical segments, disk of the fourth segment creamy white between the intermediate carinae. Venter varied with dark brown and creamy white. Legs brown, anterior and intermediate femora twice banded with pale, posterior tarsi and tibial spines blackish.

Described from one male example kindly sent to me by Prof. H. F. Wickham and labelled "Ch. Ranch, Utah, July 22." This strikingly marked insect is so distinct from any other described species I do not hesitate to describe both the genus and species from a single specimen.

## Subfamily TROPIDUCHIDA Stål.

Of this subfamily but two species have heretofore been recorded from our territory: *Tangia spona* Uhler and *Monopsis tabida* Spin., both from Florida, but doubtless others will yet be found along our southern border. I describe below a third species which has been masquerading in our collections under a false name.

Genus **PELITROPIS** n. gen.

Closely allied to *Tambinia* Stål and differing principally by its wider head, ecarinate front and different elytral venation. Head with the eyes as wide as the pronotum or nearly so, laminately flattened. Vertex produced, flat; base angularly emarginate; sides parallel; margins and middle line carinate. Front almost horizontal, broad, sides parallel, base angularly rounded, disk a little depressed, ecarinate. Clypeus a little convex, ecarinate. Pronotum roundly produced before, deeply angularly emarginate behind; tricarinate, the lateral carinae curved, almost attaining the posterior angles. Mesonotum tricarinate, the lateral approximate before, the median terminating in a transverse furrow before the apex. Elytra long and narrow, parallel, with a very slender costal membrane; radial nervures simple; first ulnar forked behind the middle, second at the middle; claval nervures united before the middle of the commissural margin, the resulting nervure attaining the apex of the clavus; apex of the elytra subangularly rounded; inner edge of the membrane almost rectilinear, outer curved; base of membrane separated from the corium by a subangulated line of transverse nervures, behind which eight longitudinal nervures run straight and almost parallel to the apex; these are crossed about half-way to the apex by a second series of transverse veinlets; a few supernumerary veinlets may occur on the disk either side of this second line, and two short longitudinal nervures are interpolated near the inner angle; apical margin with a very narrow areolate or punctate appendix. Posterior tibiæ trispinose.

This genus is very near *Tambinia* Stål from Ceylon, and in our fauna should be placed near *Monopsis* and *Tangidia*.

***Pelitropis rotulata*** n. sp.

Pale green obscurely varied with brown. Vertex as long as broad, anterior margin obtusely angled, almost parallel with the posterior; edge carinate all around, median carina distinct, surface depressed with a few lineations, most conspicuous of which are two on the middle and two on either side anteriorly, placed at right angles to and touching the margin. Cheeks before the eyes narrow, pointed, together with



the pleuræ and sides of the pronotum deeper green, marked with black above under the lateral carinæ of the vertex and with a short parallel line below from the anterior angle of the eye. Front almost horizontal, its disk oblong, depressed; its length one-third greater than its width; its sides parallel and its base obtusely angled, the apical angles cut off in line with the sides of the clypeus. Clypeus an equilateral triangle, the three sides rectilinear. Ocelli minute, placed next the lower angle of the eye. Antennæ placed against the inferior edge of the eye; base green cylindrical, next joint brown, surmounted by a slender brown seta. Pronotum of about equal length across its whole width, deeply acutely emarginate behind; carinæ distinct, the lateral meeting the median before, curved, at first concentric with the anterior edge, almost attaining the prominent posterior angles; sides tricarinate behind the eyes, the inferior carina bounded above by a black line, and there are a few obscure marks along the disk anteriorly. Tegulæ small with a black disk. Mesonotum with some obscure marks on the disk. Elytra pale greenish pellucid, sparsely dotted with black along the nervures of the clavus and corium; those along the costa drawn out in oblique false veinlets; tip of the membrane a little smoky with some of the transverse veins brownish. Beneath deeper green, the legs paler with the tips of the tarsal and tibial spines and a mark on the apex of the femora exteriorly blackish. Length 7 mm.

Described from three examples from Florida. One is a fine fresh specimen kindly given me by Mrs. Slosson, the other two are old specimens changed to a dull testaceous brown. This species is frequently determined as *Monopsis florida* Walker. Mr. Otto Heidemann has kindly compared this with National Museum material and sends me the names used here for the genus and species. These were given by Dr. Uhler, who recognized it as distinct from *Monopsis*, but who it seems never published either the genus or species.

#### Subfamily ACHILIDA Stål.

Genus **HELICOPTERA** A. and S. (1843). (*Elidiptera* Spin. 1839).

This genus was first described as *Elidiptera* by Spinola, and I can see no valid reason for the change made by Amyot and Serville; but as the more recent name has been almost universally adopted I have thought best to retain it here. Our species may be distinguished as follows:

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| Color black, front white or banded with white, . . . . .               | 1. |
| Color brown or grayish, . . . . .                                      | 2. |
| 1. Vertex about as long as broad; front white with a black basal band, |    |
| <i>opaca</i> Say.  |    |

- Vertex twice as long as broad; front white without a basal band, abdomen red, . . . . . *colorata* Van D.
- 2. Front transversely banded, . . . . . 3.
- Front unicolorous, perhaps shading a little darker toward the base, not banded, . . . . . 4.
- 3. Front brown, base abruptly darker; elytra narrow, parallel, wider toward the apex, indistinctly variegated or irrorated; pronotum deeply, angularly emarginate behind, . . . . . *Slossoni* Van D.
- Front creamy white with a fuscous base and brown clypeus; elytra expanded, the costal edge quite uniformly rounded; surface distinctly variegated; pronotum obtusely emarginate behind, . . . . . *pallida* Say.
- 4. Vertex as long as broad; pronotum strongly produced, truncated between the eyes; elytra brown, very obsolete variegated; front unicolorous, pale testaceous brown; venter blackish fuscous, . . . . . *septentrionalis* Prov.
- Vertex distinctly broader than long; pronotum less produced, rounded before between the eyes; front irrorate, shading to darker at base; elytra variegated, . . . . . *variegata* Van D.

*Helicoptera vestita* Prov. is evidently a synonym of *opaca* Say. *Monopsis floridae* and *fusca* Walker are placed by Stål in *Helicoptera*, but they are unknown to me in nature.

***Helicoptera opaca* Say.**

This large and broad species is black with the elytra more brownish and opaque, the areoles closely and minutely dotted with pale and with a pale stigmatal spot; the face is deep black with a broad transverse band of yellowish white covering the front to the superior line of the eyes. This pale band is extended more narrowly along the sides of the pleuræ. Antennæ pale fulvous. This seems to be a rare and local form. I took one example at Phœnicia, in the Catskills, in August, 1904, and Mr. John D. Evans, of Trenton, Ontario, has sent me another for study that he took in County Hastings, Ontario. Mr. Evans' specimen, which is a male, has the pronotum and disk of the vertex obscurely irrorate with pale. I have seen one or two additional specimens in other collections.

***Helicoptera colorata* n. sp.**

Allied to *opaca*, but smaller and narrower with a strongly produced vertex. Black, front and vertex white, venter sanguineous. Vertex long, moderately narrowed toward its rounded apex, its length a little more than twice its width at base; median line almost obsolete, disk soiled white, margins strongly reflexed, black. Front long, much narrowed toward the base, precurrent median carinæ feeble; reflexed margins expanded towards the base of the clypeus; white with the

margins black beyond the apical angle of the eyes; sides of the head to the lower line of the eyes and the clypeus black; antennal base soiled yellowish white like the vertex. Pronotum rather obtusely angularly emarginate behind, strongly produced before, the narrow apex truncated before between the eyes; carinæ strong, the lateral straight and almost reaching the hind margin; color black, a little piceous between the carinæ, the deflexed sides edged with white below. Mesonotum black, opaque, the carinæ distinct at base, becoming obsolete, the lateral at the middle, the median beyond the middle; metanotum apparently rufous. Elytra narrow, but little expanded at base, appendix broad; color black, nervures mostly pale, areoles except along the costa and on the appendix dotted with pale, mostly in a single row in each areole; stigma concolorous. Wings deep smoky brown with fuscous nervures. Sternum black anteriorly, pale posteriorly and about the coxæ; propleuræ edged with white above. Anterior and intermediate legs black, posterior brown. Abdomen sanguineous, perhaps somewhat fuscous above; apical pieces paler edged with black. Sides of the genital segment of the female feebly arcuated, not at all sinuated. Length 8 mm.; width across the elytra scant 3 mm.

Described from one female example swept by me from bushes on a wooded hillside at Gowanda, New York, August 7, 1907. This is a beautiful addition to our Fulgorid fauna. Its strongly produced head, white front, sanguineous abdomen and narrower and blacker elytra, wanting the stigmatal spots, will at once distinguish this from *opaca*. The elongated head seems to ally this species with genus *Pseudohelicoptera* Fowler, but by itself does not seem to warrant the establishment of a separate genus. Fowler's species probably is not congeneric with this.

*Helicoptera pallida* Say.

Mrs. Slosson has sent me specimens of this species and *septentrionalis* Prov. from the White Mountains that show them to be sufficiently distinct. *Pallida* is proportionately broader than any of our other described species; the vertex is about as long as broad, being longer than in *variegata*; the elytra are very pale brown, closely irrorated and reticulated with pale, these colors being about evenly divided; there are a few larger brown spots, about two on the disk of the corium and three toward the apex, the latter somewhat broken by the pale nervures. The front is pale with its base abruptly, and the clypeus brown. This pale color is extended along the sides of the pleuræ and is bounded above with black. Abdomen mostly fuscous; metanotum rufous. Last ventral segment of the female sinuated, subangulated on either

side; genital segment quite deeply notched toward its ventral aspect. Length 9 mm.; width across the elytra about 4 mm.

*Helicoptera septentrionalis* Prov.

A little narrower than *pallida* with the elytra less expanded, the vertex shorter and the pronotum more deeply angularly emarginate. Front uniformly pale testaceous brown; pleuræ marked as in *pallida*. Elytra more uniformly colored, the claval and costal nervures distinctly alternated; apical field with three brown points and there are indications of three minute ones along the costal areole; abdomen blackish, pale at tip. Last ventral segment of the female feebly sinuated, rounded on either side, edge of the genital segment truncated, scarcely if at all sinuated. Length 8 mm., width across the elytra scant 4 mm.

This species is very close to *pallida*, and without the two for direct comparison it would be difficult to distinguish satisfactorily between them. They are sufficiently distinct, however, and I feel sure that I have rightly identified them here.

*Helicoptera slossoni* n. sp.

Allied to *variegata*, but proportionately much narrower and with a slightly longer vertex.

Vertex about as long as the median line of the pronotum. Front narrower at base which is rounded, as is the apex of the vertex; its sides straight in the female, slightly arcuated in the male; its color ferruginous brown in the female, yellowish in the male, scarcely irrorate, abruptly darker at base. Produced anterior margin of the pronotum subtruncated between the eyes; lateral carinæ almost straight, a little curved anteriorly; median carinæ short, basal; carinæ of the mesonotum obsolete posteriorly. Vertex, pronotum and mesonotum fuscous brown, minutely irrorated with pale; deflexed sides of the pronotum deep black edged with white in the male and ferruginous yellow in the female; disk of the mesonotum darker with the extreme tip pale. Elytra fuscous brown quite regularly irrorated with paler, and marked in the female with a fuscous spot on the stigma and several round points on the disk, arranged three in a row on the costal areole, three clustered in the apical field and two on the disk of the corium at about the middle. Wings smoky with fuscous nervures. Lower surface and legs in the female pale brownish varied with flavous on the sides of the pleural pieces, the abdomen fuscous, pale on the apex and in places on the edges of the segments; in the male the lower surface becomes yellowish, with the pleural pieces edged with black above and the abdomen more or less fuscous. Sides of the genital segment of the

female obliquely truncated, scarcely sinuated. Length 8 mm., width across the elytra 3 mm.

Described from one pair taken on Mt. Washington by Mrs. Annie Trumbull Slosson. It affords me pleasure to dedicate this interesting species to Mrs. Slosson as a slight recognition of her valuable services to entomology in bringing to light so many new and rare insects.

This species may readily be recognized by its uniformly dark color, slender form and narrow elytra with the appendix but slightly developed.

*Helicoptera variegata* n. sp.

Larger than *pallida* and *opaca*; grayish varied with pale fuscous brown. Vertex shorter than in any other *Helicoptera* known to me, about the length of the eye in its greatest superior diameter, regularly rounded before, disk pale with a longitudinal furrow, edge reflexed, darker. Front narrow, contracted basally, the sides almost sinuated, distinctly tricarinate and with the clypeus pale brownish shading to darker basally and along the carinæ, more or less distinctly irrorated with pale; clypeal suture quite strongly angulated. Pronotum shorter and more deeply emarginate than in *pallida*, the produced anterior margin rounded between the eyes, lateral carinæ broadly rounded outwardly, median carina feeble but almost attaining the anterior margin in one example, upper surface of the pronotum brown or ferruginous brown, closely irrorated with pale, below the carinate edge deep black, bordered with white. Mesonotum brown or ferruginous, irrorated with pale, becoming darker before the pale apex and marked with a darker line without the base of the lateral carinæ close to the basal angles. These carinæ feeble, especially the median. Elytra brown varied with gray patches, most conspicuous of which is one along the base of the inner claval area, about four very irregular and indefinite ones along the median line of the corium and another adjoining the blackish apex of the clavus; the dark areas irrorate with pale in places and the nervures more or less irrorated, those at the apex pale; about three fuscous points in the costal area and three others approximate in the apical field. Wings smoky, darker toward their apex, the nervures fuscous. Beneath testaceous varied with pale brown; disk of the ventral segments sometimes fuscous. Legs pale brown with the knees still paler. Sides of the genital segment of the female quite deeply angularly emarginate. Length 8 to 10 mm.; width across the elytra about 4 mm.

Described from one female example taken by Mr. W. Metcalf at Ottawa, Ontario, and a pair somewhat longer and paler taken by Mrs.

Slosson at Franconia, New Hampshire. Mrs. Slosson has also sent me a male taken at Richmond, Virginia, which I believe belongs to this species. In this the elytra are pale brown, irrorated but scarcely variegated with gray. This is the species most commonly received from correspondents, and I have formerly determined it as *septentrionalis* Prov., but a fine series of *Helicopteras* recently received from Mrs. Slosson has enabled me to correct this determination.

Genus **CATONIA** Uhler.

This genus was founded by Dr. Uhler in 1895 (*Proc. Zool. Soc.*, p. 61). It is certainly very close to *Plectoderes* Spinola, which is still unknown to me in nature, but it has a somewhat different aspect and undoubtedly is sufficiently distinct. I would distinguish it from *Helicoptera* by its narrower, more elongated form and the much shorter pronotum, which forms a rounded flap behind the eyes and not a longitudinal compartment as in *Helicoptera*. Dr. Uhler states that the posterior tibiæ are unarmed, but this is not strictly true of any of the species known to me. All, including *intricata*, the type species, have a minute spine placed much nearer the base than in *Helicoptera*, and in *fusca* there are two such spines. In *Catonia* the basal joint of the antennæ is almost globular, while in all the *Helicopteras* known to me this joint is much more elongated. The three species of *Helicoptera* described by Fowler in the *Biologia* evidently belong to this genus.

*Catonia cinctifrons* Fitch is unknown to me, but our other seven species may be separated as follows:

- |   |                          |
|---|--------------------------|
| Front conspicuously transversely banded, . . . . .  | 1                        |
| Front not distinctly banded, . . . . .  | 4.                       |
| 1. Hind tibiæ with two small spines, elytra uniformly fuscous dotted with pale; inhabits California, . . . . .  | <i>fusca</i> Van D.      |
| — Hind tibiæ unispinose, . . . . .  | 2.                       |
| 2. Elytra unicolorous, nervures impunctate, . . . . .   | <i>impunctata</i> Fitch. |
| — Elytra variegated, nervures punctate, . . . . .   | 3.                       |
| 3. Larger, front strongly narrowed basally, this base scarcely banded, . . . . .  | <i>nava</i> Say.         |
| — Smaller, front not greatly narrowed basally, transverse bands two, conspicuous, . . . . .   | <i>picta</i> Van D.      |
| 4. Larger, elytral areoles with numerous incomplete transverse veinlets, apex of mesonotum with a pair of ocellated black points, . . . . .                           | <i>grisea</i> Van D.     |
| — Smaller, elytra maculated, without reticulating veinlets, . . . . .   | 5.                       |
| 5. Vertex and base of the front broader; elytral areoles almost immaculate, with a whitish transverse band indicated across the apical third of the clavus, . . . . . | <i>pumila</i> Van D.     |

- Vertex and base of the front narrower; elytral areoles more variegated and minutely dotted with pale in the darker areas; inhabits the West Indies, . . . . . *intricata* Uhler.

*Catonia fusca* n. sp.

Form and size of *grisea*; fuscous brown; elytra unicolorous dotted with white; front banded. Length  $5\frac{1}{2}$  mm.

Vertex short, transverse, brown with pale carinæ, anterior and posterior margins parallel, hardly arcuated. Front about as in *impunctatâ*; rather broad and but little narrowed basally, the carinæ strong, the marginal well elevated; whitish tinged with fulvous brown on the base and toward the apex of the clypeus; crossed by two broad black bands; margins scarcely dotted toward their base. Antennæ brown with their setæ black. Pronotum blackish with pale carinæ, the lateral concentric as in all the species known to me, with about three branches to the hind margin. Mesonotum fulvous with the three straight parallel carinæ and extreme apex pale, the carinæ margined with fuscous. Elytra uniformly smoky brown, a little paler toward the margins, nervures pale toward the apex, areoles dotted with pale. Abdomen with pale segmental margins; pleural pieces fuscous varied with pale. Legs pale brown, becoming a little darker at the knees.

Described from one female specimen collected in San Mateo County, California, by a Mr. Coleman.

*Catonia nava* Say.

This is a somewhat larger and darker species than *grisea*, with the front strongly narrowed basally; base brown minutely irrorated with paler, followed by a white transverse median band and then a blackish band next the base of the pale clypeus; the marginal carinæ dotted with pale. Mesonotum tinged with fulvous with a large blackish central cloud. The elytra quite strongly variegated and dotted on the nervures. I have taken this species at Hamburg and Gowanda, New York, and have seen others from the Eastern States.

*Catonia cinctifrons* Fitch.

I have not yet seen anything that just answers to the description given by Fitch, but this seems to be a good species very near to *nava* and is perhaps Say's variety "a" of that species.

*Catonia picta* n. sp.

Allied to *nava* and *cinctifrons*. Face white with two black bands; mesonotum rufopiceous; elytra obscurely banded. Length  $5\frac{1}{2}$  mm.

Front broad, but slightly narrowed at base; clypeus short, conical, and with the front tricarinate, the lateral carinæ marginal, strongly elevated.

Vertex short, broader than long, but feebly advanced before the eyes, obtusely angled before; margins and middle line carinate. Pronotum very short, almost linear, tricarinate. Mesonotum much longer than the pronotum and vertex together, tricarinate, the lateral carinae rectilinear, very slightly diverging posteriorly.

Color testaceous gray; mesonotum and a large costal spot or indistinct transverse band on the basal third of the elytra obscure rufopiceous, behind this dark band is a broad indefinite whitish vitta; nervures mostly dotted, the dots on the costa and commissure larger; commissure with four black points, two on either margin of the whitish band; tip of the scutellum, a chain of points on the pronotum and a few on the vertex whitish. Beneath pale fulvous. Front deep black with a broad median transverse band of ivory white; the marginal carinae dotted with white and an indefinite whitish band crosses the base of the clypeus. Tip of the rostrum and tarsal spines black; knees discolored.

Described from one example taken at Lakehurst, New Jersey, August 18, and kindly sent to me for study by Prof. John B. Smith. This may be the variety "a" of Say's *nava*, although that is more likely to be the *cinctifrons* of Fitch, but it is a very distinct species. Its smaller size, strongly marked front, and less maculated elytra, showing obscure transverse banding, will distinguish it.

*Catonia impunctata* Fitch.

This species, like *cinctifrons*, was described by Fitch as a *Cixius*. It is a little smaller than *nava* with the elytra testaceous brown, subhyaline, almost immaculate, with the nervures touched with white in places, indicating a transverse band near the middle and on the base of the apical areoles. Fitch seems to have described the male and included the female as a variety. The female has the whole basal portion of the face black, with the black marks on the vertex and pronotum scarcely indicated. I have taken this species at Phoenicia in the Catskills, and have received specimens from Pennsylvania and elsewhere in the Middle States. The *Myndus impunctatus* of my Buffalo list was *sordidipennis* and not the present species.

*Catonia grisea* n. sp.

Nearest to *intricata* Uhler, but a little larger and paler; elytra gray varied with white; front pale feebly maculated; mesonotum brown with two black points posteriorly. Length 6-7 mm.

Front elongated, quite strongly narrowed basally with the sides almost straight and the carinae strong; pale flavous, in the female



obscurely irrorated on the base of the front and clypeus leaving a paler intermediate band, indicated on the marginal carinæ by two brownish spots. Vertex almost square, feebly angled anteriorly, projecting about half its length before the eyes, the lateral fovæ marked with a dark point. Pronotum shorter than the vertex, rather sharply angled and marked with a blackish line beneath the eye. Mesonotum pale, quite strongly maculated with brown in the female, with pale carinæ and a black point posteriorly placed in a pale annulus within the lateral carinæ. Elytra whitish tinged with smoky especially toward their tips; the nervures white, the areoles with numerous imperfect transverse white veinlets; on the costa are a few larger brown spots. Beneath pale, the abdomen fuscous with the segments edged with pale.

Described from a series of both sexes taken at Niagara Falls, Hamburg and Gowanda, New York, and one female taken on basswood at Ottawa, Ont., by Mr. W. Metcalfe. This is our most abundant northern species of *Catonia*. It varies some in the extent of maculation on the vertex, pronotum and mesonotum, but the pair of ocellated points near the tip of the scutellum seems to be a persistent character.

*Catonia pumila* n. sp.

Allied to *grisea*, but much smaller and wanting the ocellated points before the apex of the scutellum. Length 4 mm.

Vertex longer and narrower than in *grisea*, projecting for more than half its length before the eyes, subangularly rounded before. Front proportionately a little broader and shorter than in *grisea*; carinæ distinct, but the marginal not as strongly elevated as in its ally. Color yellowish testaceous tinged with fulvous on the vertex and scutellum and with the carinæ slightly paler. Pronotum pale obscurely dotted with brown; front nearly immaculate, the marginal carinæ obscurely dotted; eyes and antennal setæ black. Elytra obscure brownish hyaline becoming fulvous along the costa; a whitish transverse band is indicated before the apex of the clavus, and the apex of the corium and some vague areas along the costa are paler; apical nervure margined within by a fuscous vitta which is broken by the pale veins; all the nervures more or less distinctly dotted with pale. As in the allied species the wings are smoky hyaline with strong fuscous nervures. Anterior and intermediate tibiæ banded.

Described from one pair taken by me at Milan, Ohio, September 1, 1905, and another male which I took in August, 1904, at Jamaica, Long Island. This latter has the edges of the ventral segments touched with sanguineous. This is a neat little species recognizable by its small size and unmarked front.

*Catonia intricata* Uhler.

This is a small species very close to *pumila*, but the front is more narrowed basally, pale, closely dotted with brown, and the elytra are more variegated and minutely dotted with pale, and in some examples are quite decidedly tinged with rufous toward the costa. Dr. Uhler described this species from the Island of St. Vincent. I took it in Jamaica and Prof. Ball has received it from Hayti. So far it has not been reported from the United States, but it is quite likely to be found in southern Florida.

## Subfamily CIXIIDA Stål.

This subfamily has a wide distribution in the temperate regions of the world. Six genera and thirty-five species are now known from this country. *Monorachis* Uhler is too insufficiently known to me to be included in this table. Our other genera may be separated as follows:

- Posterior tibiæ armed with two or three spines, . . . . . 1.  
 Posterior tibiæ unarmed, . . . . . 2.
1. Base of the head broadly sinuated; mesonotum tricarinate,  
*Cixius* Latr.
- Base of the head angulate-emarginate; mesonotum normally 5-  
 carinate, . . . . . *Oliarus* Stål.
2. Eyes sinuated anteriorly, antennæ inserted before this sinus,  
*Bothriocera* Burm.
- Eyes sinuated inferiorly, or entire, antennæ inserted below the eyes,  
 3.
3. Base of the head truncated; vertex very narrow, its sides parallel  
 or wider anteriorly; front and clypeus elongated, *Æcleus* Stål.
- Base of the head subsinuated; vertex broader, narrowed anteriorly;  
 front and clypeus together elliptical, . . . . . *Myndus* Stål.

Genus *MONORACHIS* Uhler.*Monorachis sordulentus* Uhler.

Mrs. Slosson has very kindly sent me for study a type specimen of this species which unfortunately is without a head. As nearly as I can judge from the fragment remaining, I believe this is the species afterward described by Canon Fowler as *Metabrixia aspersa* from Mexico and Vera Cruz. This may sink the genus *Metabrixia* as a synonym of *Monorachis*, although this is by no means certain, as Canon Fowler says, "This species differs considerably from the rest and may belong to another genus." Mrs. Slosson's specimen seems to be of a short-winged form.

and others, I am convinced that the species found throughout the West Indies and Florida and listed by me as *B. Signoreti* in my paper on Jamaican Hemiptera is really *Adana Westwoodi* Stal, which Canon Fowler places as a synonym of *Bothriocera tinealis* Burm. He states that *Signoreti* may be known by its having the apex of the elytra broadly blackish, while in *tinealis* it is more or less invaded with hyaline.

***Bothriocera undata* Fabr.**

Described from the West Indies. Mrs. Slosson has sent me a specimen captured by her at Lake Worth, Florida.

Genus **OLIARUS** Stål.

Of this cosmopolitan genus nine species have been recorded from North America, of which six are now represented in my collection. Here we find the vertex longer than in *Cixius*, almost quadrangular, with the base angularly emarginate. Generally there are five distinct carinæ on the mesonotum. The following artificial key will assist in placing the species known to me:

- Elytra pellucid or nearly so, sometimes banded or mottled with brown, . . . . . 1.  
 Elytra deep smoky brown, at least toward the apex, . . . . . 4.  
 -1. Elytral nervures distinctly punctate, . . . . . 2.  
 - Elytra hyaline or a little dusky at apex where the nervures are then heavy and brown, nervures impunctate or nearly so, . . . . . 5.  
 2. Front broad, brown with an ivory white area on either margin next the base of the clypeus; elytra hyaline with the stigma and nervures toward their apex brown, . . . . . *aridus* Ball.  
 - Front unicolorous, the clypeus sometimes a little paler, . . . . . 3.  
 3. Clypeus scarcely paler than the front; elytra less maculated, the stigma distinctly longer than broad, . . . . . *vicarius* Walk.  
 - Clypeus generally paler than the front; elytra more maculated or generally transversely banded, stigma subquadrate, . . . . . *5-lineatus* Say.  
 4. Elytra deep smoky brown, the slender costa and stigma pale, . . . . . *cinnamomeus* Prov.  
 - Elytra smoky at apex beyond the stigma, base usually subhyaline, size smaller, . . . . . *humilis* Say.  
 5. Length 8 mm., elytra entirely pellucid with fuscous nervures, stigma, and basal band, . . . . . *hyalinus* Van D.  
 - Length 4-5 mm., elytra nearly hyaline or somewhat infuscated at apex, without a basal band, . . . . . *complexus* Ball.

The following North American species of *Oliarus* are still unknown to me:

- O. franciscanus* Stål, *Frega Eugenes Resa. Ins.*, p. 273, 1859. California. Seems to be near *aridus* Ball.
- O. sementinus* Ball, *Can. Ent.*, xxxiv, p. 152, 1902. Colorado. A small robust species.
- O. pima* Kirk., Haw. Sugar Plant. Assoc., *Bul.* iv, p. 62, 1907. Arizona.

1. *Oliarus vicarius* Walker.

This species is very close to *5-lineatus* Say. I separate it by its slightly larger size, less strongly maculated elytra, longer and narrower stigma and pellucid wings. The general color is paler, the rostrum is considerably longer, nearly or quite attaining the hind edge of the sixth abdominal segment; and the intermediate carinæ of the mesonotum become evanescent or join the median carina some distance from the hind margin of the pronotum. I took an example of this species at Atlanta, Georgia, in May, 1899, and have seen one pair taken by Mrs. Slosson at Jacksonville and Ormond, Florida.

2. *Oliarus quinquelineatus* Say.

This is our most abundant and widely distributed species. I took a fine series at Boulder, Colorado, in July, 1903, and have also taken it about Buffalo, New York, and at Cape May, New-Jersey, and Atlanta, Georgia. Prof. Osborn has sent me specimens from Ohio, and I have examined material from other localities—as far south as Florida. *O. 5-lineatus* is proportionately broader and shorter than *vicarius*, with heavier elytral maculations, a blacker and nearly quadrate stigma and a distinctly broader front. The general color is darker, almost a piceous brown on the head and thorax, and the wings are quite deeply infuscated toward their apex. The male genitalia are quite distinct from that of *vicarius*; the ventral sinus on the genital segment is deeper with the median tooth pale yellowish and slender, reaching to the line of the rounded lateral lobes; the plates are narrow and abruptly bent and but little widened at apex, and the pygofers are expanded and rounded at apex and considerably longer than the plates, forming a concave dome beyond their tips. In *vicarius* the median tooth does not attain the line of the lateral lobes of the genital segment; the expanded apex of the plates are broader and more rounded and strongly reflexed, and the pygofers are narrower, flatter at apex, and but little surpass the tip of the plates.

3. *Oliarus aridus* Ball.

A western form of which I have before me only Colorado specimens. It is of about the size of the preceding species and may be distinguished by its broader vertex, the somewhat indefinite pale spots on the apex of the front and the whitish-hyaline elytra with minutely dotted ner-

vures and slender stigma. The cross veins toward the apex of the elytra are marked with fuscous, the wings are milky hyaline with brown nervures and are unclouded, and the intermediate carinæ of the mesonotum are obsolete anteriorly in my specimens.

4. *Oliarus hyalinus* n. sp.

Most closely related to *humeralis* Fowler. Mesonotum tricarinate; elytra hyaline, with fuscous nervures, stigma, basal band and commissural nervure. Length 8 mm.

Vertex long and narrow, about as in *complectus* Ball; blackish fuscous with fulvous carinæ and a whitish line either side next the inner margin of the eye. Front strongly widened below; dark castaneous with pale carinæ and a pale area on either side next the clypeal margin. Clypeus blackish fuscous with pale carinæ. Pronotum very short, linear, acutely emarginate behind almost to the anterior margin; soiled yellowish clouded with fuscous at the sides and under the eyes. Tegulæ pale clouded on their disks. Mesonotum dark castaneous; intermediate carinæ obsolete or very feebly indicated anteriorly. Elytra long and narrow, clear hyaline with the nervures brown, under a lens very obscurely and minutely punctate; marginal and transverse nervures heavier; stigma long and narrow, fuscous, darker inwardly and bounded by a whitish nervure anteriorly; base marked by a transverse fuscous band across the apex of the scutellum which scarcely attains the costal margin; claval suture pale; commissural nervure fuscous, heavier for a space on the middle, then whitish to the apex of the clavus. Beneath blackish fuscous, paler on the meso- and metapleura and edges of the abdominal segments. Legs brownish testaceous, darker on the femora. Ventral sinus of the male genital segment deep, with a short median tooth; its sides obliquely rounded; plates long, but little separated at base; expanded apical plate as long as the slender base, roundedly triangular, inner edges approximate, grooved; pygofers just as long as the plates and concentric with them at their rounded apex.

Described from one male example taken by Mrs. Annie Trumbull Slosson at Biscayne Bay, Florida. This species is somewhat anomalous in genus *Oliarus* by its narrow pellucid elytra, practically impunctate nervures and tricarinate mesonotum, in all which characters it agrees most closely with *complectus* Ball. It has however the short pronotum, angularly emarginate hind margin of the vertex and frontal ocellus of *Oliarus*, in which genus I now place it. It closely resembles Fowler's figure of *O. humeralis* (*Biologia*, pl. x, fig. 18), but the basal band is narrower and the elytra are pellucid, not milky-hyaline, and the nervures are fuscous. I believe it quite distinct.

5. *Oliarus complectus* Ball.

This small species has much the aspect of *Ædeus decens* Stål, but the vertex narrows anteriorly not posteriorly as in *Ædeus*, and the hind edge is angularly emarginate. In *complectus* the intermediate mesonotal carinæ are almost obsolete in some specimens. I have taken this species at Effingham, Kansas, Washington, D. C., Niagara Falls and at other localities about Buffalo. The eastern specimens differ from those from Kansas in having the wings quite strongly infuscated toward their apex, but the genital and other characters seem to be substantially the same. This is the only species known to me in which the frontal ocellus is represented only by a scar.

6. *Oliarus cinnamomeus* Prov.

This is very distinct from any other species known to me. It can at once be distinguished by its fuscous elytræ with the slender costa and the stigma whitish. Provancher's type came from Vancouver Island; Mrs. Slosson has taken it in the White Mountains, and Prof. W. E. Britton has sent me three examples taken at Colbrooke, Connecticut. It seems to be a rare and local northern form.

7. *Oliarus humilis* Say.

This our most abundant northern species is sufficiently distinct from any other. It varies considerably in size and depth of coloring.

Genus *CIXIUS* Latr.

Elytra black or nearly so; commissural margin and the costa slenderly pale; body black above with a broad pale vitta covering the vertex and middle line of the pro- and mesonotum,

*dorsalis* Van D.

Elytra hyaline or slightly enfumed, frequently more or less banded or maculated with fuscous; nervures with brown punctures, . . . 1.

1. Vertex distinctly transverse, at most obtusely angled before; elytra proportionately broader; outer sector of the corium forked as near to or nearer the base than is the inner; maculation transverse, . . . . . 2.

— Vertex a little longer than broad, triangular, its apex subacute; elytra proportionately narrower; outer sector of the corium forked farther from the base than is the inner; maculation longitudinal, . . . . . *cultus* Ball.

2. Vertex broad triangular, obtuse or subacute before, its apex very nearly attaining the apex of the front and almost bisecting the transverse compartment at the apex of the head; front black with the carinæ pale; plates and stiles of the male about equaling the pygofers, . . . . . *stigmatus* Say.

— Vertex short, transverse, rounded before; transverse compartment at the apex of the head much less narrowed, divided by a median carina, . . . . . 3.

3. Larger, 6-7 mm.; clypeus paler than the front; plates and stiles of the male distinctly shorter than the pygofers, . . . . . 4.  
 —. Smaller, 5 mm.; face entirely black with pale carinæ; plates and stiles of the male as long as the pygofers, . . . *colæpeum* Fitch.  
 4. Length 7 mm.; clypeus abruptly paler, at base strongly angled; plates of the male less than half the length of the pygofers; elytra generally quite strongly maculated, their base more or less distinctly fuscous, . . . . . *basalis*-Van D.  
 —. Length 6 mm.; clypeus less strongly differentiated; plates more than half the length of the pygofers; elytra almost immaculate or with some small broken spots beyond the middle, base not darker, . . . . . *pini* Fitch.

*Cixius basalis* n. sp.

Size and general aspect of *Oliarus 5-lineatus*, but readily distinguished by the three mesonotal carinæ. Vertex short transverse, arcuated, its anterior and posterior margins about parallel, its outer angles rounded, median carina not pronounced; transverse compartment at the apex of the head but slightly narrowed at center. Front proportionately longer than in *pini*, but shorter than in *stigmatus*; black with the strong carinæ fulvous; clypeus abruptly fulvous, its apex and the tylus blackish, basal margin strongly angled. Pronotum linear and deeply angled as in the allied species; soiled fulvous-yellow as are the carinæ of the vertex and the tegulæ; mesonotum deep black with a pale point at the posterior end of each carina. Elytra abruptly widened near the base, then almost parallel to the stigma; whitish hyaline, nervures white conspicuously dotted with black, costal stronger with about 16 larger dots before the stigma, a few of which are grouped where the transverse band touches the margin; the radial forked nearer the base than is the second ulnar. In fully marked specimens the base of the elytra are deep fuscous or black to behind the tip of the scutellum; a broken linear transverse band crosses about half-way to the stigma and another at the stigma; sometimes there is a costal spot between these bands, and the transverse nervures at the base of the apical areoles are heavily brown. Frequently the base is but slightly obscured and the anterior band and costal spots or all the markings are wanting or feebly indicated. Beneath black varied with soiled yellow; legs pale with the femora more or less fuscous. Abdomen black with the narrow edges of the segments and base of the genital pieces of the female pale; in the male the plates, inferior surface of the pygofers at base and a dot at each incisure on the edge of the abdomen is pale. Plates of the male short, slender at base, abruptly expanded above in a transverse oblique plate lying against the slightly

oblique apical margin of the genital segment: pygofer extending for more than half their length beyond the plates, estimating from the ventral notch of the genital segments. Length 7 mm.

Described from twelve examples taken by me at Hamburg and Gowanda, New York; several taken at Quinze Lake, P. Q., by Mr. W. J. Palmer, of Buffalo, and one strongly marked female taken at Como, P. Q., by Mr. R. M. Moore. This our largest *Cixius* seems to be distinctively a northern form. Like the closely allied *stigmatus*, *pini* and *colæpeum*, it varies greatly in the extent of elytral maculation. These species are very distinct in the characters of the male genitalia, but it is difficult to so describe them that they may be readily recognized. I feel tolerably certain of my determination of Say's *stigmatus*, but have had to place the two species of Fitch more by size and general appearance, and these can so stand until more definitely located by comparison with the types, if they still exist.

*Cixius stigmatus* Say.

In this species and *colæpeum* the male plates are not shorter than the pygofers. In *stigmatus* the sides of the genital segment are short and rounded, not oblique, the ventral notch broad and shallow, and the expanded apex of the plates are broad and rounded.

*Cixius stigmatus* seems to be more widely distributed than our other species. I have taken it about Buffalo, New York, and have received others from Rhode Island, and Mr. Palmer has taken it in numbers along the trail from Temagami, Ontario, to Quinze Lake, Quebec.

*Cixius pini* Fitch.

In this species as in *basalis* the male plates are much shorter than the pygofers, but here they reach somewhat beyond their middle, reckoning from the ventral notch of the genital segment. The sides of this segment are much more oblique than in *basalis*, and the expanded apices of the plates are broader and more rounded and compressed about the pygofers. This species I have taken at Buffalo, Hamburg, Colden and Lake Placid, New York, and Denver, Colorado.

*Cixius colæpeum* Fitch.

I have placed here a small species with more regularly maculated elytra. At least they are so in the only specimens I have seen, but doubtless this character is as variable as in the allied species. Here the sides of the male genital segment are rounded, a little oblique, with a broad shallow ventral notch. In all our species there is a small median tooth at the apex of this ventral notch. In *colæpeum* the male plates are long, slender at base, expanded at apex in suborbicular disks which just attain the apex of the pygofers. In this species, *pini*, and



*stigmatus* the elytra are proportionately broader, with the costa more rounded than in *basalis*. I have taken one male of *colæpeum* at Buffalo and another at Sunset, Colorado, at an altitude of over 8,000 feet.

*Cixius dorsalis* n. sp.

Color blackish fuscous, paler beneath; front pleuræ and legs testaceous brown, tinged with ferruginous on the clypeus; front clouded with brown, the carinæ paler. Dorsal surface almost black with a broad pale yellow vitta tinged with fulvous covering the whole vertex the pro- and mesonotum between the lateral carinæ and the elytral commissure, where it becomes narrower and more obscured. Sides of the mesonotum deep black. Costa very narrowly pale with a pale spot on the base of the stigma; nervures concolorous, punctured, apical areoles with a few vague paler spots.

Vertex longer than in our other species, transverse, almost quadrangular, widened before by the expanded sides of the front. Pronotum very short, linear, roundly produced before, the anterior and posterior margins almost parallel, very feebly angled behind; lateral carinæ very oblique, terminating outside of the mesonotal carinæ, the latter straight, but little divergent posteriorly; post-scutellum pale across the middle. Pale commissural vitta of the elytra occupying the interior claval areole. Wings smoky hyaline with fuscous nervures. Length about 6 mm.

Described from one female example taken by Mrs. Annie Trumbull Slosson at Biscayne Bay, Florida. This species is very distinct from any other known to me. Its black color with broad yellowish dorsal vitta will at once distinguish it.

The above six species of *Cixius* are all that are known to me to inhabit North America, but Prof. Smith, in his *Catalogue of the Insects of New Jersey*, enumerates *albicincta* Germ. from that State. I have seen nothing that could be identified with that species, or have I learned of its having been found elsewhere in this country.

Genus **MYNDUS** Stål.

*Myndus sordidipennis* Stål.

The species I have placed under this name is not uncommon about moist springy spots in rich woods near Buffalo. All my specimens differ from Stål's short and inadequate description in having the abdomen more or less blackish fuscous. The elytra however agree exactly and I believe my identification to be correct.

*Myndus pictifrons* Stål.

This is another allied species with banded front, but it may be readily separated from *sordidipennis* by the brown vitta at the inner

apical angle of the elytra. About Buffalo it is less abundant than the preceding. Mrs. Slosson has taken it in the White Mountains.

Of our other described species I have or have studied *Slossoni* and *viridis* of Ball and *radicis* of Osborn. *Slossoni* and *impiger* Ball have a brown front almost immaculate; in *radicis* the front is pale with a basal fuscous band indicated, while *viridis* Ball and *fulvus* Osborn are almost unicolorous insects. *Cixius impunctatus* Fitch is a *Catonia*.

***Myndus delicatus* n. sp.**

Closely allied to *sordidipennis*, but a little smaller and paler. Vertex a little narrower anteriorly, the sides almost parallel before the middle; in *sordidipennis* these sides converge nearly to their apex; black with a broad longitudinal line toward the apex pale fulvous. Eyes black with their inner edges slenderly pale. Front rounded ovate; yellowish white with a black band across the base and apex; these bands a little narrower than in the allied species; carinæ on the apex of the head pale, lower down on the front the lateral carinæ become blackish within. Clypeus soiled white. Pronotum about as wide as in the same sex of *sordidipennis*; the hind edge more angularly emarginate and the humeral angles more rounded; superior disk black with the slender hind edge and median carina pale; sides pale slightly stained, the deflected portion black more or less broadly bordered with pale; in *sordidipennis* entirely pale in the specimens before me. Patagia black, fuscous in its ally. Mesonotum black with its side compartments invaded with ferruginous before, the small scutellum pale. Elytra almost hyaline, slightly smoky at tip; nervures white dotted with concolorous bristle-bearing pits; stigma whitish. Beneath whitish, a little suffused with flavous on the venter. Apex of the genital segment oblique, armed with a minute triangular ventral tooth; in *sordidipennis* this ventral tooth is larger with the adjoining margin quite deeply excavated; stiles undulated at base as in *sordidipennis* but distally approximated to their rounded apex. In *sordidipennis* most of the lower surface and genital pieces are black. Length 5 mm.

Described from two male examples taken at Hot Springs, North Carolina, by Mrs. Annie Trumbull Slosson.

Subfamily ISSIDA.

This subfamily is quite largely represented in our territory. I notice here one new species taken by Mrs. Slosson in Florida and two western forms.

***Peltonotellus decoratus* n. sp.**

Closely allied to *simplex*, but with the elytra and abdomen mostly

piceous black. Characters of the front, vertex, pro- and mesonotum almost exactly as in *simplex*; the anterior edge of the pronotum is, however, more regularly rounded instead of forming an indistinct angle at the inner corner of the eyes; the mesonotum is shorter with its lateral posterior margins much less oblique and the pectoral flap of the pronotum is narrower and more transverse. Immediately below this flap projects the inferior end of one of the pleural pieces; in *decoratus* its sides are almost at right angles with the emarginated apex which fits around the base of the intermediate coxæ; in *simplex* the hind edge of this piece is oblique and the apex is scarcely sinuated; the next adjoining piece is almost square in this new species but subtriangular in *simplex*.

Color fuscous deepened almost to ferruginous in the male in which sex the elytra and abdomen are deep piceous black, almost blue-black on the elytra, with the base of the abdomen and the apex of the genital segments touched with fulvous. Legs fulvous with the tarsal claws and the line of fine bristles on the edges of the tibiæ blackish; the pustulate border of the front is also slightly infuscated. In the female the general color is more flavous and this pale color is much more extended over the abdomen and inner field of the elytra.

In the characters of the male genitalia this species is quite distinct. The ventral aspect of the genital segment is much shorter with the valve small and triangular, not short and transverse as in *simplex*; the plates (stiles of some authors) are much shorter and more rounded and do not nearly attain the anal tube. In *simplex* the plates are longer and thicker, are narrowed to an incurved pointed apex like the strong stout claws of some birds, and in my specimens project almost at right angles to the apex of the segment, and would about reach the anal tube if depressed.

Described from one male and three female examples taken at Charlotte Harbor, Florida, by Mrs. Slosson. At first sight this looks like a mere color variety of *simplex*, but the different form of the pro- and mesonotum, pleural pieces and male genitalia as well as its very distinct coloring will readily separate it. This species and *simplex* differ from our three other known species, *histrionicus* Stal, *rugosus* Ball, and *bivittatus* Ball, in having a pale clypeus.

Genus HYSTEROPTERUM A. and S.

*Hysteropterum cornutum* Melichar.

Dr. Melichar has described this species on p. 147 of his *Monograph of the Issida*. His specimens were from California, but I found it abundant in Utah and in Colorado west of the Continental Divide.

Two other species of this genus have been described from this country: *aurorum* Uhler and *punctiferum* Walk., the latter redescribed by Dr. Uhler as *aciculatum* according to Melichar.

Genus **THIONIA** Stål.

This genus is well represented in Central and South America. Melichar enumerates the following from this country:

*Thionia simplex* Germ. Recorded from Washington, D. C., to Texas.

I have taken it in Ohio.

*Thionia elliptica* Germ. Recorded from Washington, D. C., to Missouri.

*Thionia transversalis* Mel. Recorded from "N. Am."

*Thionia bullata* Say. Recorded from New York to Georgia. I have taken it in numbers at Niagara Falls and Gowanda, N. Y., and Mr. Palmer took it in North Carolina. Melichar places *Issus conspersus* Walker as a synonym.

*Thionia ocellata* Mel. Recorded from "N. Am."

I add the following:

*Thionia producta* n. sp.

Form of *naso* Fowler, but smaller and less elongated. Vertex much longer than broad, almost equally five-sided; the basal portion nearly square, its sides slightly diverging anteriorly, the apical portion produced in an angle a little less than a right angle; sides carinate, hind edge very feebly arcuated, surface flat with a feeble median carina at apex. Front narrow, much longer than the head, a little narrower toward the angulated base; apex deeply emarginate for the reception of the clypeus; the three carinae distinct, acutely converging at base; clypeus long, strongly convex with a prominent median carina. Pronotum shorter than the vertex, strongly advanced and rounded anteriorly between the eyes, truncated behind, ecarinate, with two impressed points on the disk. Mesonotum short, not longer than the pronotum, its sides arcuated. Elytra narrower than in *bullata* with the costa more angled and the apex more obtusely angled, not obliquely truncated as in that species; venation typical of this genus. Wings deeply cleft. Length 6 mm.

Color dull testaceous, paler on the abdomen. Vertex and pronotum mostly black with a broad median pale vitta; slender edges of the pronotum and some marks behind the eyes also paler; front much invaded with black on the base, sides and apex; clypeus darker, either side with a few oblique lines; cheeks except at base and apex ivory

white; pleural flaps of the pronotum white and pruinose below, above black with a pale median cloud; hind margin of the eyes pale. Scutellum pale with the median line, basal angles and a short vitta on either side black. Elytra with the longitudinal nervures and a broad vitta following the inner margin of the scutellum to behind the middle, black. Venter marked with black along the middle and sides.

Described from one pair taken at Rifle, Colo., July 26, 1900. This species and *naso* of Fowler present a new facies in this genus by their produced vertex, but in every other respect they are true *Thionias* and should doubtless be retained here.

Subfamily ACANALONIDA Stål.

I can see no reason for uniting this subfamily with the *Issida* on one hand or with the *Flatida* on the other. Four genera and ten species have been recorded from our territory, but doubtless many others will yet be found.

Genus **AMPHISCEPA** Germ.

*Amphiscepa pumila* n. sp.

Form nearly of *Hysteropterum*, much smaller than any other described species; elytra almost semicircular in outline. Vertex very short, rounded almost from the base to the front with no transverse carina between the two; anterior and posterior margins parallel. Front almost quadrate, the lower angles cut off in line with the sides of the clypeus, the sides below a little expanded and reflexed; base of the clypeus strongly angled, reaching almost to the line of the antennæ. Pronotum short, broadly rounded before, almost straight behind. Elytra but little longer than broad, somewhat tumid toward the base, the costa semicircularly rounded, the whole surface rather closely but not very distinctly reticulated. Length 4 mm.; of the elytra 3 mm.; width of the elytra  $2\frac{1}{2}$  mm.

Color soiled brownish testaceous a little tinged with green, paler beneath, commissural and apical margins of the elytra faintly dotted with brownish; tumid basal part of the elytra with a piceous spot. Spines of posterior tibiæ tipped with black.

Described from a single example taken by Mrs. Slosson at Biscayne Bay, Florida.

I have not yet seen Germar's description of this genus, but evidently it was founded for his *malina*, which Stål places as a synonym of *Flata bivittata* Say, published the same year. In three places where Stål mentions this genus he places it in the *Issida* and states that the hind tibiæ are unispinose, but in this he is certainly mistaken, as pointed out

by Melichar. In this genus the head is broader than in *Acanalonia*, but the longer scutellum and broad vertical reticulated elytra seem to ally it most closely with *Acanalonia* and I follow Melichar in placing it with that genus. Through a clerical error Melichar has credited this genus to Say instead of Germar.

Genus **ACANALONIA** Spinola.

*Acanalonia clypeata* n. sp.

Allied to *virescens* Stål but a little smaller with much narrower elytra. Vertex horizontal, longitudinally a little concave; slightly conical before, a little more so than in *virescens*, but with its length distinctly less than its width between the eyes; passage to the front rounded. Front broad, much shortened by the encroachment of the broad truncated base of the clypeus, which reaches above the lower line of the eyes; base tumid, sides well rounded, less angled than in *virescens*. Clypeus very large, transversely tumid, polished. Pro- and mesonotum about as in *virescens*, ecarinate. Elytra as long as in *virescens* but much narrower, their length twice their greatest width which is at about the basal fourth, then narrowed and a little sinuated or subparallel to the feebly rounded apex; longitudinal venation strong, reticulations weak and somewhat coarser than in *virescens*. Wings as long as the elytra; whitish hyaline or a little infuscated, with prominent nervures. Length 7 mm. to the tip of the closed elytra; width across the elytra 3 mm.

Color pale greenish yellow tinged with testaceous on the clypeus; eyes brown; tarsi tinged with rufous; apical spines of the posterior tibiae and antennal setae black. Elytra pale pea-green becoming whitish along the base of the costa and with the marginal nervure about the apex very slenderly brown.

Described from a single male example taken at St. George, Utah, in July, by Prof. H. F. Wickham. This species is very near to *delicatula* Fowler, but the elytra are still narrower, the vertex is shorter and not separated from the front by a carina, and there are no discernible carinae on the mesonotum. The large oval and tumid clypeus and narrow elytra are good characters for distinguishing this species.

Subfamily FLATIDA Stål.

Genus **CYARDA** Walker.

*Cyarda Melichari* VanDuzee.

A fine series of *Cyardas* from Florida received from Mrs. Slosson has enabled me to correct one other error of determination in my Jamaica list. The Florida specimens there mentioned under *Cyarda* were of

*Melichari* (*punctata* Walk. of Melichar), but those from Jamaica were probably the *acuminipennis* Spinola. The length given by Spinola is about 8 mm., which corresponds with my Jamaican material. In this Jamaican species there is a blackish cloud beneath and behind the elytral hump, the anterior side of which is piceous; and the elytra are subfalcate at apex, which is cut off obliquely and a little arcuated; the vertex is longer and less deeply sculptured than in *Melichari* and the base of the front is piceous brown.

In these Florida specimens of *Melichari* the apex of the elytra is narrower, wedge shaped and subacute; the costa is more abruptly expanded at base and the disk wants the infuscation found in the other species. Here the base of the front is scarcely if at all darker. I cannot accept Melichar's synonymy of Walker's species he places under *acuminipennis*, *conformis*, and *punctata*.

Genus **FLATOIDES** Guer.

*Flatoides fuscus* n. sp.

Form of *Flatoides scabrosus* Melichar; dull-blackish fuscous, disk of the elytral areoles and all beneath pale yellowish brown. Length 10 mm.; width across the elytra  $4\frac{1}{2}$  mm.

Vertex a little more than one-half as long as the width between the eyes, disk depressed, anterior margin quite regularly rounded. Front a little longer than broad, narrowed toward the base, sides broadly reflexed, moderately rounded, basal and clypeal margins parallel, almost rectilinear; clypeus long triangular, a little convex. Pronotum strongly rounded before between the eyes, of equal length across its whole width, the discal plate formed by the strong curved lateral carinae semicircular with the hind edge rather deeply arcuated. Mesonotum lozenge shaped, the sides nearly equal, anterior angle rounded, carinae obscure. Elytra about twice longer than broad, costa straight and parallel with the commissure, apex regularly rounded; costal membrane twice wider than the costal areole, broader toward the base where it projects moderately in a rounded lobe; crossed by numerous transverse veins; all the nervures heavy, those of the disk irregular; toward the apex with two transverse lines, the inner indistinct and irregular; the subbase with a strong blackish tubercle. Plates of the male genital segment long triangular, approximate at base within.

Color blackish fuscous covered with a grey mealy tomentum which obscures the neuriation and other characters; indefinite disk of the vertex and pronotum, marginal nervure and disk of all the areoles of the elytra and all beneath dull yellowish brown; base of the front with a blackish band which crosses the sides of the face and inferior flap of

the pronotum; basal joint of the antennæ brown with a pale tip; clypeus tinged with ferruginous, darker toward the apex; anterior and intermediate legs, middle pleural pieces and disk of the ventral segments clouded with darker brown. Wings smoky with strong fuscous nervures.

Described from one male and two female examples labelled "Colorado Desert" and received from Prof. J. B. Smith. In this species the elytra are moderately convex and are held at an angle of about 45 degrees. This species is very close to *scabrosus* Mel., but the vertex is shorter, the colors very different and the elytral nervures stronger and more irregular. These species are not characteristic of this genus and are intermediate between it and *Dascalia*.