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A Synopsis of The Tabanidae of Nebraska with a Description of a New Species from Colorado

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A SYNOPSIS OF THE TABANIDAE OF NEBRASKA, WITH A DESCRIPTION OF A NEW SPECIES FROM COLORADO

BY EVERETT E. WEHR
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Recently, the writer has had occasion to prepare a synopsis of the species of *Tabanidae,* otherwise known as horseflies, deerflies or gadflies, of the State of Nebraska. These flies are of importance to the farmer and stock raiser because of their blood-sucking propensities and their annoyance to stock. They breed in marshy lands and wet soil. This synopsis is based altogether on specimens collected in Nebraska and now actually present in the University of Nebraska collection. It is not probable , therefore, that it is a complete list. More extensive collecting over the state would probably reveal the presence of other species, since very little time has been spent in especially collecting these insects.

The classification of Hine has been followed in the main, but in listing the species those that are closely related have been brought together. The writer is indebted to Professors Myron H. Swenk and R. W. Dawson of the University of Nebraska, who have made possible the preparation of this paper. Acknowledgement should also be made to the works of Professor James S. Hine and Baron C. R. Osten Sacken on the *Tabanidae,* since these have contributed greatly toward the satisfactory identification of the species and the synoptic work.

Only three of the North American genera of *Tabanidae* are represented in the Nebraska fauna, viz., *Silvius, Chrysops* and *Tabanus.* In order to show the relationship of these three genera, however, the following table (after Hine) of the nine North American genera is given:

1. Hind tibiae with spurs at the tip 2

   Hind tibiae without spurs 6

2. Third segment of the antennae composed of eight annuli, the first of which is only a little longer than the following ones 3

   Third segment of the antennae composed of only five annuli, the first of which is much longer than the following ones; ocelli present 5

3. Front of female narrow; ocelli present or absent; fourth posterior cell at least open ..... *Pangonia*

   Front of the female broad with a denuded callus; ocelli present 4

4. Eyes in the female acutely angulated above; wings in both sexes with a dark picture ..... *Goniops*

   Eyes in the female not acutely angulated above; wings hyaline ..... *Apatolestes*

5. Second segment of the antennae about half as long as the first; eyes in life with numerous small dots ..... *Silvius*

   Second segment of the antennae as long or but little shorter than the first; wing with a dark picture ..... *Chrysops*

6. Third segment of the antennae with a well developed basal process ..... *Tabanus*

   Third segment of the antennae without, or with a rudimentary basal process 7

7. All the tibiae enlarged, the hind pair ciliate ..... *Snowiellus*

   None of the tibiae enlarged and the hind tibiae not ciliated 8

8. Front of the female as broad as long, the callus transverse ..... *Haematopota*

   Front of the female narrow ..... *Diachlorus*

Silvius Meigen

There are but five known North American species in this genus, one of which is here described as new. Two of these five species are known to occur in Nebraska. In order to show the relationships of the new species, the following key to all five of the North American species is offered:

1. Wings blackish, costa more intense.....*jonesi*

   Wings hyaline, with or without spots..... 2

2. Wings without spots, whole body yellowish..... 3

   Wings usually spotted, whole body grayish..... 4

3. Abdomen uniformly yellow with a dark spot beneath the scutellum and an elongated spot of the same color in the middle of the second segment; denuded areas on face; length ♀, 10-12 mm. ..... *gigantulus*

   Abdomen not uniformly yellow, no denuded areas on face; length ♀, 10-11 mm.....*microcephalus*

4. Abdomen with four longitudinal rows of spots; length ♀ ♂, 6-10 mm.....*quadrivittatus*

   Abdomen with two longitudinal rows of spots; length ♀, 10 mm. ..... *pollinosus*

Silvius microcephalus n. sp.

♀. Length 10-11 mm. In coloration this species approaches *gigantulus*, except that it is paler. The head appears small in comparison to the rest of the body, and the abdomen is broad. Face and front grayish-pollinose, sparsely covered with pale yellow and black pile; no denuded areas on face as in *gigantulus*. Front narrow; frontal callosity small, black and round; ocelli ruby-colored; ocelligerous tubercle of the same color as the front. Proboscis shorter than the head. Antennae with first two joints yellow, beset with short black hairs, the basal annulus reddish-yellow, the apical four annuli black. The antennae is but little longer than the proboscis. The thorax is yellowish-pollinose, darker than either the face or the abdomen, with pale and black pile associated together, and with three longitudinal faint mesonotal vittae. Scutellum of the same color as the thorax. Abdomen broadly yellow on the sides, leaving a broad black stripe in the middle on which is a row of small faint gray triangles, the apex of that on the second segment reaching

the posterior margin of the first segment; the venter pale yellow except for a black area in the apex of the second segment; both dorsal and ventral aspects covered with black hairs. Wings hyaline with costa and stigma yellow; a stump on the anterior branch of the third vein. Legs yellow with the last four tarsi dark, the apical half of the tibiae and tarsus heavily beset with black hairs.

Type. Ute Creek, Costilla County, Colorado, on sage flats, August 7, 1907 (R. W. Dawson). Two ♀ ♀, type and paratype. University of Nebraska collection. Compared with *gigantulus* ♀ ♀ from Truckee, California, August 4, 1914 (L. Bruner), also in the University of Nebraska collection.

Silvius quadrivittatus Say. Jr. Acad. Nat. Sci. Phil., iii, 33 (1823); Compl. Writ., ii, 54 (1859); Hine, Ohio Naturalist, v, No. 2, 229 (1904).

Common over the entire state of Nebraska. One ♂ and eighty-three ♀ ♀ from South Bend, Cass County; Louisville Cass County; Lincoln, Lancaster County; Ashland, Saunders County; South Sioux City, Dakota County; McCook, Redwillow County, Culbertson, Hitchcock County, and Haigler, Dundy County, June 14th to September 3rd.

Silvius pollinosus Williston. Tr. Conn. Acad. Sci., iv, 224 (1879).

A ♀ specimen from McCook, Redwillow County, June 20, 1913 (R. W. Dawson), establishes the place of this species in the Nebraska fauna.

Chrysops Meigen

There are specimens of nine species of this genus collected in Nebraska represented in the University of Nebraska collection. Of these, the males of five species are available for study. I offer the following key as an aid in separating the species:

1. Apex of the wing beyond the cross-band hyaline; body uniformly black; thorax on each side with a tuft of yellow hair at root of wings; length ♀, 8-9 mm.....*carbonarius*

Apex of the wing beyond the cross-band not entirely hyaline..... 2

2. First antennal segment distinctly enlarged; the hyaline spot is crescent-shaped and entirely surrounded by the dark of the wing; the first two segments of the abdomen yellow on the sides, length ♀, 7-9 mm., ♂, 7-8 mm. .....*fulvaster*

First antennal segment not distinctly enlarged..... 3

3. A hyaline spot in the discal cell; face grayish with four black dots; length ♀, 9-10 mm., 8-9 mm.....*discalis*

No hyaline spot in the discal cell..... 4

4. First basal cell hyaline..... 5

First basal cell altogether or to a considerable extent infuscated 7

5. Abdomen with a middorsal yellow stripe on the first four segments, which is attenuated posteriorly; length ♀, 7-8 mm. *obsoletus*

Abdomen without a middorsal yellow stripe..... 6

6. A black triangle encroaches upon the posterior part of the yellow on each side of the second abdominal segment; length ♀, 8-11 mm.; ♂, 8-9 mm. .....*moerens*
No black triangle on each side of the second abdominal segment; length ♀, 8 mm., ♂, 7-8 mm.....*callidus*

7. Frontal triangle, thoracic stripes and scutellum yellow; length ♀, 9 mm.; ♂, 7-8 mm. .....*vittatus*

Frontal triangle and scutellum mostly or altogether black..... 8

8. The hyaline triangle crosses the second longitudinal vein, apical spot invades the first posterior cell; length ♀, 8-9 mm.....*sequax*

The hyaline triangle does not cross the second longitudinal vein, and is almost as wide at the apex as at the base of wing; length ♀, 7-8 mm.....*pikei*

Chrysops carbonarius Walker. List., i, 203 (1848); Hine, Ohio, Naturalist, v, No. 2, 220 (1904).

1848. *niger* Walker, List., i, 202.
1850. *provocans* Walker, Dipt. Saund., i, 73.
1850. (?) *atra* Macquart, Dipt. Exot. Suppl., iv, 40.
1875. *fugax* Osten Sacken, Prodrome, i, 375; Williston, Trans. Kans. Acad. Sci., x, 132 (1887).

There are in the collection seven ♀ ♀, all collected in Sioux County, chiefly in Monroe and Warbonnet Canyons, June 18th to 27th.

Chrysops fulvaster Osten Sacken. West. Dipt., 221 (1877); Hine, Ohio Naturalist, v, No. 2, 223 (1904).
1892. *coloradensis* Bigot (in part), Mem. Soc. Zool. Fr., v, 605.

This is evidently a very comon species in Nebraska, since there are specimens in the collection represented from a large number of localities. Nine ♂ ♂ and thirty-one ♀ ♀ from the following localities: Sowbelly Canyon, Sioux County; Glen, Sioux County; Pine Ridge, Dawes County; Mitchell, Scottsbluff County; Glenn Rock Canyon, Banner County; Halsey, Thomas County; Haigler, Dundy County, and Valentine, Cherry County, June 13th to August 31st.

Chrysops discalis Williston. Tr. Conn. Acad. Sci., iv, 245 (1887); Hine, Ohio Naturalist, v, No. 2, 221 (1904).

Eight ♀ ♀ have been taken at the following localities: Haigler, Dundy County; Bridgeport, Morrill County, and Mitchell, Scottsbluff County, June 10th to July 29th. The larger size will serve to separate this species from *fulvaster,* which it somewhat resembles.

Chrysops obsoletus Wiedemann. Dipt. Exot., i, 108 (1821); Hine, Lousiana Bull. No. 93, 32 (1907).

Evidently this is not a common species in Nebraska. Only two ♀ ♀ are represented in the University collection, both taken at Omaha, Douglas County, on July 28th and August 11th, respectively.

Chrysops moerens Walker. List., i, 201 (1848); Hine, Ohio State Acad. Sci. Special Papers, No. 5, 40 (1903).
1867. *aestuans* Van der Wulp, Tijd. Ent., x, 135, pl. 3, fig. 8 and 9; Osten Sacken, Prodrome, i, 378 (1875).

This species resembles the following species very closely. It is found over the entire state. Two ♂ ♂ and twenty-three ♀ ♀ taken at Omaha, Douglas County; Lincoln, Lancaster County; South Sioux City, Dakota County; Neligh, Antelope County; Bridgeport, Morrill County, and Mitchell, Scottsbluff County, June 21st to August 15th.

Chrysops callidus Osten Sacken. Prodrome, i, 379 (1875); Hine, Louisana Bull. No. 93, 28 (1907).

Moderately common in the eastern part of the state. One ♂ and five ♀ ♀ taken at Omaha, Douglas County; Lincoln, Lancaster County; South Sioux City, Dakota County, and Neligh, Antelope County, June 22nd to August 13th.

Chrysops vittatus Wiedemann. Dipt. Exot., i, 106 (1821); Hine, Louisana Bull. No. 93, 35 (1907).

1848. *areolatus* Walker, List., i, 197.
1868. *lineatus* Jeannicke, Neue Dipt. Exot., 26.

This species very closely approaches *striatus* of the eastern states. Three ♂ ♂ and six ♀ ♀ have been collected at Omaha, Douglas County, and Lincoln, Lancaster County, from July 15th to August 11th.

Chrysops sequax Williston. Tr. Kans. Acad. Sci., x, 133 (1887); Hine, Louisana Bull. No. 93, 34 (1907).

This species presents many variations and consequently is difficult to define. It is likely to be confused with *C. striatus.* Fifteen ♀ ♀ have been collected at the following localities: Carns, Keya Paha County; Halsey, Thomas County, and Haigler, Dundy County, from July 8th to August 19th.

Chrysops pikei Whitney. Canad. Ent., xxxvi, 205 (1904); Hine, Louisana Bull. No. 93, 33 (1907).

Only four ♀ ♀ are present in the University collection, and all of these were taken around Lincoln, Lancaster County, from June 28th to August 4th. Evidently it is not a very common species.

Tabanus Linnaeus

The thirteen species of this genus known to occur in Nebraska may be separated by the following key:

1. Eyes glabrous 2

   Eyes pilose 9

2. Abdomen with definite white markings..... 3

   Abdomen without definite white markings..... 7

3. Abdomen with a middorsal stripe; a row of gray triangles on either side 4

   Abdomen not so colored 5

4. Eyes with a single band in life; thorax uniformly pollinose; costal cells yellowish; length ♀, 10-14 mm., ♂ 13 mm. .....*costalis*

   Eyes with three bands in life; thorax dark colored with gray stripes; costal cells hyaline; length ♀, 14-16 mm., ♂, 12-14 mm. .....*lineola*

5. Wings with first posterior cell closed.....*abdominalis*

   Wings with first posterior cell open..... 6

6. Prevaling color of abdomen black; segments 3-5 with large gray triangles, segment 2 of female with a rounded white dot on each side, length ♀, 16-19 mm., ♂ 15-16 mm.....*trimaculatus*

   Prevailing color of the abdomen reddish-brown; segment 2 with a gray triangle; length ♀, 18-20 mm., ♂, 19-20 mm.....*sulcifrons*

7. Thorax, in well preserved specimens, densely covered with white pollen; abdomen void of white pubescence..... 8

   Thorax black, abdomen covered with white pubescence; entire body including wings uniformly black; length ♀, 21-25 mm., ♂, 22 mm.....*atratus*

8. Tibiae with white ring at base; length ♀, 18-21 mm.; ♂, 18-19 mm. ..... *punctifer*

   Tibiae without white ring at base; length ♀, 18 mm.....*stygius*

9. Prevailing color of the whole body yellowish; ocelligerous tubercle absent in both sexes; length ♀, 9-10 mm., ♂, 11 mm. .....*bicolor*

Prevailing color of the whole body dark..... 10

10. Abdomen with a wide middorsal brown stripe and a gray stripe of about the same width on either side; length ♀, 12-13 mm., ♂, 13-14 mm.....*dodgei*

Abdomen not so colored..... 11

11. Subcallus denuded in the female; venter of abdomen black, covered with gray pollen; dark species; length ♀, 13-15 mm. .....*rhombicus*

Subcallus not denuded in the female..... 12

12. Wings reddish hyaline, with no distinct fuscous on the margins of the cross-veins and bifuration of the third vein; lateral abdominal triangles usually rounded; length ♀, 13-14 mm. *septentrionalis*

Wings with distinct fuscous on the margins of the cross-veins and bifurcation of third vein; lateral triangles oblique; large large gray species; length ♀, 13-17 mm.....*reinwardtii*

Tabanus costalis Wiedemann. Auss. Zweifl. Ins., i, 173 (1828); Hine, Louisana Bull. No. 93, 46 (1907).
1848. *vicarius* Walker, List., i, 187.
1855. *baltimorensis* Marquart, Dipt. Exot., Suppl., 34.

This species is known as the green-headed horse fly or "greenhead." Twelve ♂ ♂ and ten ♀ ♀ taken at the following localities: Lincoln, Lancaster County; South Bend, Cass County; Fremont, Dodge County; South Sioux City, Dakota County; Fairmont, Fillmore County; Haigler, Dundy County, and Harlan County, June 28th to July 31st.

Tabanus lineola Fabricius. Ent. Syst., iv, 369 (1775); Hine, Louisana. Bull. 93, 50 (1907).
1848. *simulans* Walker, List., i, 182.
1856. (?) *scutellaris* Walker, Dipt. Saund., 27.
1859. *trilineatus* (Latr?) Bellardi, Saggio Ditt. Mess., i, 63.

This is a very common species over the state. Fifteen ♂ ♂ and twenty-seven ♀ ♀ have been taken at Omaha, Douglas County; Lincoln, Lancaster County; South Bend, Cass County; West Point, Cuming County; Fairmont, Fillmore County;

McCook, Redwillow County, and Mitchell, Scottsbluff County, from June 13th to August 24th.

Tabanus abdominalis Fabricius. Syst. Antl., 96 (1775); Hine, Louisana Bull. No. 93, 41 (1907).

Only two ♀ ♀ are represented in the University collection, one of which was taken at Lincoln, Lancaster County, August 6, 1910 (Zimmer) and the other in Harlan County (Hedgcock).

Tabanus trimaculatus Palisot de Beauvois. Ins. Dipt., 56, tab. 1, fig. 5 (1805-21); Hine, Louisana Bull. No. 93, 58 (1907).
1834. *quinquelineatus* Macquart, Hist. Nat. Dipt., i, 200.

Two ♂ ♂ and five ♀ ♀ have been taken from the following localities: Lincoln, Lancaster County; South Bend, Cass County; West Point, Cuming County, and Fairmont, Fillmore County, from June 12th to July 16th.

Tabanus sulcifrons Macquart. Dipt. Exot., Suppl., v. 33 (1885); Hine, Louisana Bull. No. 93, 56 (1907).
1875. *tectus* Osten Sacken, Prodrome, ii, 436.

This species is very near *exul.* One ♂ and two ♀ ♀ have been taken at Rulo, Richardson County, July 3, 1915 (Partridge), and Lincoln, Lancaster County, July 30, 1909 (Burnham). For a time I believed the ♂ to be *exul.* The abdominal triangles are only of moderate size, but the small facets lie high (nearly in the middle of the head), the pleurae have a tuft of brown hair in the middle, the disc of the discal cell is distinctly less brown than the brownish shadow at the base and along the forth vein, and the abdomen is distinctly roof-shaped.

Tabanus atratus Fabricius. Syst. Ent., 789 (1775); Hine, Louisana Bull. No. 93, 44 (1904).
1770-82. *americannus* Drury, Ins., i, tab. 44, fig. 3.
1805-21. *niger* Palisot de Beuvois, Ins. Dipt., tab i, fig. 1.
1828. *validus* Wiedemann. Auss. Zweif. Ins., i, 113.

This is a common species in the eastern part of the state. Four ♂ ♂ and thirteen ♀ ♀ have been collected at the following places: Omaha, Douglas County; Lincoln, Lancaster County; Louisville, Cass County; South Sioux City, Dakota County; Halsey, Thomas County, and Duff, Rock County, from June 16th to September 10th.

Tabanus punctifer Osten Sacken. Prodrome, ii, 453 (1875); Hine, Ohio Naturalist, v, No. 2, 242 (1904).

This an extreme western species. There are five ♂ ♂ and twenty-three ♀ ♀ from Monroe Canyon, Warbonnet Canyon and Glen, Sioux County, and Glenn Rock Canyon, Banner County, June 13th to September 2nd.

Tabanus stygius Say. Jr. Acad. Sci. Nat. Phil., iii, 33 (1823); Hine, Ohio State Acad. Sci. Special Papers, No. 5, 54 (1903).

There is only one (♂) specimen represented in the University collection and it was with considerable hesitancy that it has been idenitfied with the above species. This species is very closely related to *nigrescens* and the ♂ ♂ are separated only through great familiarity. As *nigrescens* has never been collected this far west, at least to my knowledge, and the thorax of *nigrescens* is shining black, it was determined as *stygius*. It was collected at Weeping Water, Cass County, July 20th (H. S. Smith).

Tabanus bicolor Wiedemann. Dipt. Exot., i, 96 (1821); Hine, Ohio State Acad. Sci. Special Papers, No. 5, 48 (1903).

1848. *fulvescens* Walker, List., i, 171; Osten Sacken, Prodrome, ii, 460 (1875); Catalogue 229.

1855. *ruficeps* Macquart, Dipt. Exot., Suppl., 5, 35.

Only two ♂ ♂ and two ♀ ♀ of this species are represented in the collection. One ♂ and ♀ were collected in Sioux County, one ♂ at McCook, Redwillow County, and one ♀ at Haigler, Dundy County, all western localities. June 20th to August 20th.

Tabanus dodgei Whitney. Canad. Ent., xi, 37 (1879); Hine, Ohio Naturalist, v, No. 2, 236 (1904).

The coloration of the abdomen makes this species a distinct one from any known to the writer. There are one ♂ and two ♀ ♀ before me, a pair taken at West Point, Cuming County, and the odd ♀ at Broken Bow, Custer County, June.

Tabanus rhombicus Osten Sacken. Prodrome, ii, 472 (1876); West. Dipt., 218 (1877); Hine, Ohio Naturalist, v, No. 2, 242 (1904).

There are several specimens before me that agree with Osten Sacken's second form of *rhombicus*, that is, the lateral triangles on abdominal segments 2-5 are oblique; the intermediate triangles show a tendency to a linear prolongation of the apex toward the next segment; the subcostal cell is nearly hyaline; the subcallus is not denuded; and there is no stump on the anterior branch of the third vein. Hine in "The Tabanidae of Western United States and Canada" makes the statement that he believes Osten Sacken's second form of *rhombicus* to be *centron*. Hine further states that the distinguishing character that separates *rhombicus* from *centron* is the color of the abdomen, it being black and covered with a white pubescence in *rhombicus* and largely red in *centron* The specimens before me have the venter colored as in *rhombicus*.

Eight ♀ ♀ taken at Warbonnet Canyon, Monroe Canyon, Sowbelly Canyon, Sioux County; Mitchell, Scottsbluff County, and Glenn Rock Canyon, Banner County, June 23rd to August 7th.

Tabanus septentrionalis Loew. Verh. zool.-bot. Ges., viii, 592 (1858); Hine, Ohio Naturalist, v, No. 2, 243 (1904).

One ♀ taken at Mitchell, Scottsbluff County, August 21st.

Tabanus reinwardtii Wiedemann. Auss. Zweifl. Ins., i, 130 (1821) Hine, Ohio State Acad. Sci. Special Papers, No. 5, 54 (1903).
1850. *erthroletus* Walker, Dipt. Saund., 25, tab. 2, fig. 1.

Eleven ♀ ♀ taken at Monroe Canyon and Glen, Sioux County, and Valentine, Cherry County, August 6th to 23rd.

A SYNOPSIS OF THE SYRPHIDAE OF NEBRASKA WITH DESCRIPTIONS OF NEW SPECIES FROM NEBRASKA AND COLORADO

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In June, 1907, Mr. Paul R. Jones published in the Journal of the New York Entomological Society "A Preliminary List of Nebraska Syrphidae with Descriptions of New Species." At that time there was available only a comparatively small collection of Syrphid flies, but apparently it contained a fairly good representation of the species found in the state. Subsequent collectors have contributed a considerable amount of new material from the state in which there are twelve additional species, two of which are new. With these additions, the Nebraska list is increased to ninety species.

At the present time the classification of the family Syrphidae seems to be undergoing a course of complete revision. Many of the old generic names that had been suppressed for a number of years have been brought into use again, and many of the genera subdivided. Such a course of revision has simplified the synoptic keys and facilitated the determination of doubtful species. It is sincerely hoped that this good work will continue to completion. The author believes that insufficient work on the group as a whole has resulted in the erection of many specific names which are probably not valid.

As a guide to the division of the family *Syrphidae* into subfamilies and genera, the writer has followed the classification recently proposed by Shannon.* This work on the family is the most recent and complete now published. Mention should also be made of Metcalf's paper on "Syrphidae of Ohio" and Williston's "Synopsis of North American Syrphidae," as these

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works have aided materially in making identifications and in preparing the synoptic tables.

To Professors Myron H. Swenk and R. W. Dawson the writer wishes to express his gratitude for the many valuable criticisms and suggestions offered during the preparation of this paper, and also for a critical reading of the manuscript.

CHARACTERS OF THE FAMILY SYRPHIDAE

Antennae three-jointed; usually with a dorsal arista, rarely with a terminal style; third vein of the wings without an anterior branch; anal cell acute and prolonged nearly to the wing margin; either a spurious vein present between the third and fourth veins, or a subsquamal plumose filament (the plumula) present, usually both present; empodium bristle-like; hypopygium asymmetrical, an elongated mesocoxal projection present on middle coxae.

TABLE OF SUBFAMILIES OF SYRPHIDAE

1. Chitinous parts of body thickly punctate; prostigma placed on cephalic aspect of thorax, thorax being foreshortened; abdomen of both sexes consisting of four visible segments; arista as short as the width of third antennal joint; spurious vein of anal cell (elsewhere called the anal furrow) very short, not extending as far as anal lobe incision; eyes faintly pubescent. Medium sized flies ..... *Nausigasterinae*

   Body not punctate and otherwise not as above..... 2

2. Antennae very elongate and with a terminal style; anterior cross-vein joining discal cell at or beyond the middle; usually an adventitious branch extending into first posterior cell (discal cell, Shannon) from third vein; face produced downwards, bare; plumula absent; males holoptic, with only four visible abdominal segments; females with five abdominal segments.... *Cerioidinae*

   Antennae without a terminal style, excepting in *Callicera* and *Pelecocera*, but these genera have the anterior cross-vein joining the discal cell well before the middle..... 3

3. Antennae very elongate, with a bare dorsal arista; face evenly

and gently arched, never produced forward at oral margin and entirely clothed with pile; a stigmatical cross-vein present; third vein usually (absent only in *Mixogaster*) with an adventitious and free branch projecting into the first posterior cell (discal cell, Shannon); apical cross-vein upright or recurrent; both sexes with three to four visible abdominal segments exclusive of genitalia; males dichoptic.....*Microdontinae*

Antennae not elongate and possessing dorsal arista, excepting in a few genera, which are without a stigmatical cross-vein, and the apical cross-vein is parallel with the wing margin (*Chrysotoxum* and *Sphecomyia*); or, if the apical cross-vein is upright or recurrent (*Chrysogaster*), then the mouth is produced forward 4

4. The humeral calli and region between them distinctly destitute of pile, the head being "cupped" over the anterior end of thorax, causing the pile to end abruptly behind the posterior margin of humeral region (the head may have to be removed to permit examination); antennae placed well above middle of head; arista usually a little shorter than length of antennae; abdomen of both sexes with five visible segments exclusive of genitalia; anterior cross-vein placed well before middle of discal cell .....*Syrphinae*

Pile extending upon the humeral region, abdomen of males with only four visible segments exclusive of hypopygium, females with five 5

5. Apical cross-vein recurrent at distal end; marginal cell closed; arista with either long or very dense plumosity; face protruding downwards; wings broad; alula very broad; squamae usually very broad; thorax frequently bearing bristles..*Volucellinae*

Apical cross-vein parallel with wing margin, or, if recurrent (*Chrysogaster, Eumerus* and *Merodon*), the arista is bare..... 6

6. Arista long plumose for at least the greater two-thirds of its length; marginal cell open; anterior cross-vein placed near or beyond middle of discal cell; either yellow markings present on abdomen, or with dense pile more or less yellow, except *Pyritis*, which has long dense brownish pile; face protruding downwards, or swollen, or tuberculate; the right prong (or style, Metcalf), of the forceps of the genitalia is longer than the left one and tapers to a sharp point, the left prong developed as an obtuse lobe .....*Sericomyinae*

Arista rarely long plumose for one-half its length or more, in such cases some (certain species of *Eristalis*) may be excluded by the closed marginal cell; others (certain *Chilosia*) can be excluded by the absence of yellow body markings or yellow pile, and by having the anterior cross-vein placed well before middle of discal cell; finally, the prongs of the genitalia are similar..... 7

7. Very large yellow and black species; the post stigma very elongate, being very nearly twice as long as broad; marginal cell closed; third vein with a downward loop into first posterior cell (discal cell, Shannon); sixth vein recurrent beyond anal cell; shape of head, position of antennae and length of arista similar to the *Xylota* type, but the face is broadly covered with loose pile (*Milesia* only) .....*Milesinae*

Length of post stigma one and one-half times or less that of width, and otherwise without above combination of characters.... 8

8. Third longitudinal vein with a deep downward loop into first posterior cell (discal cell, Shannon); face except for a medium stripe, clothed with long pile; sixth vein entering margin of wing or short distance beyond anal cell, *i. e.*, usual distance; thorax never bearing bristles; marginal cell closed in *Eristalis* and *Meromacrus*.....*Eristalinae*

Third longitudinal vein usually straight, but in such cases where i tis looped downwards (*Pterallastes* and *Teuchocnemis*) the face is bare, except for a few hairs along eye margins, and sixth vein is prolonged well forward beyond anal cell. (The bare face also excludes *Tropidia* and *Syritta* from *Eristalinae*, while the bristles on the thorax and the brassy color excludes *Chrysochlamys* 9

9. Anterior cross-vein placed well before middle of discal cell; third vein always straight; antennae sometimes with terminal style (*Callicera* and *Pelecocera*).....*Chilosinae*

Anterior cross-vein joining discal cell at or beyond middle; face rarely covered with pile and in such cases third vein is always straight .....*Xylotinae*

SYPHINAE

KEY TO THE TRIBES

1. Face black, scutellum entirely aeneous or black.....*Melanostomini*

2. Face partly or wholly yellow, scutellum yellow, partly yellow or black (certain species of *Paragus*) ..... *Syrphini*

MELANOSTOMINI

KEY TO THE GENERA

1. Wings shorter than abdomen; abdomen depressed, long-elliptical; front and middle tarsi elaborately developed; vertical triangle large and prominent ..... *Pyrophaena*

   Wings longer than the abdomen 2

2. Front tibiae slender in both sexes ..... *Melanostoma*

   Front tibiae and tarsi of male dilated; those of female slightly widened ..... *Platychirus*

Pyrophaena Schiner

Only one Nebraska species of this genus.

Pyrophaena ocymi (Fabricius). Syst. Ent., iv, 309 (1775); Schiner, Fauna Austr., i, 297 (1862).

A ♂ from Halsey, Thomas County, June 19, 1912 (J. T. Zimmer).

Melanostoma Schiner

KEY TO THE SPECIES

1. Tubercle of face not at all prominent, indistinct; spots on abdomen quadrate (♂), oval (♀) and yellow ..... *mellinum*

   Tubercle of face prominent, distinct; abdomen bluish green, metallic with inverted wine glass velvety-black opaque areas on third and fourth segments, the handle of the glass reaching the anterior margin of the segment ..... *concinnum*

Melanostoma melinum (Linnaeus). Syst. Nat., 10th ed., 594 (1758). 1858. *scalaris* Osten Sacken, Cat. Dipt., 121.

Two ♀ ♀ are represented in the University collection, and both were taken at Glen, Sioux County, on August 8 and 9, 1905, respectively.

Melanostoma concinnum Snow. Kans. Univ. Quart., iii, 229 (1895).

One ♂ taken at Monroe Canyon, Sioux County, on August 9, 1908 (L. Bruner). Prior to this the species had been recorded only from New Mexico and Colorado.

Platychirus St. Fargeau and Serville

KEY TO THE SPECIES

1. Front tibiae of the male, on the inner side toward the end, somewhat concave, the outer angle produced into a lappet-like process, yellow spots on abdomen in both sexes very large, leaving only a median stripe and cross-bands; hind femora and tibiae yellow ..... *quadratus*

   Front tibiae of the male gently and evenly convex on the inner side, the top on the outer side less produced, more angular; spots of abdomen smaller; hind legs chiefly black..... 2

2. Front femora in the male with a row of five to seven long bristly hairs; second abdominal segment with large, the fifth with small, yellow spots..... *chaetopodus*

   Front femora without such bristles; second segment of the abdomen in both sexes with a small rounded spot on each side, fifth segment in the male without yellow..... *hyperboreus*

Platychirus quadratus (Say.) Jr. Acad. Nat. Sci. Phil., iii, 90 (1823); Osten Sacken, Cat. Dipt., 122 (1858).

This species has a wide distribution in the state. Thirty-one ♂ ♂ and thirty-four ♀ ♀ have been collected from the following localities: Glen, Sioux County; Mitchell, Scottsbluff County; Neligh, Antelope County; Maskell, Dixon County; Lincoln, Lancaster County, and Omaha, Douglas County, between May 9th and September 3rd.

Platychirus chaetopodus Williston. Synop. N. A. Syrph., 59 (1886); Snow, Kans. Univ. Quart., iii, 23 (1895).

Five ♂ ♂ and one ♀ from Lincoln, Lancaster County, and Sioux County.

Platychirus hyperboreus. (Staeger.) Groenl. Antl., 362 (1845); Willis-

ton, Synop. N. A. Syrph., 29 (1886); Snow, Kans. Univ. Quart., iii, 231 (1895).

A ♂ and ♀ from Lincoln, Lancaster County, April 20th and 25th, 1908 (C. H. Gable).

SYRPHINI

Key to the Genera

1. Abdomen elongate-slender and contracted beyond the base....*Baccha*

   Abdomen not narrowed on basal portion..... 2

2. Dorsum of thorax with yellow lateral stripes..... 3

   Dorsum of thorax without yellow lateral stripes..... 8

3. Antennae very elongate, about six times as long as broad..... ..... *Chrysotoxum*

   Antennae less than three times as long as broad..... 4

4. Dorsum of thorax with a median cinereous line..... 5

   Dorsum of thorax without such line..... 6

5. Hind femora of male thickened and arcuate, tibiae arcuate and dilated at tip, hind femora of female posteriorly with blackened ring .....*Toxomerus*

   Hind femora and tibiae of male normal, hind tibiae of female entirely yellow, rarely (var. *boscii*) with blackened ring posteriorly ..... *Mesogramma*

6. Eyes of male with an area of enlarged facets above; fourth segment of abdomen with two median yellow stripes and an oblique side spot .....*Allograpta*

   Eyes of male not with an area of enlarged facets above; fourth abdominal segment not so marked..... 7

7. Face projecting below; slender species.....*Sphaerophoria*

   Face receding below; abdomen broadly oval.....*Xanthogramma*

8. Third longitudinal vein deeply constricted into first posterior cell .....*Didea*

   Third longitudinal vein straight or with a gentle downward curve 9

9. Sixth abdominal segment (hypopygium) of male as long as the two preceding ones together, cylindrical; fifth segment of female one-half as long as preceding.....*Eupeodes*

   Sixth segment not peculiar; the fifth segment in the female not over one-half as long as the preceding..... 10

10. Small, robust species; abdomen without yellow stripes.....*Paragus*

    Large species; abdomen with yellow stripes..... 11

11. Front very convex, eyes of male with an area of enlarged facets above (*Lasiopthicus, Catabomba*).....*Scaeva*

    Front normal, eyes of male not with an area of enlarged facets above .....*Syrphus*

Baccha Fabricius

KEY TO THE SPECIES

1. Third joint of the antennae elongate oval, obtusely pointed; face very prominent; abdomen more spatula-like.....*clavata*

   Third joint oval, obtusely rounded; face not prominent..... 2

2. Wings almost entirely black, a triangular hyaline spot behind the outer end of the third vein, the auxillary portion more or less subhyaline .....*fuscipennis*

   Wings almost entirely hyaline, a quadrangular fuscous area extending across the middle of the wing from the costa to the fifth longitudinal vein .....*lemur*

Baccha clavata (Fabricius). Ent. Syst., iv, 298 (1775); Williston, Trans. Amer. Ent. Soc., xv, 270 (1888).

1886. *Babista* Walker, List., iii, 549 (1849); Williston, Synop. N. A. Syrph., 117.

A ♂ from Lincoln, Lancaster County, in September.

Baccha fuscipennis Say. Jr. Acad. Nat. Sci. Phil., iii, 100 (1823); Williston, Synop. N. A. Syrph., 119 (1886).

Four ♂ ♂ and three ♀ ♀ taken at Omaha, Douglas County, between August 15 and September 2, 1913 (L. T. Williams).

Baccha lemur Osten Sacken. West. Dipt., 331 (1877); Williston, Synop. N. A. Syrph., 121 (1886); Hunter, Canad. Ent., xxix, 131 (1897).

A ♂ from Monroe Canyon, Sioux County, in August (C. H. Gable).

Chrysotoxum Meigen

KEY TO THE SPECIES

1. Lateral margin of third abdominal segment yellow; second and third abdominal bands narrowly interrupted.....*laterale*

   Lateral margin of third abdominal segment not entirely yellow 2

2. Anterior coxae with a yellow spot above..... 3

   Anterior coxae without a yellow spot above.....*pubescens*

3. Black spot of the fifth abdominal segment wine-glass shaped *currani*

   Black spot of the fifth abdominal segment andiron-shaped *cuneatum*

Chrysotoxum laterale Loew. Cent., v, 42 (1864); Williston, Synop. N. A. Syrph., 14 (1886); Townsend, Trans. Amer. Ent. Soc., xxii, 35 (1895).

Six ♂ ♂ from Lincoln, Lancaster County, and West Point, Cuming County, June 2nd to June 20th.

Chrysotoxum pubescens Loew. Wien. Ent. Monatsch., iv, 84 (1869); Williston, Synop. N. A. Syrph., 15 (1886); Townsend, Trans. Amer. Ent. Soc., xxii, 35 (1895); Hunter, Canad. Ent., xxviii, 91 (1896).

Two ♂·♂ taken at Lincoln, June 1st.

Chrysotoxum currani n. sp.

♀. Length 13 mm. Eyes pilose. Face yellow with a rather broad, fusiform, black stripe extending from the oral margin to the base of the antennae, light pilose. Cheeks yellow, separated from the face by a brownish black stripe extending from the rim of the compound eyes to the oral margin. Front shining black, with a large yellow pollinose

spot on each side. Vertex shining black, black pilose. (Antennae missing.)

Thorax shining metallic black, with yellow lateral stripes. Dorsum with two cinerous stripes, evanescent on the posterior two-fifths. Pleura colored like the dorsum with yellow spots as follows: One above the anterior coxa, one each on the mesopleura, sternopleura, and hypopleura. Scutellum yellow, the disk black fasciolate.

Abdomen shining black, with maize yellow bands. The bands are moderately wide, arcuate and interrupted medially. Segments with apical margins banded buff-yellow, the band on the second segment slightly dilated medially, that on the third segment more strongly so and that on the fourth segment considerably dilated, the yellow of the posterior margin of the fifth segment produced into a triangular spot, so that between this spot and the broad maize yellow fasciae the black forms an inverted wine-glass shaped spot. Venter of the first segment maize yellow, second with posterio-lateral spots maize yellow, third and fourth with anterio-lateral and posterio-lateral spots maize yellow, fifth black.

Coxae and trochanters piceous, femora maize yellow except for an apical reddish yellow band, tibiae maize yellowish, tarsi reddish yellow.

Wings smoky hyaline; base, costal and subcostal cells, proximal parts of first basal and marginal cells lutescent.

Type. Lincoln, Lancaster County, Nebraska, June 26, 1908 (C. H. Gable). One ♀. University of Nebraska collection. This species was determined as new by Mr. C. Howard Curran of the Canadian Department of Agriculture, Division of Entomology, who returned it undescribed. In recognition of Mr. Curran's courtesy and valuable contributions on the *Syrphidae,* this species has been named in his honor.

Chrysotoxum cuneatum n. sp.

♀. Length 12.5 mm. Antennae black, 2 mm. in length, the lengths of the joints in the ratio of 9:12:15, numbering from the first. Face yellow with a rather broad, fusiform, black stripe, extending from the oral margin to the base of the antennae, light pilose; cheeks luteous, separated from the face by a brownish black stripe. Front shining black, with a yellow pollinose spot on each side, light pilose. Vertex black. Eyes pilose. Occiput covered with ash-gray pollen and with pale yellow pubescence.

Thorax shining bluish black, with lateral yellow stripes. Dorsum with two yellowish pollinose stripes evanescent on the posterior two-fifths. Pleura colored like the dorsum with light buff spots as follows:

One above the anterior coxa, one in front of wing, one each on the mesopleura, sternopleura, and hypopleura. Halteres reddish-yellow. Scutellum yellow, the disk black fasciolate.

Abdomen shining black with faint metallic iridescence, maize yellow banded, the fasciae moderately wide, arcuate, and interrupted medially. The fasciae on the third, fourth and fifth segments wider than the corresponding ones on *currani*. Segments with apical margins banded buff, the bands somewhat narrowed and interrupted in the mid-lateral region on the second and third segments, the anterior margin of the band of the second segment notched at the middle, the buff-yellow posterior margin of the fifth segment produced into a triangular spot, so that between this spot and the broad maize-colored fasciae the black forms an andiron-shaped spot. The shape of this spot is very similar to that of *luteopilosa* Curran, except that the arms are slightly more sinuate. Venter with the first segment maize yellow, the second with the posterio-lateral margins maize yellow, the third and fourth each with an anterior oblique spot and the posterio-lateral margins maize yellow, the fifth with an anterior spot only maize yellow, the spots largest on the third segment and smallest on the fifth.

Coxae and trochanters piceous, femora auburn, tibae maize yellowish, tarsi slightly darker, claws black apically.

Wings smoky hyaline; base, costal and subcostal-cells, proximal parts of first basal and marginal cells lutescent.

Type. West Point, Cuming County, Nebraska, June. One ♀. University of Nebraska collection. This species was determined as new by Mr. C. Howard Curran of the Canadian Department of Agriculture, Division of Entomology, who returned it undescribed.

Toxomerus Macquart

Toxomerus geminatus. (Say). Jr. Acad. Nat. Sci. Phil., iii, 92, 7; Compl. Writ., ii, 80 (1883); Williston, Proc. Amer. Phil., Soc., xx, 310 (1882).

1886. *Mesograpta geminata* Williston, Synop. N. A. Syrph., 102.

West Point, Cuming County; Lincoln, Lancaster County, and Omaha, Douglas County, between June 25th and August 20th; five ♂♂ and two ♀♀.

Mesogramma Loew

KEY TO THE SPECIES

1. Scutellum yellow, legs yellow, except the hind tarsi..... 2

   Scutellum black or brown with a yellow border; front of female above only a little narrowed; hind femora wholly yellow..... .....*marginata var.*

2. Front of female only a little narrowed above; third to fifth abdominal segments with narrow lateral yellow margins.....*marginata*

   Front of female much narrowed above; third to fifth abdominal segments with no yellow on the margins.....*polita*

Mesogramma marginata (Say). Jr. Acad. Nat. Sci. Phil., ii, 92 (1823).

1886. *Mesograpta marginata* Williston, Synop. N. A. Syrph., 100.

The University collection contains a large series of this species, fifty-four ♂ ♂ and sixty-one ♀ ♀, from the following localities: Rulo, Richardson County; Omaha, Douglas County; Lincoln, Lancaster County; Beatrice, Gage County; Fairmont, Fillmore County; York, York County; South Bend, Cass County; West Point, Cuming County; Coburn, Dakota County; Concord, Dixon County; Maskell, Dixon County; South Sioux City, Dakota County; Neligh, Antelope County; Butte, Boyd County; Carns, Keyapaha County; Glen, Sioux County; Monroe Canyon, Sioux County, and Mitchell, Scottbluff County, between May 9th and September 13th.

Mesogramma polita (Say). Jr. Acad. Nat. Sci. Phil., iii, 68 (1823); Snow.

1886, *Mesograpta polita* Williston, Synop. N. A. Syrph., 98.

Kans. Univ. Quart., iii, 239 (1895).

Three ♂ ♂ and one ♀ taken at Lincoln, Lancaster County, in the month of September.

Allograpta Osten Sacken

Allograpta obliqua (Say). Jr. Acad. Nat. Sci. Phil., iii, 89 (1823); Williston, Synop. N. A. Syrph., 96 (1886).

This species has a wide distribution over the state. Twenty-seven ♂ ♂ and twenty-three ♀ ♀ have been taken at Rulo, Richardson County; Omaha, Douglas County; Meadow, Sarpy County; Weeping Water, Cass County; South Bend, Cass County; Lincoln, Lancaster County; York, York County; South Sioux City, Dakota County; Concord, Dixon County; Broken Bow, Custer County; Glen, Sioux County; Monroe Canyon, Sioux County, and Mitchell, Scottsbluff County, beteween May 8th and August 25th.

Sphaerophoria St. Fargeaux and Serville

KEY TO THE SPECIES

1. Lateral thoracic stripe ending at the suture; face entirely yellow; abdominal bands beyond the second segment present in the female, usually obsolete or wanting in the male; length 8 mm. ..... *cylindrica*

   Lateral thoracic stripes continuous..... *scripta*

Sphaerophoria cylindrica (Say.) Amer. Ent., 1 (1824); Williston, Synop. N. A. Syrph., 105 (1886).

Twenty-nine ♂ ♂ and twelve ♀ ♀ collected at the following localities: Omaha, Douglas County; Bellevue, Sarpy County; South Bend, Cass County; Lincoln, Lancaster County; Fairmont, Fillmore County; South Sioux City, Dakota County; Concord, Dixon County; West Point, Cuming County; Carns, Keyapaha County; Glen, Sioux County; Monroe Canyon, Sioux County; Harrison, Sioux County, and Mitchell, Scottsbluff County, between May 9th and August 31st.

Sphaerophoria scripta (Linnaeus). Fauna Suec., ended., 449 (1746); Williston, Synop. N. A. Syrph., 107 (1886).

Three ♂ ♂ and two ♀ ♀ taken at Brock, Nemaha County, and Lincoln, Lancaster County. The ♂ from Brock and two ♀ ♀ from Ute Creek, Colorado, have the coxae and the base of the femora black; this is probably only geographical variation.

Xanthogramma Schiner

KEY TO THE SPECIES

1. Scutellum with basal half black.....*flavipes*

   Scutellum yellow 2

2. The yellow band on the second abdominal segment does not attain the lateral margin.....*felix*

   The yellow band on the second abdominal segment attains the lateral margin..... 3

3. Second and third abdominal segments with the extreme anterior angles yellow .....*emarginata*

   Second and third abdominal segments with the extreme anterior angles not yellow.....*aenea*

Xanthogramma flavipes (Loew). Cent., iv, 83 (1863); Williston, Synop. N. A. Syrph., 94 (1886).

Two ♂ ♂ taken at Omaha, Douglas County, on July 17 and August 3, 1913, and one ♀ taken on August 17, 1914, by L. T. Williams.

Xanthogramma felix Osten Sacken. Bull. Buff. Soc. Nat. Sci., iii, 67 (1875); Williston, Proc. Amer. Phil. Soc., xx, 311, (1882).

A ♂ taken at Lincoln, Lancaster County, July 9, 1909 (C. H. Gable).

Xanthogramma emarginata (Say). Jr. Acad. Nat. Sci. Phil., iii, 91 (1823); Williston, Synop. N. A. Syrph., 93 (1886).

Three ♂ ♂ and two ♀ ♀ collected at the following localities: Omaha, Douglas County; West Point, Cuming County, and Neligh, Antelope County, between June 18th and August 30th.

Xanthogramma aenea Jones. Jr. N. Y. Ent. Soc., xv, 93 (1907).

The type was a ♀ from West Point, Cuming County, Nebraska, taken in June, 1906, by P. R. Jones. A ♂ collected

at Omaha, Douglas County, August 26th, by L. T. Williams, is in the collection.

Didea Macquart

Didea fasciata var. **fuscipes** Loew. Cent., iv, 82 (1863); Osten Sacken, Cat. Dipt., 245, note 212 (1858); Williston, Synop. N. A. Syrph., 89 (1886).

One ♂ and three ♀ ♀ taken at Harrison, Sioux County; Monroe Cayon, Sioux County, and Omaha, Douglas County, between June 1st and August 15th.

Eupoedes Osten Sacken

Eupoedes volucris Osten Sacken. West. Dipt., 329 (1877); Williston, Synop. N. A. Syrph., 65 (1886); Snow, Kans. Univ. Quart., iii, 232 (1895).

This species is a very common one in the state. Specimens have been collected at Monroe Canyon, Sioux County; Harrison, Sioux County; Glen, Sioux County; Crawford, Dawes County; Mitchell, Scottsbluff County; Sidney, Cheyenne County; Loup City, Sherman County, and Lincoln, Lancaster County, between May 12th and September 1st.

Paragus Latrielle

KEY TO THE SPECIES

1. Scutellum with a yellow border; face of male without a black median stripe; front of female narrow above.....*bicolor*

   Scutellum without a yellow border; face in both sexes with a black median stripe; front in female of nearly equal width..... 2

2. Abdomen with more or less red on the dorsum..... 3

   Abdomen wholly greenish black.....*angustifrons*

3. Vertical triangle in male large.....*tibialis*

   Vertical triangle in male not unusually large.....*dimidiatus*

Paragus bicolor (Fabricius). Ent. Syst., iv, 297 (1794), Williston, Synop. N. A. Syrph., 18 (1886).

Ten ♂ ♂ and five ♀ ♀ taken at Omaha, Douglas County; Cedar Bluffs, Saunders County; Lincoln, Lancaster County; West Point, Cuming County; Carns, Keyapaha County; Halsey, Thomas County; Crawford, Dawes County; Glen, Sioux County, and Monroe Canyon, Sioux County, between April 31st and September 12th.

Paragus angustifrons Loew. Cent., iv, 64 (1863); Williston, Synop. N. A. Syrph., 17 (1886).

Two ♀ ♀ from Roca, Lancaster County and Omaha, Douglas County on April 29, 1905 and August 16, 1913, respectively.

Paragus tibialis (Fallen). Dipt. Suec. Syrph., 60, 5 (1814-17); Williston, Synop. N. A. Syrph., 19 (1886).

Sixteen ♂ ♂ and three ♀ ♀ collected at the following localities: Omaha, Douglas County; South Bend, Cass County; Lincoln, Lancaster County; Cedar Bluffs, Saunders County; Carns, Keyapaha County; Halsey, Thomas County; Mitchell, Scottsbluff County, and Harrison, Sioux County, between April 31st and September 1st.

Paragus dimidiatus Loew. Cent., iv, 63 (1863); Williston, Synop. N. A. Syrph., 20 (1886).

A ♂ taken at Lincoln, Lancaster County, on August 2, 1910 (F. A. Burnham).

Scaeva Fabricius

Scaeva pyrastri (Linnaeus). Syst. Nat., 10th ed., 594 (1758).

1886. *Catabomba pyrastri* Williston, Synop. N. A. Syrph., 63.
1905. *Lasiophthicus pyrastri* Aldrich, Cat. N. A. Diptera, 363.

Two ♂ ♂ and one ♀ taken in Sioux County, and at Lincoln, Lancaster County, in May, July and August.

Syrphus Fabricus.

KEY TO THE SPECIES

1. The three principal bands entire; the second and third ones not reaching the lateral margin, face with a brown stripe.....*americanus*

   The three principal bands interrupted..... 2

   First cross band interrupted; the others entire..... 5

2. Abdominal spots of the third and fourth segments distinctly arcuated 3

   Abdominal spots straight and transverse..... 4

3. Abdominal spots of second and third segments truncate near anterior margin; eyes pilose.....*creper*

   Abdominal spots of second and third segments rounded near anterior margin; eyes bare.....*arcuatus*

4. Fifth abdominal segment, at least, entirely red.....*snowi*

   Fifth abdominal segment not red.....*mentalis*

5. Eyes pilose, not pubescent.....*creper*

   Eyes bare 6

6. Abdominal spots of the second segment reaching the lateral margin 7

   Abdominal spots of the second segment not reaching the lateral margin 10

7. Eyes pubescent.....*torvus*

   Eyes bare 8

8. The cross-bands of the third and fourth segments reach the lateral margin .....*ribesii*

   The cross-bands of the third and fourth segments do not reach the lateral margin..... 9

9. Fifth abdominal segment, at least, red.....*snowi*

   Fifth abdominal segment not red.....*opinator*

10. Face with a brown stripe.....*americanus*

    Face without brown stripe.....*snowi*

Syrphus americanus Wiedemann. Auss. Zweifl. Ins., ii, 129 (1830); Osten Sacken, Proc. Bost. Soc. Nat. Hist., xvii, 145 (1875); Williston, Synop, N. A. Syrph., 82 (1886).

This species has quite a wide distribution over the state. Fourteen ♂ ♂ and twenty-six ♀ ♀ have been taken at Falls City, Richardson County; Omaha, Douglas County; Bellevue, Sarpy County; South Bend, Cass County; Lincoln, Lancaster County; South Sioux City, Dakota County; West Point, Cuming County; Neligh, Antelope County, and Monroe Canyon, Sioux County, between April 18th and August 30th.

Syrphus arcuatus (Fallen) Dipt Suec. Syrph., 42, 11 (1816); Osten Sacken, Proc. Bost. Soc. Nat. Hist., xviii, 149 (1875).
1877. *lapponicus* Osten Sacken, West Dipt., 326.

Four ♂ ♂ and four ♀ ♀ collected from Monroe Canyon, Sioux County; Glen, Sioux County; Crawford, Dawes County, and Mitchell, Scottsbluff County, between June 10th and August 20th.

Syrphus mentalis Williston. Synop. N. A. Syrph., 72 (1886); Hunter, Canad. Ent., xxix, 130 (1897).

One ♂ taken at Glen, Sioux County, on August 10, 1905.

Syrphus creper Snow. Kans. Univ. Quart., iii, 234 (1895).

One ♂ taken in May in Sioux County. The second and third abdominal crossbands are narrowly interrupted in this specimen, but in three ♂ ♂ from Colorado (Estes Park, Russell, Ute Creek) they are entire.

Syrphus torvus Osten Sacken. Proc. Bost. Soc. Nat. Hist., xviii, 139 (1875); Williston, Synop. N. A. Syrph., 79 (1886).

One ♀ taken at Monroe Canyon, Sioux County, August 16, 1912 (E. J. Taylor).

Syrphus ribesii (Linnaeus). Syst. Nat., 10th ed., 593 (1758); Williston, Synop. N. A. Syrph., 77 (1886).

This is an abundant species in the state. There are in the University collection eighteen ♂ ♂ and twenty-one ♂ ♂ from the following localities: Omaha, Douglas County; Child's Point, Sarpy County; Bellevue, Sarpy County; Meadow, Sarpy County; Roca, Lancaster County; Lincoln, Lancaster County; Beatrice, Gage County; Gordon, Sheridan County; Bridgeport, Morrill County; Glen, Sioux County; Harrison, Sioux County; Monroe Canyon, Sioux County, and Bad Lands, Sioux County, between April 10th and September 2nd.

Syrphus opinator Osten Sacken. West. Dipt., 327 (1877); Williston, Synop. N. A. Syrph., 83 (1886); Snow, Kans. Univ. Quart., iii, 236 (1895).

Two ♂ ♂ and four ♀ ♀ taken at Monroe Canyon, Sioux County; Glen, Sioux County, and Omaha, Douglas County, between August 7th and 20th.

Syrphus snowi Curran. (=**ruficauda** Snow).

1892. *ruficauda* Snow, Kans. Univ. Quart., i, 36.

A ♀ from Monroe Canyon, Sioux County, August 16, 1912 (E. J. Taylor).

MICRODONTINAE

Microdon Meigen

KEY TO THE SPECIES

1. Slender, elongate species; antennae short, third joint a little longer than the first two together, wings indistinctly fasciate ..... *coarctatus*

   Short, thick-set species..... 2

2. Scutellum not emarginate; large black species; first joint a trifle longer than the second and third together, third joint when viewed from the side lanceolate..... *lanceolatus*

   Scutellum emarginate 3

3. Hind metatarsi extraordinarily thickened and dilated..... *fuscipennis*

Hind metatarsi not extraordinarily thickened or dilated.....*tristis*

Microdon coarctatus Loew. Cent., v, 47 (1864); Williston, Synop. N A. Syrph., 6 (1886).

Three ♂ ♂ and one ♀ from Sioux County, the latter specimen collected July 1, 1911 (R. W. Dawson).

Microdon lanceolatus Adams. Kans. Univ. Sci. Bull., ii, 212 (1903).

A ♀ taken at Warbonnet Canyon, Sioux County, in 1901 (M. A. Carriker).

Microdon fuscipennis (Macquart). Hist. Nat. Dipt., i, 488 (1834); Williston, Synop. N. A. Syrph., 4 (1886).

A ♀ taken at Neligh(Antelope County, June 22, 1909 (W. Thompson).

Microdon tristis Loew. Cent., v, 45 (1864); Williston, Synop. N. A. Syrph., 6 (1886).

One ♂ and one ♀ from West Point, Cuming County, June 27, 1906 (P. R. Jones) and Halsey, Thomas County, June 1, 1906 (L Bruner).

CHILOSINAE

KEY TO THE GENERA

1. Face entirely black..... 2

   Face more or less yellow..... 10

2. Oral opening broadly oval and without indentations; face very gently and evenly convexed, completely covered with rather long, loose pile..... 3

   Oral opening irregular in outline, having a dorsal directed indentation at the front margin..... 6

3. Face considerably broader at the oral margin than at the antennae (if doubtful, compare *Heringia*).....*Pipiza*

   Face but little or not at all broader at the oral margin than at

the antennae 4

4. Arista microscopically bare; eyes often with a horizontal bare stripe ..... *Pipizella*

   Arista microscopically pilose to the end; eyes always evenly pilose 5

5. Venter of fourth segment in the male only half as long as its dorsum; middle tibiae in female slender; third antennal joint in female elongate ..... *Heringia*

   Venter of fourth segment three-fourths as long as its dorsum; middle tibiae in female rounded in front, in male produced anteriorly; trochanters in male usually with long process *Cnemodon*

6. Face and front usually with transverse wrinkles; smaller species ..... *Chrysogaster*

   Face and front not with transverse wrinkles; larger species 7

7. Petiole beyond union of third and fourth longitudinal veins much longer than anterior cross-vein 8

   Petiole shorter 9

8. Eyes hairy; antennal pits separated ..... *Chilosia*

   Eyes bare; antennal pits confluent ..... *Cartosyrphus*

9. Scutellum unusually large, nearly quadrate; males dichoptic; face concave ..... *Chalcomyia*

   Scutellum normal; males holoptic; face concave in the females, tuberculate in males ..... *Myiolepta*

10. Epistoma produced into a long porrect snout; costal vein continued well beyond apex of wing; the usual hairs on the base of the costa reduced to minute spines ..... *Rhingia*

    Epistoma not produced snout-like 11

11. Arista shorter than antennae; epistoma produced downwards; face in profile gently concave ..... *Neoascia*

    Arista longer than antennae; epistoma produced anteriorly; face in profile deeply concave ..... *Sphegina*

Cnemodon Egger

KEY TO THE SPECIES

1. Wings purely hyaline, last section of fourth vein sinuous....*sinuosa*

   Wings cinereous or brownish hyaline, last section of fifth vein bent at its middle; third antennal joint black above; male with middle and hind coxae with processes.....*calcarata*

Cnemodon sinuosa Curran. Proc. Cal. Acad. Sci., xi, No. 16, p. 368 (1921).

A ♀ from Glen, Sioux County, 9,000 feet, August 18, 1906 (P. R. Jones). This specimen agrees pretty closely with *sinuosa* but has been given that name tentatively only, because males are necessary for the certain determination of it.

Cnemodon calcarata (Loew). Cent., vi, 42 (1865).
1886. *Pipiza calcarata* Williston, Synop. N. A. Syrph., 24.

One ♂ from Lincoln, Lancaster County, in April.

Pipiza Fallen

Pipiza femoralis Loew. Cent., vi, 38 (1865); Williston, Synop. N. A. Syrph., 26 (1886).

Two ♂ ♂ and three ♀ ♀ from Roca and Lincoln, both in Lancaster County, May and June.

Pipizella Rondani

Pipizella pulchella (Williston). Synop. N. A. Syrph., 29 (1886); Curran, Proc. Cal. Acad. Sci., xi, No. 16, p. 349 (1921).

A ♂ from Glen, Sioux County, August 20, 1906 (H. S. Smith). The third joint of the antenna is not as long as that of specimens from Colorado, but the last section of the fourth vein is bent near its middle.

Heringia Rondani

Heringia salax (Loew). Cent., vi, No. 39 (1865).
1886. *Pipiza pistica* Williston, Synop. N. A. Syrph., 29.

A ♀ from Monroe Canyon, Sioux County, August 9, 1908 (L. Bruner).

Chrysogaster Meigen

KEY TO THE SPECIES

1. Base and tip of tibiae, or at least first two joints of tarsus, yellow or yellowish red; last section of fourth longitudinal vein rectangular; antennae elongate 2

   Legs wholly black; last section of fourth vein curved or bent 3

2. The last section of the fourth vein joins the third beyond the tip of second vein, rectangular, with a stump of a vein in the middle; second joint of antennae nearly as long as the third; eyes with linear markings ..... *nitida*

   The last section of the fourth vein joins the third before the tip of the second; eyes unicolorous ..... *pictipennis*

3. Epistoma produced forwards ..... *robusta*

   Epistoma not produced forwards ..... *nigripes*

Chrysogaster nitida Wiedemann. Auss. Zweifl. Ins., ii, 116 (1830); Williston, Synop. N. A. Syrph., 35 (1886); Townsend, Trans. Amer. Ent. Soc., xxii, 36 (1895).

Five ♂ ♂ and eight ♀ ♀ from Lincoln, Lancaster County; West Point, Cuming County, and Omaha, Douglas County, between April 22nd and September 11th.

Chrysogaster pictipennis (Loew). Cent., iv, 58 (1863); Williston, Synop. N. A. Syrph., 37 (1886); Hunter, Canad. Ent., xxix, 124 (1897).

Nine ♂ ♂ and six ♀ ♀ taken at Lincoln, Lancaster County; Roca, Lancaster County; Ashland, Saunders County; Cedar Bluffs, Saunders County; West Point, Cuming County; Broken Bow, Custer County; Mitchell, Scottsbluff County, and Glen, Sioux County, between April 30th and August 28th.

Chrysogaster robusta Shannon. Proc. Ent. Soc. Wash., xviii, 101 (1916).

A ♀ collected in the Bad Lands at the mouth of Monroe Canyon, Sioux County, May 28th, 1901 (L. Bruner).

Chrysogaster nigripes Loew. Cent., iv, 60 (1863); Williston, Synop. N. A. Syrph., 33 (1886).

A ♂ taken at Cedar Bluffs, Saunders County, in April.

Chilosia Meigen

KEY TO THE SPECIES

Face bare; pile on mesonotum short; everywhere profoundly punctured ..... *punctulata*

(Face hairy; pile on mesonotum long; not profoundly punctured ..... *livida*)

Chilosia punctulata Hunter. Canad. Ent., xxix, 128 (1897).

This species is not represented in the University collection, altho it is recorded by Hunter as having been collected at West Point, Cuming County, on September 9th.

I take this opportunity to present the description of a new *Chilosa* from Colorado, as follows:

Chilosia livida n. sp.

♂. Length 9-11 mm. Eyes hairy. Face and cheeks a bright blue-green black, the ocular depression with a faint pinkish tinge, white pilose except the oral margin and tubercle, face deeply concave just below the base of the antennae where it is whitish pollinose. Front a dull blue-green black, with a longitudinal depression and covered with moderately long pale yellow pile.

Dorsum of thorax bright greenish black, covered with moderately long pale yellow pile; pleura colored like the dorsum of the thorax with long whitish pile. Scutellum bluish black.

Abdomen bluish black with a very faint greenish tinge, the first three tergites darker than those following due to a covering of short black hairs. Lateral margins of abdomen with long white pile. Venter whitish pilose.

Apices of femora and bases and apices of tibiae reddish brown. Wings brownish on the basal portion becoming lighter apically.

Type. Ute Creek, Costilla County, Colorado, 9,000 feet, June 29, 1907 (R. W. Dawson). ♂. University of Nebraska collection.

Paratypes. Ute Creek, Costilla County, Colorado, 9,000 feet June 24, 1907 (L. Bruner). Two ♂ ♂ University of Nebraska collection.

Cartosyrphus Bigot

KEY TO THE SPECIES

1. Body entirely shining.....*comosa*

   Body not entirely shining..... 2

2. Front nearly bare.....*laevifrons*

   (Front with long black pile.....*longipilosa*)

Cartosyrphus comosa (Loew). Cent., iv, 66 (1863); Williston, Synop. N. A. Syrph., p. 44 (1886).

Two ♀ ♀ taken at Sioux County, and Bellevue, Sarpy County, both in May.

Cartosyrphus laevifrons (Jones). Jr. N. Y. Ent. Soc., xv, 90 (1907). 1907. *Chilosia laevifrons* Jones, Jr. N. Y. Ent. Soc., xv, 90.

The ♂ type is from Roca, Lancaster County, Nebraska, May 12th, 1906, on *Fragaria virginiana* (P. R. Jones).

I append here the description of a new *Cartosyrphus* from Colorado:

Cartosyrphus longipilosa n. sp.

♂. Length 8-9 mm. Face shining black, front and vertex black with long black pile. Antennae reddish brown, arista black and pubescent.

Thorax metallic, but feebly shining, clothed with dusky yellow and black pile. Pleura with black pile. Scutellum black with bristles on the margin. Wings hyaline with the stigma brown, the last section of the fourth vein much longer than the posterior cross-vein.

Abdomen opaque black except the anterior angles of the second segment, a triangular spot on each side of the third segment, the fourth segment and the hypopygium which are metallic. Legs black with the apices of the femora and bases of the tibiae reddish.

Type. Ute Creek, Costella County, Colorado, 9,000 feet, July 6, 1907 (L. Bruner). ♂. University of Nebraska collection.

Paratypes. Ute Creek, Costilla County, Colorado, 9,000 feet, July 6, 1907 (L. Bruner). 6 ♂♂. University of Nebraska collection.

Chalcomyia Williston

Chalcomyia aerea (Loew). Cent., x, 53 (1872); Williston, Synop. N. A. Syrph., 126 (1886).

A ♀ collected at Cedar Bluffs, Saunders County, in April.

Myiolepta Newman

KEY TO THE SPECIES

1. Abdomen black ..... *nigra*

   Abdomen with luteous or yellow spots at the base..... *varipes*

Myiolepta nigra Loew. Cent., x, 54 (1872); Williston, Synop. N. A. Syrph., 129 (1886).

A ♀ from South Sioux City, Dakota County, July 22, 1912 (L. T. Williams).

Myiolepta varipes Loew. Cent., ix, 79 (1869); Williston, Proc. Amer. Phil. Soc., xx, 308 (1882); Synop. N. A. Syrph., 128 (1886).

Two ♂♂ from Lincoln, Lancaster County, and Fairmont, Fillmore County, on May 8, 1906 (L. Bruner) and June 16, 1915 (C. E. Mickel), respectively.

Rhingia Scopoli

Rhingia nasica Say. Jr. Acad. Nat. Sci. Phil., iii, 94 (1823); Williston, Synop. N. A. Syrph., 130 (1886).

Five ♂ ♂ and eleven ♀ ♀ taken at Lincoln and Roca, Lancaster County, and South Bend, Cass County, between April 29th and May 29th.

Neoascia Williston

Neoascia globosa (Walker). List., iii, 546 (1849); Williston, Synop. N. A. Syrph., 111 (1886).

1882. *metallica* Williston, Proc. Amer. Phil. Soc., xx, 515.

One ♀ from Bellevue, Sarpy County, May 9, 1908 (L. Bruner). This specimen is the variety *metallica* of Williston.

Sphegina Meigen

Sphegina lobata Loew. Cent., iii, 21 (1863); Williston, Synop. N. A. Syrph., 115 (1886).

A ♀ from Monroe Cayon, Sioux County, June 18, 1911 (R. W. Dawson).

SERICOMYINAE

Condidea Coquillett.

Condidea lata Coquillett. Canad. Ent., xxxix, 75 (1907).

Two ♀ ♀ from Jim Creek and Warbonnet Canyon, Sioux County, in June, 1901.

VOLUCELLINAE

KEY TO THE GENERA

1. Arista featherly plumose.....*Volucella*

   Arista very densely pulmose, appearing like a solid mass....*Copestylum*

Volucella Geoffroy

KEY TO THE SPECIES

1. Wings cloudy only on cross-veins; larger species; in front of scutellum a yellowish, rather obscure parallelogram, emarginate anteriorly; abdomen yellow with narrow black posterior margins; face yellow.....*satur*

Wings with cloudiness other than on cross-veins; smaller species; in front of scutellum two yellowish oval spots; abdomen with three rather broad yellow bands.....*fasciata*

Volucella satur Osten Sacken. West. Dipt., 333 (1877); Williston, Synop. N. A. Syrph., 142 (1886).

Two ♂ ♂ and five ♀ ♀ collected in the western part of the state at Glen, Sioux County; Monroe Canyon, Sioux County, and Bad Lands, Sioux County, in August (12-19).

Volucella fasciata Macquart. Dipt. Exot., ii, 2, 22 (1842); Osten Sacken, West. Dipt., 334 (1877); Williston, Synop. N. A. Syrph., 145 (1886).

Eight ♂ ♂ and ten ♀ ♀ collected from the following localities: Warbonnet Canyon, Sioux County; Monroe Canyon, Sioux County; Glen, Sioux County; Imperial, Chase County; Haigler, Dundy County; Hitchcock County; Curtis, Frontier County; Gordon, Sheridan County; Mouth of Gordon Creek, Sheridan County; Halsey, Thomas County; Springview, Keyapaha County, and Lincoln, Lancaster County, between April 18th and September 30th.

Copestylum Macquart

Copestylum marginatum (Say). Jr. Acad. Nat. Sci. Phil., vi, 167 (1829); Williston, Synop. N. A. Syrph., 151 (1886).

Three ♂ ♂ and two ♀ ♀ taken at Crawford, Dawes County; Haigler, Dundy County, and Halsey, Thomas County, between May 25th and August 12th.

ERISTALINAE

KEY TO THE GENERA

1. Marginal cell closed.....*Eristalis*

   Marginal cell open..... 2

2. No stigmatical cross-vein; epaulet at base of costa broad and clothed with mostly yellowish hairs; squamae broad, bordered

by dense, straight (*H. similis, latifrons*) or branched (*H. conostomus, laetus, chrysostomus, integer*) cilia.....*Helophilus*

Stigmatical cross-vein present..... 3

3. Less pilose; eyes of male broadly separated; in the male hind coxae, hind femora, and tip of hind tibiae provided with spurs or protuberances; abdomen of male narrowed posteriorly (*Triodontia*) .....*Polydontomyia*

More pilose; eyes of male contiguous; in the male hind coxae, hind femora, and tip of hind tibiae not provided with spurs or protuberances; abdomen of male not narrowed posteriorly....*Mallota*

Eristalis Latreille

KEY TO THE SPECIES

1. Eyes bare with small round dark spots; dorsum of thorax in female distinctly vittate; abdomen without light markings.....*aeneus*

Eyes pilose..... 2

2. Thorax with transverse bands; front in female narrowed above ..... *transversus*

Thorax without such bands..... 3

3. Mesonotum with four opaque black stripes, the median pair in the shape of a tuning fork.....*furcatus*

Mesonotum not so marked..... 4

4. Third segement of abdomen wholly shining, without opaque spots or bands (opaque spots in ♂ *latifrons*, opaque bands in ♂ *nitidus*) 5

Third abdominal segment with opaque markings..... 7

5. Pile of eyes not confined to a vertical stripe; the black of second abdominal segment, at least in part, opaque (except ♀ *latifrons*) 11

Pile of eyes mostly confined to a vertical stripe; the abdomen wholly shining; large species..... 6

6. Honey-bee like in appearance; moderately pilose; base of tibiae yellowish, posterior tarsi blackish; arista nearly bare.....*tenax*

Humble-bee like in appearance; thorax and abdomen with thick, long pile (on the dorsum of thorax sometimes blackish pilose (var. *melanostomus*); arista plumose; hind tarsi red.....*flavipes*

7. Third abdominal segment with a posterior, velvety black cross-band not interrupted in the middle..... 8

Third segment with three opaque spots; an elongated one on each side behind, and an oval median one in front; the opaque of second segment with a triangular shining spot behind; fourth segment with an oval opaque spot in front.....*dimidiatus*

8. Third segment of the abdomen broadly and conspicuously yellow on the sides (not so in ♀), joining the yellow of the second segment, the black of the second segment wholly opaque, not extending outwards on the sides behind; third segment with an opaque spot in front; fourth segment metallic, usually with a small opaque spot in front.....*meigenii*

The third segment not conspicuously yellow on the sides; the posterior opaque fascia of the second segment behind reaching toward the lateral margin (*meigenii* ♀)..... 9

9. Male with anterior velvety-black cross-band not interrupted in the middle on the third and fourth segments; female with no velvety black cross-bands on third and fourth segments.....*nitidus*

Male with only an anterior opaque spot on the third and fourth segments (not sure of *inornatus* ♂); female with or without anterior opaque spot on the third and fourth segments..... 10

10. Lighter markings of abdomen usually quite distinct; third and fourth segments with a small elongate, opaque black spot in front .....*temporalis*

Lighter markings obsolete, third and fourth segments without opaque anterior spot.....*inornatus*

11. Second, third and fourth segments of abdomen broadly reddish on sides, leaving a narrow black stripe, which is wholly opaque on the segment, and in front, at least, on the third segment; eyes narrowly separated (♂).....*montanus*

Second segment of abdomen only yellow on sides, with a posterior, interrupted or subinterrupted velvety cross-band; posterior margin of segments 2-4 yellowish white with a fringe of pale golden yellow hairs.....*latifrons*

Eristalis aeneus (Fabricius). Ent. Syst., iv, 302 (1772-94); Williston, Synop. N. A. Syrph., 161 (1886).

Thirty-two ♂ ♂ and twenty-six ♀ ♀ collected in the eastern part of the state at the following places: Lincoln, Lancaster County; West Point, Cuming County, and Omaha, Douglas County, between April 10th and November 1st.

Eristalis transversus Wiedemann. Auss. Zweifl. Ins., ii, 188 (1828); Williston, Synop, N. A. Syrph., 170 (1886).

Three ♂ ♂ and five ♀ ♀ taken at Brock, Nemaha County; South Bend, Cass County, and Lincoln, Lancaster County, in May and July.

Eristalis furcatus Wiedemann. Auss. Zweifl. Ins., ii, 176 (1828); Williston, Trans. Amer. Ent. Soc., xv, 279 (1888).

A ♀ is at hand labeled "Lincoln, Lancaster County, June." Heretofore at least, to the knowledge of the writer, this species has never been collected farther north than Brownsville, Texas, and in no great numbers north of Central America. I am unable to acount for its occurence in this state. With only one specimen in the collection there is a chance of it having been wrongly labeled.

Eristalis tenax (Linnaeus). Syst. Nat., 10th ed., 591 (1758); Osten Sacken, Ent. Mo. Mag., xxiii, 97 (1883); Williston, Synop. N. A. Syrph., 160 (1886).

Twelve ♂ ♂ and twenty ♀ ♀ taken at Monroe Canyon, Sioux County; Glen, Sioux County; Gordon, Sheridan County; West Point, Cuming County; Coburn, Dakota County; Lincoln, Lancaster County; Malcolm, Lancaster County; Louisville, Cass County, and Omaha, Douglas County, between June 3rd and November 14th.

Eristalis flavipes Walker. List., iii, 633 (1849); Williston, Synop. N. A. Syrph., 168 (1886); Hunter, Canad. Ent., xxviii, 99 (1896).

Five ♂ ♂ and seven ♀ ♀ taken at Omaha, Douglas County;

Lincoln, Lancaster County; Roca, Lancaster County, and Scottsbluff County, between March 31st and October 11th.

Eristalis dimidiatus Wiedemann. Auss. Zweifl. Ins., ii, 180 (1828); Williston, Synop. N. A. Syrph., 162 (1886).

Fourteen ♂♂ and three ♀♀ from Omaha, Douglas County; Lincoln, Lancaster County; Roca, Lancaster County; Fremont, Dodge County; South Bend, Cass County; Concord, Dixon County, and West Point, Cuming County, between March 31st and July 13th.

Eristalis meigenii Wiedemann. Auss. Zweifl. Ins., ii, 177 (1828).
1877. *androclus* Osten Sacken, West. Dipt., 337.
1886. *brousi* Williston, Synop. N. A. Syrph., 165.

Five ♂♂ taken at Omaha, Douglas County, and Mitchell, Scottsbluff County, between June 17th and August 22nd.

Eristalis temporalis Thomson. Eugen. Resa., 490 (1868).
1865. *hirtus* Loew, Cent., vi, 66, Osten Sacken, West. Dipt., 335 (1877); Williston, Synop. N. A. Syrph., 162 (1886).

Three ♂♂ and eight ♀♀ taken at Warbonnet Canyon, Sioux County; Mouth of Monroe Canyon, Sioux County; Harrison, Sioux County; Glen, Sioux County; Mitchell, Scottsbluff County, and Omaha, Douglas County, between May 29th and August 20th.

Eristalis inornatus Loew. Cent., vi, 68 (1865); Williston, Synop. N. A. Syrph., 175 (1886).

A ♀ taken in the Bad Lands, mouth of Monroe Canyon, Sioux County, May 28, 1911 (L. Bruner).

Eristalis montanus Williston. Proc. Amer. Phil. Soc., xx, 322 (1882); Synop. N. A. Syrph., 166 (1886); Hunter, Canad. Ent., xxviii, 98 (1896).

One ♀ and two ♂♂ taken at Lincoln, Lancaster County, April 6, 1918 (L. Bruner) and in Sioux County.

Eristalis latifrons Loew. Cent., vi, 65 (1865).; Williston, Synop. N. A. Syrph., 164 (1886).
1877. *stipator* Osten Sacken, West. Dipt., 336.

Fifty-eight ♂ ♂ and ninety-nine ♀ ♀ taken at the following localities: Monroe Canyon, Sioux County; Glen, Sioux County; Mitchell, Scottsbluff County; Bridgeport, Morrill County; Haigler, Dundy County; Hitchcock County; McCook, Redwillow County; Curtis, Frontier County; Halsey, Thomas County; Gordon, Sheridan County; Carns, Keyapaha County; Concord, Dixon County; Maskell, Dixon County; Coburn, Dakota County; West Point, Cuming County; Lincoln, Lancaster County; South Bend, Cass County; Louisville, Cass County; Fairmont, Filmore County; Omaha, Douglas County, and Rulo, Richardson County, between May and October.

The description of a new *Eristalis* from Colorado is here appended:

Eristalis nitidus n. sp.

♀. Length 10-12.5 mm. Face shining black covered with a dense white pollen except the tubercle and nearly all the front. Front wide with white and black pile, the white pile being just above the base of the antennae. Occiput with long pale hairs. Eyes dark pilose. Antennal pits yellowish. First and second joints of antennae black, the third brownish- black and nearly quadrate.

Thorax bluish-black, little shining, densely covered with moderately long pale yellowish pile. Pleura bluish-black, clothed in long whitish pile. Scutellum with a reddish yellow cast and clothed with pale yellowish pile.

Abdomen shining bluish-black with the posterior margin of each segment, except the first, reddish yellow. First segment covered with white pollen, clothed with white pile, the remaining segments with black pile on the dorsum and white pile on the margins.

Femora except the apices, basal half of all the tibiae, and the tarsus except the first two joints of the middle and hind pairs, blackish, the remaining portion of the legs yellowish.

Wings hyaline except a brown spot at the base and another across the center of the wing.

♂. Length 10-11 mm. Similar to the female. The second segment of the abdomen has a triangular yellow spot on each side, the third segment has an anterior and posterior uninterrupted opaque band, and

the fourth segment has an anterior opaque band. The lighter hairs of the body are yellowish. The brown spots on the wings are distinctly marked. The yellow of the legs is less extended, especially on the tibiae.

This species was determined by Jones* as *saxorum*. It may be distinguished from *saxorum* by the broader front and the absence of velvety-black cross-bands on the abdomen in the female, the absence of a velvety cross-band on the posterior margin of the fourth segment in the male, and the less distinctly shining steel blue color of the entire body.

Type. Pike's Peak, Colorado, July 20, 1906 (L. Bruner). ♀. University of Nebraska collection.

Allotype. Pike's Peak, Colorado, July 20, 1906 (L. Bruner). ♂. University of Nebraska collection.

Paratypes. Pike's Peak, Colorado, July 20, 1906 (L. Bruner). 4♀♀, 3♂♂. University of Nebraska collection.

Helophilus Meigen

KEY TO THE SPECIES

1. Face jutting forward into a cone.....*conostomus*

   Face not conically produced forwards..... 2

2. Sixth longitudinal vein distinctly sinuous..... 3

   Sixth longitudinal vein nearly straight or only gently curved.... 4

3. Front of female black pilose; front of male narrowed above....*similis*

   Front of female black pilose only near the ocelli; front of male broad .....*latifrons*

4. Abdomen elongate, cylindrical in the male..... 5

   Abdomen oval; face yellow..... 6

5. Hind coxae of the male with a stout process below.....*chrysostomus*

   (Hind coxae of the male not with a stout process .....*distinctus* Willst).

6. Luteous fasciae of the abdomen broad, the first narrowly interrupted, the remainder entire.....*integer*

   Fascia on the third segment narrowly interrupted.....*laetus*

*Ent. News, xviii, p. 241.

Helophilus conostomus Williston. Synop. N. A. Syrph., 193 (1886).

Two ♀ ♀ taken at South Sioux City, Dakota County, and West Point, Cuming County, in June and July.

Helophilus similis Macquart. Dipt. Exot., ii, 2, 64 (1842); Williston, Synop. N. A. Syrph., 189 (1886).

Five ♂ ♂ and six ♀ ♀ collected at Lincoln, Lancaster County; Cedar Bluffs, Saunders County, and Hardy, Nuckolls County, in April and August.

Helophilus latifrons Loew. Cent., iv, 73 (1863); Williston, Synop. N. A. Syrph., 188 (1886); Hunter, Canad. Ent., xxix, 138 (1897).

Thirty-six ♂ ♂ and thirty-nine ♀ ♀ taken at Omaha, Douglas County; Louisville, Cass County; South Bend, Cass County; Wabash, Cass County; Lincoln, Lancaster County; Cedar Bluffs, Saunders County; Ashland, Saunders County; Hardy, Nuckolls County; West Point, Cuming County; Neligh, Antelope County; Niobrara, Knox County; Concord, Dixon County; Carns, Keyapaha County; Halsey, Thomas County; Valentine, Cherry County; Haigler, Dundy County; Bridgeport, Morrill County; Mitchell, Scottsbluff County; Gering, Scottsbluff County; Gordon, Sheridan County; Crawford, Dawson County; Glen, Sioux County, and Bad Lands, mouth of Monroe Canyon, Sioux County, between May 8th and October 6th.

Helophilus chrysostomus (Wiedemann). Auss. Zweifl. Ins., ii, 174 (1828); Wiliston, Synop. N. A. Syrph., 190 (1886).

Five ♂ ♂ taken at Lincoln, Lancaster County, and Mitchell, Scottsbluff County in July and September.

Helophilus integer Loew. Cent., iv, 76 (1863); Williston, Synop. N. A. Syrph., 195 (1886); Hunter, Canad. Ent., xxiv, 139 (1897).

Two ♂ ♂ and twelve ♀ ♀ taken at Omaha, Douglas County; Lincoln, Lancaster County; West Point, Cuming County, and Mitchell, Scottsbluff County, between June 13th and August 12th.

Helophilus laetus Loew. Cent., iv, 77 (1863); Williston, Synop. N. A. Syrph., 189 (1886); Hunter, Canad. Ent., xxix, 139 (1897).
1895. *aureopilis* Townsend, Trans. Amer. Ent. Soc., xxii, 51.

Five ♂ ♂ and one ♀ from Omaha, Douglas County; Lincoln, Lancaster County; Sandhills, and Mitchell, Scottsbluff County, June 13th to September 10th.

Polydontomyia Williston

Polydontomyia curvipes (Wiedemann). Auss. Zweifl. Ins., ii, 149 (1828).
1886. *Triodonta curvipes* Williston, Synop. N. A. Syrph., 206.
1877. *Polydontia curvipes* Osten Sacken, West. Dipt., 338.

Three ♂ ♂ and six ♀ ♀ taken at Lincoln, Lancaster County; Haigler, Dundy County, and Mitchell, Scottsbluff County between June 23rd and August 24th.

Mallota Meigen

KEY TO THE SPECIES

1. Eyes pilose; more or less of the base of the abdomen with yellow pile.....*posticata*

   Eyes bare..... 2

2. Eyes contiguous in the male; abdomen almost wholly black pilose; hind tibiae of the male with a stout spur in the middle (form *bautias*) or wholly without such spur.....*cimbiciformis*

   Eyes separated in the male..... 3

3. Larger species; black facial stripe broad; abdomen black with yellow hair on the base and apex; legs mostly blackish in color .....*fascialis*

   Smaller species; black facial stripe narrow; abdomen black clothed with light colored pile; legs mostly reddish.....*illinoisensis*

Mallota posticata (Fabricius). Syst. Antl., 237 (1805); Williston, Synop. N. A. Syrph., 201 (1886).

Three ♂ ♂ and three ♀ ♀ taken at Rulo, Richardson

County; Omaha, Douglas County, and Nebraska City, Otoe County, from July 2nd to September 14th.

Mallota cimbiciformis (Fallen). Syrphici., 27; Williston, Synop. N. A. Syrph., 202 (1886); Hunter, Canad. Ent., xxviii, 99 (1896).

A ♀ collected at Milford, Seward County, in June.

Mallota fascialis Hunter. Canad. Ent., xxviii, 100 (1896).

Six ♂♂ and six ♀♀ taken at Warbonnet Canyon, Sioux County; Bad Lands, mouth of Monroe Canyon, Sioux County; Pine Ridge, Dawes County, and Lincoln, Lancaster County, between June 8th and July 8th, including the type specimen of the species.

Mallota illinoisensis Robertson. Canad. Ent., xxxiii, 284 (1901).

A ♂ from West Point, Cuming County, June 22nd (P. R. Jones).

Milesinae

Milesia Latreille

Milesia virginiensis (Drury). Illust. Exot. Ent., App., 11 (1770-82). 1886. *ornata* Williston, Synop. N. A. Syrph., 255.

A ♂ and three ♀♀ taken at Rulo, Richardson County; Omaha, Douglas County; Meadow, Sarpy County, and Lincoln, Lancaster County, from June 27th to July 31st.

Xylotinae

KEY TO THE GENERA

1. Thorax with distinct yellow markings besides those on humeri and a single spot on the pleurae. "Wasp flies"..... 7

   Thorax without distinct yellow markings of the ground color except (certain species of *Cynorrhina* and *Somula*) rarely on the humeri and a single spot on the pleurae..... 2

2. Apical cross-vein sinuate, forming a sprawling"W"; anal furrow less than one-third the length of anal cell; all basal cells desti-

tute of the usual clothing of villi, causing the wings to have a glassy appearance; hind femora a little shorter than two and one-half times their width, and are held in longitudinal groove-like impressions of the abdomen during flight; chitinous parts of sternites only one-third the entire width of the abdomen; head subhemispherical, the eyes composing the greater part of the head; face subcarinate.....*Syritta*

Without the above conglomeration of characters..... 3

3. Hind femora with an apical saw-tooth prominence; face subcarinate to carinate.....*Tropidia*

Hind femora without a saw-tooth prominence; face not carinate 4

4. Third vein with a downward loop into first posterior cell; mesonotum ochraceous, very densely pollinose above.....*Pterallastes*

Third vein straight or with a very gentle downward curve..... 5

5. Epistoma abruptly truncate, face in profile deeply and evenly concave; first posterior cell closed, petiolate.....*Xylota*

Epistoma produced either well forward or protruding downward 6

6. Antennae inserted on prominence slightly higher than vertex of head; lateral margins of abdomen yellow.....*Somula*

Antennae inserted below vertex of head; lateral margins of abdomen not entirely yellow.....*Cynorrhina*

7. Antennae inserted near middle of head; face not longer than front .....*Temnostoma*

Antennae long or short and inserted above middle of head on a conical process; face much produced downwards; sixth vein entering wing margin shortly beyond anal cell.....*Sphecomyia*

Antennae inserted above middle of head; face not produced downwards; sixth vein prolonged obliquely outward from anal cell; hind femora with conical, tooth-like projection below near distal end.....*Spilomyia*

Syritta St. Fargeau and Serville

Syritta pipiens (Linnaeus). Syst. Nat., 10th ed., 594 (1758); Williston, Synop. N. A. Syrph., 240 (1886).

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Seventy ♂ ♂ and eighty-four ♀ ♀ taken at Rulo, Richardson County; Omaha, Douglas County; Child's Point, Sarpy County; Louisville, Cass County; South Bend, Cass County; Beatrice, Gage County; Lincoln, Lancaster County; Cedar Bluffs, Saunders County; Fairmont, Fillmore County; Concord, Dixon County; Curtis, Frontier County; Mitchell, Scottsbluff County; Glen, Sioux County; Harrison, Sioux County, and Monroe Canyon, between April 25th and September 27th.

Tropidia Meigen

KEY TO THE SPECIES

1. Femora black, at the tip testaceous; the hind femora below, near the base, with a strong mammiform process (♂).....*mammillata*

   Front and middle femora yellow on distal end; hind femora without such process near the base.....*quadrata*

Tropidia mammillata Loew. Cent., i, 68 (1861); Williston, Synop. N. A. Syrph., 208 (1886); Hunter, Canad. Ent., xxix, 144 (1897).

Three ♂ ♂ and one ♀ taken at Cedar Bluffs, Saunders County, in April.

Tropidia quadrata (Say). Amer. Ent., 1, (1824); Williston, Synop. N. A. Syrph., 207 (1886).

Twenty-five ♂ ♂ and seven ♀ ♀ taken at Lincoln, Lancaster County; Hickman, Lancaster County; West Point, Cuming County, and Mitchell, Scottsbluff County, between May 1st and September 16th.

Pterallastes Loew

Pterallastes thoracicus Loew. Cent., iv, 80 (1863); Williston, Synop. N. A. Syrph., 198 (1886).

Two ♂ ♂ taken at Omaha, Douglas County, July 22, 1913 (L. T. Williams) and Fairmont, Fillmore County, June 16, 1915 (C. E. Mickel).

Xylota Meigen

KEY TO THE SPECIES

1. Legs wholly black; hind femora much thickened..... 2

   Legs not wholly black..... 3
2. Wholly black; wings black.....*chalybea*
   Abdomen chiefly red; the second segment with a basal black triangle; wings nearly hyaline.....*pigra*
3. Second and third abdominal segments (at least) red..... 4

   Second and third segments wholly black, or with yellow spots.... 5
4. Abdomen wholly red except the first segment; hind coxae of the male without a tooth below.....*bicolor*

   Abdomen except the first segment not wholly red; hind coxae of male with a spur below.....*flavitibia*
5. Abdomen long and slender, with two yellow spots on the second segment .....*angustiventris*

   Abdomen not unusually slender..... 6
6. Abdomen with two pairs of yellow spots..... 8

   Abdomen wholly black..... 7
7. Arista luteous at base.....*anthreas*

   Arista wholly black.....*obscura*
8. Hind femora much thickened, small species; arista yellow at the base .....*fraudulosa*

   Hind femora moderately thickened..... 9
9. Fourth abdominal segment brilliant bronze; third longitudinal vein gently curved.....*analis*

   Fourth abdominal segment black; third vein quite straight *ejuncida*

Xylota chalybea Wiedemann. Auss. Zweifl. Ins., ii, 98 (1828); Williston, Synop. N. A. Syrph., 233 (1886); Townsend, Trans. Amer. Ent. Soc., xxii, 53 (1895).

A ♂ taken at Omaha, Douglas County, June 11, 1913 (L. L. Williams).

Xylota pigra (Fabricius). Ent. Syst., iv, 295 (1772); Williston, Synop. N. A. Syrph., 227 (1886).

Six ♂ ♂ and four ♀ ♀ taken at Monroe Canyon and Warbonnet Canyon, Sioux County, from June 19th to August 24th.

Xylota bicolor Loew. Cent., v, 39 (1864); Williston, Synop. N. A. Syrph., 229 (1886).

A ♀ collected at Glen, Sioux County, July 12, 1910 (L. Bruner).

Xylota flavitibia Bigot. Annales, 546 (1884); Williston, Synop. N. A. Syrph., 228 (1886); Hunter, Canad. Ent., xxviii, 101 (1896).

Seven ♂ ♂ taken at Monroe Canyon, Sioux County; Bad Lands, mouth of Monroe Canyon, Sioux County; Warbonnet Canyon, Sioux County, and Glen, Sioux County, from May 28th to July 18th.

Xylota angustiventris Loew. Cent., vi, 58 (1865); Williston, Synop. N. A. Syrph., 231 (1886).
1886. *elongata* Williston, Synop. N. A. Syrph., 234.

Two ♂ ♂ have been taken at West Point, Cuming County, and Warbonnet Canyon, Sioux County, in June.

Xylota anthreas Walker. List., iii, 556 (1849); Williston, Synop. N. A. Syrph., 235 (1886).

A ♀ taken at Milford, Seward County.

Xylota obscura Loew. Cent., vi, 55 (1865); Williston, Synop. N. A. Syrph., 233 (1886).

A ♀ taken at Warbonnet Canyon in Sioux County.

Xylota fraudulosa Loew. Cent., v, 41 (1864); Williston, Synop. N. A. Syrph., 230 (1886); Hunter, Canad. Ent., xxviii, 101 (1896).

Five ♂ ♂ and two ♀ ♀ have been taken at Omaha, Douglas County; Milford, Seward County, and West Point, Cuming County, between June 21st and August 17th.

Xylota analis Williston. Synop. N. A. Syrph., 226 (1886); Hunter, Canad. Ent., xxviii, 100 (1896).

A ♂ from Warbonnet Canyon, Sioux County.

Xylota ejuncida Say. Amer. Ent., 1, (1824); Williston, Synop. N. A. Syrph., 229 (1886); Hunter, Canad. Ent., xxix, 143 (1897).

One ♂ and three ♀ ♀ from Monroe Canyon, Sioux County; Sowbelly Canyon, Sioux County, and West Point, Cuming County, taken from June 21st to August 20th.

Somula Macquart

Somula decora Macquart. Dipt. Exot., Suppl., iii, 57 (1847).
1886. *Criorhina decora* Williston, Synop. N. A. Syrph., 216.

A ♂ and ♀ taken at Dunbar, Otoe County, respectively on May 5 and 6, 1905 (M. H. Swenk).

Cynorrhina Williston

Cynorrhina umbratilis (Williston). Synop. N. A. Syrph., 212 (1886).

A ♀ taken at South Bend, Cass County, May 17, 1905 (P. R. Jones).

Temnostoma St. Fargeau and Serville.

Temnostoma bombylans (Fabricius). Syst. Antl., 189 (1895); Williston, Synop. N. A. Syrph., 250 (1886).

A ♀ taken at Neligh, Antelope County, June 22, 1909 (W. Thompson).

Sphecomyia Latreille

Sphecomyia vittata (Wiedemann). Auss. Zweifl. Ins., ii, 87 (1828); Williston, Synop. N. A. Syrph., 257 (1886); Hunter, Canad. Ent., xxviii, 101 (1896).

Two ♂ ♂ and two ♀ ♀ collected at Lincoln, Lancaster

County; South Bend, Cass County, and Sioux County, all in May.

Spilomyia Meigen

KEY TO THE SPECIES

1. Second joint of antennae much longer than first; second segment of abdomen with a broad arcuate yellow band, the third and fourth with a slender median interrupted one.....*quadrifasciata*

   Second joint of antennae not much longer than the first, third with an entire yellow band.....*longicornis*

Spilomyia quadrifasciata (Say). Long's Exped., App., 377 (1824); Williston, Synop. N. A. Syrph., 248 (1886); Hunter, Canad. Ent., xxviii, 101 (1896).

Five ♂ ♂ and seventeen ♀ ♀ have been collected at the following localities: Omaha, Douglas County; Lincoln, Lancaster County; Hardy, Nuckolls County; Mouth of Gordon Creek, Sheridan County; Glen, Sioux County, and Monroe Canyon, between August 14th and September 22nd.

Spilomyia longicornis Loew. Cent., x, 49 (1872); Williston, Synop. N. A. Syrph., 245 (1886); Townsend, Trans. Amer. Ent. Soc., xxii, 54 (1895).

A ♂ taken at Omaha, Douglas County, September 8, 1913 (L. T. Williams).

Cerioides

Cerioides Rondani

KEY TO THE SPECIES

1. Antennal process of front not more than half as long as the first joint of antennae, almost wholly wanting, first joint of antennae very slender, nearly as long as the two following together; face vertical, not at all excavated in profile; second segment of the abdomen much constricted, third and fourth segments each with two arcuate spots.....*willistoni*

2. Antennal process slender, longer than first joint of antennae; second segment of abdomen not constricted.....*abbreviata*

Cerioides willistoni (Kahl). Kans. Univ. Quart., vi, 141 (1897).
1853. *Ceria signifera* Loew, Neue Beitr., i, 18; Williston, Synop. N. A. Syrph., 262 (1886).

Three ♀ ♀ collected at Lincoln, Lancaster County, in March and May.

Cerioides abbreviata (Loew). Cent. v, 48 (1865).
1886. *Ceria abbreviata* Williston, Synop. N. A. Syrph., 261.

Two ♂ ♂ and one ♂ collected at Lincoln, Lancaster County, and Bridgeport, Morrill County, from May 17th to July 11th.

A SYNOPSIS OF THE SCARABAEIDAE OF NEBRASKA (COLEOPTERA)

BY R. W. DAWSON

LINCOLN, NEBRASKA

Several years ago the writer undertook a study of the "June-bug" family (Scarabaeidae) for the state of Nebraska. The object of the study was two fold: First to determine the number and status of our species in this large and economically important family, and second to present a taxonomic review which would enable the beginning student, or interested amateur, to readily name with reasonable certainty any species which he might encounter in the state.

In the following pages 40 genera and 162 species are tabulated, and notes given on the abundance, seasonal and geographical distribution of the species within the state. Fourteen species are included without definite records of capture, because of their known distribution being such as to practically insure their ultimate discovery in Nebraska. The list is thought to be fairly representative; however, continued collecting will undoubtedly bring to light a considerable number of additional species. In order to more readily enable the student to recognize and determine these additional species the more important and useful papers have been listed under each genus.

The collection of the Department of Entomology contains a wealth of material in this family from other states, in fact about 280 species most of which are unlike those in the Nebraska fauna. The determination of this supplementary material has considerably increased the labor involved in presenting the present paper, but the writer judges the time well spent because of the light thrown upon the Nebraska fauna in consequence of the study of these related forms. Seven undescribed species have come to light from Nebraska

during the progress of this work. Four of these have already been published by the writer in his studies on the genus *Serica;* two are now in press in a short revision of the genus *Bolbocerosoma* by the writer and Mr. McColloch, and one in the genus *Lygerodes* has been assigned to Mr. Casey for description.

In the following pages the writer has tried to continually keep in mind the needs of the beginning student and has spared no pains to make the tables easy and workable, the most evident and readily described characters available being employed in constructing the tables, regardless of their fundamental taxonomic value. Since then, the statements of the fundamental group characters have thus largely been disassociated from the generic tabulation it has seemed desirable to incorporate them in the body of the text under the major headings.

The student should not gain the notion that the *Scarabaeidae* have been fully and adequately studied, and that little new is to be added to the knowledge of the family, for such is far from the situation. Perhaps the most striking example of the inadequacy of the literature is the case of the genus *Serica,* where the writer has found more than fifty undescribed species. In fact the presentation of this review has long been delayed because of the impossibility of naming the Nebraska species in this genus until the main facts concerning it were worked out for the whole of the North American fauna. Much is yet to be learned concerning the following Genera: *Trox, Serica, Diplotaxis, Phyllophaga, Polyphylla, Hoplia, Anomala, Cyclocephala, Ligyrus, Euphoria, Cremastochilus and Trichius.* Any or all of these genera could well be restudied monographically.

The family *Scarabaeidae* is a remarkably interesting one for the systematist. He can revel in studies of individual and subspecific variation, and the correlations of variation with geographical distribution in such genera as *Hoplia, Phyllophaga, Anomala, and Euphoria* until he becomes con-

vinced that the only major differences are truly specific after all. Then he can turn to *Serica* only to discover, through the phenomenal characters in the male genitalia, that the species may be legion, and differ from each other only by minor, or almost wholly negligible, external characters. At this juncture he may well take up *Polyphylla, Cyclocephala and Ligyrus,* where both external and genital characters seem inadequate, and ponder the advisability of the monographer making life-history studies and chromosome counts before finally deciding the limits and nature of the species.

In concluding these remarks thanks are due to many persons for aid in accumulating the collection and kindly loaning much of the material that has been at the writers disposal. Especially are acknowledgements due to Professors Lawrence Bruner and Myron H. Swenk for encouragement and direction in the work.

SYSTEMATIC SYNOPSIS OF NEBRASKA SCARABAEIDAE

Family **SCARABAEIDAE:**

Subfamily LAPAROSTICTI:

Tribe Coprini:			
Genera:	*Canthon*	(7)	[2]*
	Choeridium	(1)	
	Copris	(1)	[1]
	Phanaeus	(1)	
	Onthophagus	(5)	
Tribe Aphodiini:			
Genera:	*Aegialia*	(2)	
	Aphodius..	(19)	
	Ataenius	(5)	[1]
	Psammobius	(1)	
	Rhyssemus	(1)	[1]
Tribe Orphnini:			
Genus:	*Ochodaeus*	(3)	[1]
Tribe Geotrupini:			
Genera:	*Odontaeus*		[2]
	Bolbocerosoma	(2)	[1]
	Eucanthus	(1)	
	Geotrupes	(3)	

*Figures in parenthesis indicate the number of species taken in the state, figures in square brackets the number included without definite records.

Tribe Glaphyrini:

Genus:	*Amphicoma*	(1)	

Tribe Trogini:

Genera:	*Glaresis*	(1)	
	Trox	(12)	[1]

Subfamily MELOLONTHINAE:

Tribe Sericini:

Genus:	*Serica*	(9)	

Tribe Melolonthini:

Genera:	*Diplotaxis*	(7)	[2]
	Diazus	(1)	
	Phyllophaga	(24)	[1]
	Polyphylla	(2)	

Tribe Machrodactylini:

Genera:	*Dichelonyx*	(4)
	Macrodactylus	(1)

Tribe Hopliini:

Genus:	*Hoplia*	(1)

Subfamily PLEUROSTICTI:

Tribe Rutelini:

Genera:	*Anomala*	(4)
	Strigoderma	(1)
	Pelidnota	(1)
	Cotalpa	(2)

Tribe Dynastini:

Genera:	*Cyclocephala*	(4)
	Dyscinetus	(2)
	Ligyrodes	(2)
	Ligyrus	(2)
	Aphonus	(1)

Tribe Cetoniini:

Genera:	*Euphoria*	(6)	
	Cremastochilus	(5)	
	Osmoderma	(1)	[1]
	Trichius	(1)	
	Valgus	(1)	

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SCARABAEIDAE

Antennae inserted under the sides of the front, before the eyes, 7– to 11–segmented (usually 10–segmented), the distal segments, usually three in number (sometimes as many as seven), produced transversely, forming a club of thin plates which are capable of mutual contact throughout their length.

SYNOPSIS OF THE GENERA

1. Last abdominal spiracle covered by the elytra..... 2

   Last abdominal spiracle not covered by the elytra..... 18

2. Scutellum not visible, the inner edges of the elytra in contact clear to the base; hind tibae with only one spur..... 3

   Scutellum visible, clearly separating the inner margins of the elytra at the base; hind tibiae with two spurs..... 7

3. Middle and hind tibiae slender, curved and nearly parallel sided beyond the middle.....(p. 171) *Canthon*

   Middle and hind tibiae much wider at the tip, the sides distinctly divergent beyond the middle..... 4

4. Front coxae not prominent, very transverse, the axis nearly horizonal; upper surface bare, polished and shining (p. 175) *Choeridium*

   Front coxae prominent, the axis nearly vertical or erect..... 5

5. Front legs without tarsi, middle and hind tarsi ending in a sharp, curved point, but without claws.....(p. 177) *Phanaeus*

   Front legs with tarsi, and all tarsi with claws..... 6

6. Elytra strongly furrowed or longitudinally grooved; larger species, 12-17 mm. in length.....(p. 176) *Copris*

   Elytra more or less lined longitudinally, but not deeply furrowed; smaller species, 4-13 mm. in length....(p. 178) *Onthophagus*

7. Front femora much wider than the others, usually held forward so as to largely conceal the under surface of the head and antennae; surface of body and elytra dull and opaque, often much roughened .....(p. 198) *Trox*

   Front femora of usual form and not held so as to conceal the

under surface of the head and the antennae; surface of body and elytra either dull or polished..... 8

8. Mandibles visible beyond the clypeus..... 12

Mandibles not visible beyond the clypeus..... 9

9. Hind tarsi with short, triangular segments, the basal ones conspicuously wider than the terminal.....(p. 190) *Psammobius*

Hind tarsi with longer nearly cylindrical segments, the basal ones but little wider than the terminal..... 10

10. Surface of head and pronotum roughly granulate; pronotum with three or four raised, transverse lines.....(p. 190) *Rhyssemus*

Surface of head and pronotum punctured instead of granulate; pronotum without transverse, raised lines..... 11

11. Outer, dorsal angle of hind tibiae prolonged and spine-like .....(p 187) *Ataenius*

Outer, dorsal angle of hind tibae not prolonged into a spine .....(p. 180) *Aphodius*

12. Pronotum and elytra with fine, short, semi-erect, yellow hair.... 17

Pronotum and elytra without fine yellow hair..... 13

13. Size small, 5 mm. or less in length.....(p. 180) *Aegialia*

Size larger, 7 - 20 mm. in length..... 14

14. Surface of pronotum evenly convex, not coarsely punctured .....(p. 195) *Geotrupes*

Surface of pronotum not evenly convex, more or less grooved, ridged, or tuberculate, coarsely and unevenly punctured..... 15

15. Eyes entirely divided into an upper and lower portion..... 16

Eyes only partially divided.....(p. 195) *Eucanthus*

16. Mesosternum strongly elevated between and in front of the middle coxae which are narrowly separated by a metasternal process extending forward and uniting with the mesosternal prominence .....(p. 194) *Bolbocerosoma*

Mesosternum not elevated between and in front of the middle coxae; the coxae nearly or quite contiguous.....(p. 193) *Odontaeus*

17. Yellow hairs rather thickly and evenly distributed over the surface of the elytra.....(p. 191) *Ochodaeus*

    Yellow hairs arranged in very definite, single, longitudinal rows on the elytra.....(p. 198) *Glaresis*

18. Inner margins of elytra straight beyond the scutellum, and capable of being in contact nearly or quite to the apex..... 19

    Inner margins of elytra curved, not capable of contact beyond the middle; the tips widely separated.....(p. 197) *Amphicoma*

19. Hind tarsi with a single large claw.....(p. 227) *Hoplia*

    Hind tarsi with two claws..... 20

20. Hind coxae dilated into plates which usually cover all of the first and half of the second abdominal segments; the widest portion of the coxal plates about twice the width of the hind femora .....(p. 203) *Serica*

    Hind coxal plates but little dilated, the widest portion never twice the width of the femora, and first abdominal segment never covered at the middle by the coxal plates..... 21

21. Abdomen with the sixth ventral segment much reduced in size, often entirely covered by the fifth segment, in which case the abdomen appears to have only five ventral segments..... 22

    Abdomen with the sixth ventral segment clearly visible, not reduced in size..... 23

22. Tarsal claws simple, not toothed on the inner edge; antennae 9-segmented .....(p. 211) *Diazus*

    Tarsal claws cleft at the tip, or toothed on the inner edge; antennae 10-segmented.....(p. 207) *Diplotaxis*

23. Labium developed into a large concave plate concealing the other mouth parts, and usually the antennae as well..... .....(p. 241) *Cremastochilus*

    Labium of the usual form, not entirely covering the other mouth parts, and never concealing the antennae..... 24

24. Antennal club composed of five or six plates.....(p. 224) *Polyphylla*

    Antennal club composed of only three plates..... 25

25. Pronotum relatively large and broad, distinctly wider than long 29

    Pronotum relatively smaller, but little, and sometimes not at all wider than long..... 26

26. Elytra short, truncate, their length about equalling their combined width.....(p. 244) *Trichius*

Elytra much longer, not truncate, length distinctly greater than their combined width..... 27

27. Elytra with numerous, very distinct, longitudinal grooves .....(p. 230) *Strigoderma*

Elytra not distinctly, longitudinally grooved..... 28

28. Pronotum long and narrow, one and one-half times as long as its basal width.....(p. 227) *Macrodactylus*

Pronotum much shorter, but little if any longer than wide .....(p. 225) *Dichelonyx*

29. Terminal portion of elytra with a very narrow membranous edge.....(p. 228) *Anomala*

Terminal portion of elytra not having a membranous edge..... 30

30. Tarsal claws, especially the front ones, alike in size and shape 34

Tarsal claws, especially the front ones, unequal, decidedly so in most males, but often only slightly so in the females..... 31

31. Pronotum with a narrow, but distinct rim or margin at the base 33

Pronotum not distinctly margined at the base..... 32

32. Front and clypeus separated by a ridge or keel; larger, blackish or dark grown species.....(p. 235) *Ligyrodes*

Front and clypeus separated by an obscure suture; smaller, pallid or yellowish species.....(p. 232) *Cyclocephala*

33. Clypeus separated from the front by a distinct suture..... .....(p. 231) *Cotalpa*

Clypeal suture nearly or quite obsolete.....(p. 231) *Pelidnota*

34. Epimera of mesothorax visible from above, at the base of the elytra 39

Epimera of mesothorax not visible from above..... 35

35. Front tibiae with five teeth on the outer edge.....(p. 244) *Valgus*

Front tibiae with only three teeth on the outer edge..... 36

36. Clypeus separated from the front by a ridge or keel..... 38

Clypeus separated from the front by a more or less distinct suture 37

37. Tarsal claws toothed..... (p. 211) *Phyllophaga*

Tarsal claws simple..... (p. 234) *Dyscinetus*

38. Mandibles visible from above, serrate or toothed on the outer margin ..... (p. 236) *Ligyrus*

Mandibles usually not visible from above, and not toothed on the outer margin..... (p. 237) *Aphonus*

39. Epimera of mesothorax extending up between the rear corners of the pronotum and the base of the elytra..... (p. 237) *Euphoria*

Epimera of mesothorax below the rear corners of the pronotum, and not extending up between the pronotum and the base of the elytra ..... (p. 243) *Osmoderma*

LAPAROSTICTI

Abdominal spiracles situated in the membrane connecting the sternites and tergites, the last spiracle covered by the elytra; ligulae always distinct from the mentum; the species all living on decomposing organic matter, many of them in excrement and a few in fungi.

COPRINI

Body relatively broad and rounded in outline; clypeus expanded covering the mouth parts; hind tibiae usually with a single spur; last tarsal segment usually without the two erect setae between the claws; elytra subtruncate, leaving the pygidium exposed; abdomen with six firmly united sternites.

Canthon Hoffmansegg

The genus *Canthon* is peculiar to the New World, ninety seven species, mostly from tropical America, being recorded by Harold in his monograph. Of these only seven have thus far been taken in Nebraska, although at least two additional

forms probably occur in the state. Both as larvae and adults the species are dung feeders. To provide food for the larvae pellets of characteristic size and shape for the species are molded by the parent beetles and buried with an egg on each. *Canthon laevis,* our common, large tumble-bug makes spherical balls nearly an inch in diameter which one often sees them rolling in the pastures and road-sides. Judging from a few specimens at hand *nigricornis* forms egg-shaped pellets, and *praticola* rather narrow, elongate ones.

1817. Hoffmansegg: "Entomologische Bemerkungen . . . . . über amerikanishe Insecten . . . . . ," Wiedem. Mag. i, pt. i, p. 38.
1859. Le Conte: "Coleoptera of Kansas and Eastern New Mexico." Smithson. Cont. Knowl., xi, pp. 1-58. (Table for 12 species.)
1868. Harold: "Monographie der Gattung Canthon," Berl. Ent. Zeitschr., xii, pp. 1-144. (Table for 97 species.)
1870. Horn: "Notes on some Genera of Coprophagus Scarabaeidae of the United States," Trans. Amer. Ent. Soc., iii, pp. 42-51. (Revision, and table for 15 species.)
1885. Blanchard: "On the species of Canthon and Phanaeus of the United States with notes on other genera," Trans. Amer. Ent. Soc., xii, pp. 163-172. (Revision, and table for 15 species.)
1910. Blatchley: Coleoptera of Indiana, pp. 912-915. (Descriptive notes and table for 9 species).
1915. Schaeffer: "New Coleoptera and Miscellaneous Notes," Journ. N. Y. Ent. Soc., xxiii, pp. 47-55. (Two new varieties).

SYNOPSIS OF THE SPECIES

1. Hind tibiae with two spurs.....*nigricornis*

   Hind tibiae with one spur..... 2

2. Hind femora margined in front; size large, 12 - 18 mm..... 7

   Hind femora not margined in front, size moderate to small, 12 mm. or less..... 3

3. Sides of prothorax beneath transversely excavated anteriorly for the reception of the femora.....*viridis*

   Sides of prothorax beneath not transversely excavated..... 4
4. Subhumeral stria anteriorly, finely carinated..... 5

   Subhumeral stria not carinated anteriorly..... 6

5. Nearly smooth above.....*lecontei*

   Densely, but not coarsely, granulated above.....*praticola*

6. Coarsely and sparsely granulated; striae of elytra equal ..... [*depressipennis*]

   Finely and densely granulated; lateral striae of elytra deeper than the discal striae.....*ebenus*

7. Eyes large; antennae ferruginous.....[*vigilans*]

   Eyes normal; antennae black..... 8

8. Granules of pronotum and pygidium distinct.....*laevis*

   Pronotum and pygidium finely scabrous, without distinct granules .....*chalcites*

Canthon nigricornis Say.

1823. *Ateuchus nigricornis* Say, Journ. Acad. Nat. Sci. Phila., iii, pp. 207 - 208. Le Conte Ed., ii, p. 133.

Specimens examined: 11 ♂, 5 ♀, from Pine Ridge*, Brady Island, Dismal River, Halsey, and Watts Lake in Cherry Co., collected during May, June and July. Although the specimens at hand are all from central and western Nebraska, the known distribution of the species indicates that *nigricornis* should be found over the entire state, at least under favorable local conditions.

Canthon ebenus Say .

1823. *Ateuchus ebeneus* Say, Journ. Acad. Nat. Sci. Phila., iii, p. 209. Le Conte Ed., ii, p. 134.

Specimens examined: 20 ♂, 22 ♀, from Neligh, Culbertson, Haigler, Imperial, Brady Island, Halsey, Valentine, and the lake region of Cherry Co., collected during May, June and July. This common species is widely distributed, occuring from Maine to Texas.

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* "Pine Ridge" as used in this paper refers not to the town, but to the the pine clad hills of Sioux and Dawes counties.

[**Canthon depressipennis** Le Conte.

1859. *Canthon depressipennis* Le Conte, Coleoptera of Kansas and N. M., p. 10.

This species is recorded by Blanchard (l.c.) from Dakota and Kansas, but no specimens are at hand from Nebraska.]

Canthon praticola Le Conte.

1859. *Canthon praticola* Le Conte, Coleoptera of Kansas and N. M., pp. 10, 11.

Specimens examined: 7 ♂, 2 ♀, from Haigler, Mitchell, Gordon and Kearney, collected from May to August. *Praticola* is a western species which is probably less common, or absent, in the eastern part of the state.

Canthon lecontei Harold.

1868. *Canthon lecontei* Harold, Berl. Ent. Zeitschr., p. 68.

Specimens examined: 1 ♂, from Haigler, July 6, and 1 ♀, July 4, collected by J. T. Zimmer. The character "clypeus 6–dentate, or 4–dentate" used by Dr. Horn in his table for the separation of the closely similar species *probus* and *lecontei* is apparently unsatisfactory. Our Nebraska species is here referred to *lecontei* rather than *probus* because of the carination of the subhumeral stria.

[**Canthon vigilans** Le Conte.

1858. *Cathon vigilans* Le Conte, Journ. Acad. Nat. Sci. Phila., (2), iv, p. 16.

No Nebraska specimens of this species are at hand, but since it is a rather widely distributed form, and is recorded from Iowa, Missouri and Kansas, the writer has included it in the synopsis.]

Canthon laevis Drury.

1770. *Scarabaeus laevis* Drury, Exot. Ins., i, p. 79, pl. 35, fig. 7. Westwood Ed., 1837, i, p. 73, pl. 35, fig. 7.

Specimens examined: 33 ♂, 44 ♀, from South Sioux

City, Concord, Peru, Lincoln, Omaha, Scribner, Fairmont, West Point, Rock Co., Imperial, Mitchell, and Sioux Co., collected from April to August 17. *Laevis* is a common, widely distributed and variable species. The Nebraska specimens are largely of the usual bronzed-black type, but in an occasional individual the bronzed luster is nearly or quite wanting. Among the specimens at hand the length varies from 12 to 18 mm.

Canthon chalcites Haldeman.

1843. *Canthon chalcites* Haldeman, Proc. Acad. Nat. Sci. Phila., i, p. 404.

Specimens examined: 2 ♂, 3 ♀, collected at Omaha, Maskell and Rulo, during May, June and July.

Canthon viridis Beauvois.

1805. *Copris viridis* Beuvois, Ins. Afr. et Amer., p. 23 pl. 3, fig. 2.

Specimens examined: 1 ♀ ,from South Bend. This species is recorded from Indiana, the southern and western states, and Central America. It is probably rare in Nebraska.

Choeridium Serville

From the North American fauna only two species are known in this genus, one of more southernly and one of more northernly distribution. The latter is here recorded from Nebraska.

1825. Serville: Entomological part of Encyclopédie methodique, x, p. 356.

1885. Blanchard: "On the Species of Canthon and Phanaeus of the United States with Notes on other Genera," Trans. Amer. Ent. Soc., xii, pp. 163-172. (Descriptions of the two species.)

Choeridium histeroides Weber.

1801. *Copris histeroides* Weber, Obs. Ent., p. 37.

1910. *Choeridium histeroides* Blatchley, Coleoptera of Indiana, p. 915, fig. 361.

Specimens examnied: 1 ♂, Nebraska City, April 29, 1916, collected under leaves by R. W. Dawson. *Histeroides* is also recorded from Iowa.

Copris Geoffry

1762. Geoffry: "Historie abregee des insectes qui se trouvent aux environs de Paris," i, p. 87.
1870. Horn: "Notes of some Genera of Coprophagus Scarabaeidae of the United States," Trans. Amer. Ent. Soc., iii, pp. 42-51. (Descriptive notes and table for four species).
1906. Schaeffer: "On Bradycinetus and Bolboceras of North America, with Notes on other Scarabaeidae," Trans. Amer. Ent. Soc., xxxii, pp. 249-260. (Descriptive notes and table for seven species.)
1910. Blatchley: Coleoptera of Indiana, pp. 915-916. (Descriptive notes and tables for three species.)

SYNOPSIS OF THE SPECIES

1. Sides of pronotum sinuate near the front angles, surface of pronotum dull, coarsely and densely punctate; length 11 - 18 mm. ..... *tullius*

   Sides of pronotum not sinuate, thorax more or less shining, and unevenly punctured; length 8 - 11 mm..... [*minutus*]

Copris tullius Olivier.

1789. *Scarabaeus tullius* Olivier, Ent. Hist. Nat. Ins. Col., i, p. 118, pl. 11, fig. 98, pl. 19, fig. 88.

Specimens examined: 19 ♂, 26 ♀, from Nebraska City, Lincoln, Fremont, Hooper, West Point, Holt Co., and Haigler, collected from April 16 to August 16. The name *tullius* has priority over *anaglypticus* which has long been used for this species.

[**Copris minutus** Drury.

1773. *Scarabaeus minutus* Drury, Illustr. exot. Ins., ii, p. 78, pl. 35 fig. 6.

No specimens of this common and widely distributed east-

ern species are at hand from Nebraska, but it may occur in the southeastern part of the state.]

Phanaeus Mac Leay

Eight or nine species of these remarkbale beetles are known in the North American fauna, but only one has thus far been taken in Nebraska.

1819. Mac Leay: Horae Entomologicae, i, pt. i, 1. 124.
1885. Blanchard: "On the Species of Canthon and Phanaeus of the United States, with Notes on other Genera," Trans. Amer. Ent. Soc., xii, pp. 163-172. (Revision and table for seven species.)
1910. Blatchley: Coleoptera of Indiana, p. 917. (Descriptive notes on two species.)

Phanaeus carnifex Linnaeus.
1758. *Scarabaeus carnifex* Linnaeus, Systema Naturae, ed. x, p. 346.

Specimens examined: 5 ♂, 3 ♀, from Rulo, South Bend, Dismal River, Beaver City and Haigler, collected from May to August.

Carnifex occurs more commonly than one might suppose from the meager collection of specimens at hand. During June, 1917 the writer noted a considerable number of the "shells" of these beetles in the disgorged pellets of undigested food examined at a flourishing colony of Burrowing Owls located in a pasture about six miles east of Lincoln along the O Street Road. Evidently the owls at least, were able to find *carnifex* in some numbers.

This beetle is one of the most beautiful Scarabaeids occuring in the state. When captured its relatively large size, robust form, brilliant metallic green and bronzed coloration, and the remarkable horn on the head rarely fail to awaken the interest and curiosity of the finder. The elaborate dress seems strikingly out of harmony with the habit of burrowing in fresh cow dung, and doubtless inspired the name "Phanaeus carnifex", the "dirty devil".

Onthophagus Latreille

1807. Latreille: Genera Crustaceorum et Insectorum, p. 141.
1875. Horn: "Synonymical Notes and Descriptions of New Species of North American Coleoptera," Trans. Amer. Ent. Soc., v, pp. 126-156. (Descriptive notes and table for five species.)
1910. Blatchley: Coleoptera of Indiana, pp. 917-920. (Descriptive notes and table for five species.)
1914. Schaeffer: "A Short Review of the North American Species of Onthophagus," Journ. N. Y. Ent. Soc., xxii, pp. 290-300. (Descriptive notes and table for eighteen species.)

SYNOPSIS OF THE SPECIES

1. Surface of body polished and shining, length 10 - 13 mm.....*coproides*
   Surface of body more or less opaque or dull, length, scarcely, or not, exceeding 8 mm..... 2

2. Pronotum of male not differing from that of female, simple and convex in both sexes.....*pennsylvanicus*

   Pronotum of male protruberant in front, sometimes strongly so 3

3. Anterior margin of clypeus distinctly emarginate; pronotum of male with an obtuse, triangular lobe in front.....*anthracinus*

   Anterior margin of clypeus not distinctly emarginate, often rounded or produced medially into a reflexed process; pronotum of male frequently produced anteriorly into a long process more or less emarginate at the apex..... 4

4. Body black, opaque; thorax finely granulate; elytral intervals each with two rows of fine granules.....*hecate*

   Body shining, bluish, greenish or bronzed; thorax punctured; elytra not granulate.....*orpheus*

Onthophagus coproides Horn.

1881. *Onthophagus coproides* Horn, Trans. Kans. Acad. Sci., vii, pp. 75-76.

Specmiens examined: 1 ♂, collected at Halsey, August 23, 1921 by R. W. Dawson.

Onthophagus hecate Panzer.

1794. *Scarabaeus hecate* Panzer, Faun. Ins. Amer. Bor., p. 5, pl. i, fig. 2.

Specimens examined: 38 ♂, 133 ♀, from Maskell, South Sioux City, Fort Calhoun, Weeping Water, Nebraska City, Omaha, South Bend, Ashland, Fremont, Lincoln, Fairmont, West Point, Broken Bow, Valentine, Haigler, Harrison, Monroe and Warbonnet Canyons in Sioux Co., and Mitchell, collected working in the droppings of animals from March to October.

Onthophagus orpheus Panzer.

1794. *Scarabaeus orpheus* Panzer, Faun. Ins. Amer. Bor., p. 5, pl. i, fig. 2.

Specimens examined: 5 ♂, 1 ♀, from Fairmont, Halsey, Mitchell, and Warbonnet Canyon in Sioux Co., collected during June and August. *Orpheus* is a widely distributed species, but is much less common in Nebraska than *hecate.*

Onthophagus pennsylvanicus Harold.

1871. *Onthophagus pensylvanicus* Harold, Col. Hefte, viii, p. 115.

Specimens examined: 8 ♂, 16 ♀, from South Bend, Cedar Bluffs, Omaha, Lincoln, West Point, Neligh, Fairmont, Dismal River, Halsey, Mitchell, and Monroe Canyon in Sioux Co., collected during June, July and August.

Onthophagus anthracinus Harold.

1874. *Onthophagus anthracinus* Harold, Col. Hefte, xi, p. 104.

Specimens examined: 2 ♂, from Omaha, collected by L. T. Williams June 12, 1914. This species is probably rare or accidental in Nebraska. It is recorded from Texas, Arizona, Mexico and Central America.

APHODIINI

Size small, form cylindrical; posterior tibiae with two spurs; elytra not subtruncate, covering the pygidium; abdominal segments freely articulated; last segment of the tarsi with two erect setae.

Aegialia Latreille

1907. Latreille: Genera Crustaceorum et Insectorum, p. 96.
1871. Horn: "Synopsis of Aphodiini of the United States," Trans. Amer. Ent. Soc., iii, pp. 284-297. (Descriptive notes and table for four species.)
1887. Horn: "A Monograph of the Aphodiini Inhabiting the United States", Trans. Amer. Ent. Soc., xiv, pp. 1-110. (Descriptive notes and table for ten species).

SYNOPSIS OF THE SPECIES

1. Thorax with distinct basal marginal line.....*conferta*

   Thorax without basal marginal line.....*spissipes*

Aegialia conferta Horn.

1871. *Aegialia conferta* Horn, Trans. Amer. Ent. Soc., iii, pp. 293, 294.
1910. *Aegialia conferta* Blatchley, Coleoptera of Indiana, p. 921.

Specimens examined: 5, collected at West Point in June, 1888. This is probably the commonest and most widely distributed species of the genus, and doubtless occurs more frequently in the state than the material at hand would seem to indicate.

Aegialia spissipes Le Conte.

1878. *Aegialia spissipes* Le Conte, Proc. Amer. Philos. Soc., p. 611.

Specimens examined: 6, collected at West Point in June, 1888. *Spissipes* is less common than the preceding species. It is recorded from Michigan and Massachusetts.

Aphodius Illiger

Aphodius is one of the largest genera in the family *Scarabaeidae,* and is represented in the North American fauna by 103 species. Many of these are widely distributed and several of them nearly cosmopolitan, which is a rather unusual circumstance among the higher groups of insects.

Of the nineteen species here recorded from Nebraska nine are represented in the collection by six or less specimens each. When a collection in such a group as this shows a considerable proportion of uniques the student is justified in assuming that it is not fully representative, and should therefore expect to find several additional forms.

1798. Illiger. Kugelann Verzeichniss der Kafer Preussens, P. 15.
1870. Horn: "Description of the Species of Aphodius and Dialytes of the United States", Trans. Amer. Ent. Soc., iii. pp. 110-134. (Descriptive notes and table for 51 species).
1887. Horn: "A Monograph of the Aphodiini Inhabiting the United States", Trans. Amer. Ent. Soc., pp. xiv, 1-110. (Descriptive notes and table for 81 species).
1910. Schmidt: "Coleoptera Lamellicornia Family Aphodiidae", Gen. Ins., fasc. 110, 155 pp. 3 pl. (Subgeneric tabulation and list of 108 North American species).
1910. Blatchley: Coleoptera of Indiana, pp. 927-935. (Descriptive notes and table for 20 species).

SYNOPSIS OF THE SPECIES

1. Apex of hind tibiae fringed with short equal spinules..... 2

   Apex of hind tibiae fringed with longer, unequal spinules..... 6

2. Mesosternum not carinated between the coxae..... 3

   Mesosternum distinctly carinated between the coxae..... 5

3. Head and pronotum black, elytra red, pronotum of male impressed in front .....*fimetarius*

   Head and pronotum colored like the elytra, brown or black..... 4

4. Clypeus with a distinct, transverse ridge.....*duplex*

   Clypeus without a transverse ridge.....*ruricola*

5. First segment of hind tarsi not longer than the next two together; color black; sutural interval of elytra as wide as or even wider than the second interval.....*granarius*

   First segment of hind tarsi equal to the next three together; elytra reddish brown, suture and side margins darker or blackish .....*vittatus*

6. Pronotum narrower at base than at apex; humeri of elytra dentiform .....*oblongus*

Pronotum not narrower at base than at apex 7

7. Elytra not pubescent 8

Elytra more or less pubescent 15

8. Side margins of pronotum explanate, usually with a concavity near the hind angles 9

Side margins of pronotum not explanate 10

9. Elytra, sides of pronotum and head dull red ..... *explanatus*

Color uniformly dark brown ..... *brevicollis*

10. Mesosternum distinctly carinate between the coxae; pronotum without basal, marginal line; front tibiae punctate on the anterior face, first tarsal joint longer than the second 11

Mesosternum not carinate between the coxae; anterior tibiae smooth in front 12

11. Hind tibiae stout; first joint of hind tarsi not as long as the next three together ..... *rubeolus*

Hind tibiae slender; first joint of hind tarsi longer than the next three together ..... *stercorosus*

12. Uniformly reddish brown; length 8–9 mm ..... *concavus*

Largely or entirely black or piceous 13

Elytra light brown or yellowish, either marked with black, or more or less clouded 14

13. Body beneath and legs piceous ..... *coloradensis*

Body beneath and legs pale yellow; elytra often with the alternate intervals having small red spots ..... *bicolor*

14. Anterior margin of clypeus angulate at each side of the middle; smaller, length 4.5 mm. or less ..... *serval*

Anterior margin of clypeus broadly rounded at each side of the middle; larger, length 4.5 – 5.5 mm. 18

15. Elytra reddish brown, head and thorax a little darker; length 3.4 – 4 mm. ..... *lentus*

Elytra, at least in part, yellowish, head and thorax largely black; length 4.5 – 6 mm. 16

16. Elytra largely yellow, merely the suture darker ..... [*subtruncatus*]

Elytra clouded with fuscous..... 17

17. Sides of pronotum fringed with rather long hairs; anterior tibiae with upper tooth small or wanting.....*walshi*

Sides of pronotum not fringed with long hairs; front tibiae plainly tridentate .....*femoralis*

18. Dark markings of elytra in the form of distinct streaks or spots .....*distinctus*

Dark markings of elytra in the form of a large central clouded area, leaving only the margins pallid .....*walshi*

Aphodius fimetarius Linnaeus.

1758. *Scarabaeus fimetarius* Linnaeus, Systema Naturae, ed. x, i, p. 348.

Specimens examined: 46 ♂, 55 ♀, from Omaha, Lincoln, Fairmont, Fremont, West Point, Halsey, Holt Co., Cherry Co., Glen, Monroe, Canyon in Sioux Co., and Mitchell, collected from February 22 to December 11. This is an abundant and essentially cosmopolitan species.

Aphodius duplex Le Conte.

1878. *Aphodius duplex* Le Conte, U. S. Geol. Surv., Bull. iv, pt. 2, p. 454.

Specimens examined: 1 ♂, collected in Warbonnet Canyon, Sioux Co. *Duplex* is doubtless uncommon in the state, and to be met with only in the western part. It is recorded from Colorado.

Aphodius ruricola Melsheimer.

1844. *Aphodius ruricola* Melsheimer, Proc. Acad. Nat. Sci. Phila., ii, p. 136.

Specimens examined: 54, from South Bend, Lincoln, West Point, Fairmont, Holt Co., Mitchell, and Warbonnet Canyon in Sioux Co., collected from April to August.

Aphodius granarius Linnaeus.

1767. *Scarabaeus granarius* Linnaeus, Systema Naturae, ed. xii, i, 2, p. 547.

Specimens examined: 164, from Omaha, Lincoln, Fairmont, West Point, Ravenna, and Mitchell, collected from April 4 to July 5. Like *fimetarius*, this is an European species which has become practically cosmopolitan. It is often seen flying in large numbers at sunset on warm spring evenings.

Aphodius vittatus Say.

1825. *Aphodius vittatus* Say, Journ. Acad. Nat. Sci. Phila., v, pp. 191-192. Le Conte ed., ii, p. 295.

Specimens examined: 53, from Fairmont, Holt Co., Halsey, Mitchell, and Warbonnet Canyon in Sioux Co., collected from May 16 to August 4. *Vittatus* is evidently much commoner in the western than the eastern part of the state, the majority of the specimens listed coming from Mitchell where the writer found the species abundant in middle June.

Aphodius lentus Horn.

1870. *Aphodius lentus* Horn, Trans. Amer. Ent. Soc., iii, pp. 124, 125.

Specimens examined: 6, five of these collected at West Point during May and June, 1888, and one in Monroe Canyon, Sioux Co., June, 1911. *Lentus* has been recorded from Massachusetts, Pennsylvania, Indiana, Georgia and Illinois.

Aphodius explanatus Le Conte.

1878. *Aphodius explanatus* Le Conte, U. S. Geol. Surv., Bull. iv, pt. 2, p. 457.

Specimens examined: 2 ♂, from Haigler, May 24, 1914. This is a Colorado species, and its range probably does not extend very far to the eastward in Nebraska.

Aphodius brevicollis Le Conte.

1878. *Aphodius brevicollis* Le Conte, U. S. Geol. Serv., Bull. iv, pt. 2, p. 455.

Specimens examined: 1 ♂, 2 ♀, from Lincoln, collected during November and December. The type of this species was taken in Nebraska, the exact locality being unknown.

Aphodius rubeolus Beauvois.

1805. *Aphodius rubeolus* Beauvois, Ins. Afr. et Amer., p. 90, pl. 2, fig. 4.

Specimens examined: 4, from Lincoln, West Point and Mitchell. *Rubeolus* is a rather widely distributed species, but apparently not very common in Nebraska.

Aphodius stercorosus Melsheimer.

1844. *Aphodius stercorosus* Melsheimer, Proc. Acad. Nat. Sci. Phila., ii, p. 136.

Specimens examined: 25, from South Bend, Lincoln, West Point and Fairmont, collected from June to August. This species occurs generally east of the Mississippi River.

Aphodius concavus Say.

1823. *Aphodius concavus* Say, Journ. Acad. Nat. Sci. Phila., iii, p. 214. Le Conte ed., ii, p. 138.

Specimens examined: 112, from Nebraska City, Lincoln, Hooper, and Hat Creek valley in Sioux Co., collected from April 26 to July 17. All but three of the above noted specimens were taken at Lincoln where they occur commonly at lights during the season indicated. The writer has also taken them in some numbers late in the afternoon on freshly cultivated ground, but has never seen specimens about the droppings of animals.

Aphodius coloradensis Horn.

1870. *Aphodius coloradensis* Horn, Trans. Amer. Ent. Soc., iii, pp. 126, 130.

Specimens examined: 4 ♂, 1 ♀, from Mitchell and Lincoln, taken from May 19 to June 17. This species probably occurs not infrequently in western Nebraska, but its occurrence in any numbers in the eastern part of the state is not to be expected.

Aphodius bicolor Say.

1823. *Aphodius bicolor* Say, Journ. Acad. Nat. Sci. Phila., iii, p. 212. Le Conte ed., ii, p. 136.

Specimens examined: 1, ♀ from Lincoln, collected October 24, 1915 by C. E. Mickel. Although a widely distributed species occurring from "Canada to Texas and east to Massachusetts," *bicolor* is apparently uncommon in Nebraska.

Aphodius serval Say.

1835. *Aphodius serval* Say, Boston Journ. Nat. Hist., i, pp. 177-178. Le Conte ed., ii, p. 651.

Specimens examined: 1 ♀, from Lincoln, collected December 6, 1915, by C. E. Mickel.

Aphodius distinctus Mueller.

1776. *Scarabaeus distinctus* Mueller, Zoologiae Danicae prodromus, p. 53.

Specimens examined: 164, from South Bend, Lincoln, Omaha, West Point, Fairmont, Elm Creek, Holt Co., Halsey, and Scottsbluff, collected from March 10 to November 19. This cosmopolitan species is perhaps our most abundant *Aphodius,* occurring at times in immense numbers. It has long been known under the name *inquinatus.*

[**Aphodius subtruncatus** Le Conte.

1878. *Aphodius subtruncatus* Le Conte, U. S. Geol. Serv., Bull., iv, pt. 2, p. 457.

Subtruncatus is not represented in the material studied, but is listed here on the authority of Dr. Horn who records it in his monograph of Aphodius (1887) from Colorado and Nebraska.]

Aphodius walshi Horn.

1870. *Aphodius walshii* Horn, Trans. Amer. Ent. Soc., iii, pp. 131, 132.

Specimens examined: 28 ♂, 13 ♀, from West Point, Halsey and Mitchell, collected during May and June. *Walshi* is a common species in central Nebraska on sandy soil. Professor Brunner reported it as "fairly swarming" at Halsey, May 17, 1912. This species properly belongs in that section of the genus with pubescent elytra, but it has been run out a second time in the table to take care of those specimens on which the inconspicuous, deciduous pubescence has been lost.

Aphodius femoralis Say.

1823. *Aphodius femoralis* Say, Journ. Acad. Nat. Sci. Phila., iii, pp. 215-216. Le Conte ed., ii, p. 139.

Specimens examined: 106, from Fort Calhoun, Omaha, South Bend, Ashland, Cedar Bluffs, Peru, Lincoln, West Point, and Bradshaw, collected from March 2 to September 19.

Aphodius oblongus Say.

1823. *Aphodius oblongus* Say, Journ. Acad. Nat. Sci. Phila., iii, p. 215. Le Conte ed, ii, p. 138.

Specimens examined: 1 ♂, taken at Lincoln in March. The known distribution of this species is from Pennsylvania to Colorado and Arizona.

Ataenius Harold

1867. Harold: Col. Hefte, ii, p. 100.

1871. Horn: "Synopsis of Aphodiini of the United States", Trans. Amer. Ent. Soc., iii, pp. 284-297. (Descriptive notes for 15 species).

1875. Horn: "Synonymical Notes and Descriptions of New Species of North American Coleoptera", Trans. Amer. Ent. Soc., v, pp. 126–156. (Synonymy of the species described by Harold in Coleopterologische Hefte, xii, 1874).

1887. Horn: "A Monograph of the Aphodiini Inhabiting the United States", Trans. Amer. Ent. Soc., xiv, pp. 1-110. (Table and full descriptions for 26 species).

1910. Blatchley: Coleoptera of Indiana, pp. 924-927. (Descriptive notes and table for 9 species).

One character used in the subjoined table of species probably needs a word of explanation. This is the "accessory spinule," a prolongation of the apical margin of the middle and hind tibiae on the under side adjacent to the spurs. The little spinule is scarcely or not longer than the fimbriae of the apical margin, but is easily distinguished from these by its being distinctly thicker, stronger and not articulated at the base.

SYNOPSIS OF THE SPECIES

1. Clypeus subangulate, sometimes denticulate on each side of the median emargination ..... *abditus*

   Clypeus feebly emarginate, the angles at each side broadly rounded 2

2. Opaque species; pronotum without basal marginal line; head densely, finely punctured, not rugose; elytral intervals each with a row of fine punctures bearing a small, scale-like, yellowish hair ..... *imbricatus*

   Shining species; pronotum with basal marginal line..... 3

3. Hind tibiae without accessory spinule, form slender and elongate ..... *gracilis*

   Hind tibiae with accessory spinule..... 4

4. Intervals of elytra very flat, densely and rather coarsely punctured; form short and robust..... *robustus*

   Intervals of elytra convex, rarely punctate..... 5

5. Clypeus finely punctured, without traces of wrinkles; occiput with coarse punctures; hind femora with a deep marginal line extending two-thirds to the base..... *strigatus*

   Clypeus transversely wrinkled or coarsely punctured; hind femora with at most a fine and feeble marginal line near the knee ..... *cognatus*

Ataenius abditus Haldeman.

1848. *Aphodius abditus* Haldeman, Journ. Acad. Nat. Sci. Phila., p. 106.

Specimens examined: 45, from Lincoln, Weeping Water and West Point, collected from April to June. *Abditus* is a common and very widely distributed species, occurring from Massachusetts to California and South America.

Ataenius imbricatus Melsheimer.

1844. *Aphodius imbricatus* Melsheimer, Proc. Acad. Nat. Sci. Phila., ii, p. 136.

Specimens examined: 3, one from Holt Co., and two from Halsey, collected July 5, 1908 by F. H. Shoemaker. This species occurs from Massachusetts to Texas, but is less common than the preceding one.

Ataenius gracilis Melsheimer.

1844. *Oxyomus gracilis* Melsheimer, Proc. Acad. Nat. Sci. Phila., ii, p. 137.

Specimens examined: 1, from Plattsmouth. This is a very distinct, common and widely distributed species which should be better represented in the collection.

Ataenius robustus Horn.

1871. *Ataenius robustus* Horn, Trans. Amer. Ent. Soc., iii, pp. 284, 285-286.

Specimens examined: 3 ♂, 5 ♀, from Lincoln, Fairmont and West Point, collected in April and July.

[**Ataenius strigatus** Say.

1823. *Aphodius strigatus* Say, Journ. Acad. Nat. Sci. Phila., iii, p. 212. Le Conte ed., ii, p. 137.

No specimens of *strigatus* have been taken in Nebraska, but it almost certainly occurs in the state, since it is recorded from Iowa, and the "Middle States" to the Rocky Mountain region.]

Ataenius cognatus Le Conte.

1858. *Euparia cognata* Le Conte, Proc. Acad. Nat. Sci. Phila., p. 65.

Specimens examined: 50 ♂, 97 ♀, from Fort Calhoun. Omaha, Weeping Water, South Bend, Lincoln, Fairmont, West Point, and Halsey, collected from March to September. This is our most abundant species and is often seen flying in countless numbers on a warm evening in early spring.

Psammobius Heer

1841. Heer: Fauna Coleopterorum helvetica, Turici, p. 531.

1871. Horn: "Synopsis of Aphodiini of the United States", Trans. Amer. Ent. Soc., iii, 284-297. (Descriptive notes and table for 5 species).

1887. Horn: "A Monograph of the Aphodiini Inhabiting the United States", Trans. Amer. Ent. Soc., xiv, pp. 1-110. (Descriptive notes and table for 7 species).

1910. Blatchley: Coleoptera of Indiana, p. 922. (Descriptive notes for 2 species).

Psammobius interruptus Say.

1835. *Psammodius interruptus* Say, Boston Journ. Nat. Hist., i, p. 178. Le Conte ed., ii, pp. 651-652.

Specimens examined: 5, from West Point, collected in May and June. This species is recorded by Dr. Horn as uncommon in the middle states.

Rhyssemus Mulsant

1842. Mulsant: Hist. nat. d. Col. de France, Lyon, ii, Lamellicornes, p. 314.

1871. Horn: "Synopsis of Aphodiini of the United States", Trans. Amer. Ent. Soc., iii, pp. 284-297. (Descriptive notes on three species).

1887. Horn: "A Monograph of the Aphodiini Inhabiting the United States", Trans. Amer. Ent. Soc., xiv, pp. 1-110. (Descriptive notes and table for 4 species).

SYNOPSIS OF THE SPECIES

1. Clypeus angulate or subangulate on each side; intervals of elytra with a double row of nearly equal tubercles.....*sonatus*

   Clypeus obtuse or rounded on each side of the emargination; intervals of elytra with a row of small tubercles on the inner side, a continuous, finely elevated line on the outer side.....[*scaber*]

Rhyssemus sonatus Le Conte.

1881. *Rhyssemus sonatus* Le Conte, Trans. Kansas Acad. Sci., x, p. 77.

Specimens examined: 6, from Lincoln, collected in April, June and July. *Sonatus* is also recorded from Iowa, Kansas, Colorado and Montana.

[**Rhyssemus scaber** Haldeman.

1848. *Rhyssemus scaber* Haldeman, Journ. Acad. Nat. Sci. Phila., p. 107.

No specimens of this species are at hand from Nebraska, but judging from Dr. Horn's statement, "occurs at the margins of streams from the Middle States to Texas," it is to be expected in the state.]

ORPHNINI

Oval, convex species, brown or dull yellow in color covered above with short, erect hair; elytra striate; clypeus not expanded as in the two preceding tribes, and mandibles and labrum visible; principally western in range.

Ochodaeus Serville

Little is known of the habits of the species in this genus, and they are seldom seen except at lights in the evening.

1825. Serville: Entomological part of Encyclopédie methodique, x, p. 360.

1868. Le Conte: "New Coleoptera Collected on the Survey for the Extension of the Union Pacific Railway, E. D. from Kansas

to Fort Craig, New Mexico", Trans. Amer. Ent. Soc., ii, pp. 49–59. (Notes and table for 10 species).

1876. Horn: "Revision of the United States Species of Ochodaeus and other Genera of Scarabaeidae", Trans. Amer. Ent. Soc., v, pp. 179-197. (Descriptive notes and table for 8 species).

1909. Fall: "A Short Synopsis of the Species of Ochodaeus Inhabiting the United States", Journ. N. Y. Ent. Soc., xvii, pp. 30-38. (Descriptive notes and table to 19 species).

SYNOPSIS OF THE SPECIES

1. Front with an acute horn or tubercle.....*mandibularis*

   Front without an acute tubercle..... 2

2. Apical angles of elytra slightly produced or dentiform; upper tooth of front tibiae nearer to the middle tooth than to the base 3

   Apical angles of elytra not at all produced.....*musculus*

3. Vertex of male with a transverse ridge; frontal margin not acutely tuberculate .....*kansanus*

   Vertex of male without a transverse ridge; frontal margin elevated on each side into a small tubercle.....[*biarmatus*]

Ochodaeus musculus Say.

1835. *Odontaeus musculus* Say, Boston Journ. Nat. Hist., i, p. 178. Le Conte ed., ii, p. 51.

1910. *Ochodaeus musculus* Blatchley, Coleoptera of Indiana, p. 935.

Specimens examined: 1 ♂, 5 ♀, from Mitchell and Monroe Canyon in Sioux Co., collected during July at lights. *Musculus* is probably not confined to western Nebraska even though there are no specimens at hand from other parts of the state.

Ochodaeus kansanus Fall.

1909. *Ochodaeus kansanus* Fall, Journ. N. Y. Ent. Soc., xvii, pp. 31, 34.

Specimens examined: 1 ♂, 2 ♀, from Mitchell, taken at lights July 24-29, 1916, by C. E. Mickel.

[**Ochodaeus biarmatus** Le Conte.

1868. *Ochodaeus biarmatus* Le Conte, Trans. Amer. Ent. Soc., ii, p. 51.

This species has not been taken in Nebraska. However, it is common from Kansas southward and may be found in the southwestern part of the state.]

Ochodaeus mandibularis Linell.

1896. *Ochodaeus mandibularis* Linell, Proc. U. S. Nat. Mus., xviii, p. 723.

Specimens examined: 1, from Mitchell, taken at light, July 24, 1916 by C. E. Mickel.

GEOTRUPINI

Body rounded and very convex, elytra usually strongly striate; pronotum of the male frequently modified, armed with horns or tubercles; head of male sometimes armed; mandibles and labrum prominent; antennae 11-jointed; pygidium always entirely covered by the elytra.

Odontaeus Klug

1843. Klug: Abhandl, d. K. Akad. d. Wiss. z. Berlin, p. 37.

1870. Horn: "Notes on some Genera of Coprophagus Scarabasidae of the United States", Trans. Amer. Ent. Soc., iii, pp. 42-51. (Descriptive notes on 3 species).

1910. Blatchley: Coleoptera of Indiana, p. 938. (Descriptive notes on 2 species).

Thus far none of the three species known in this genus have been collected in Nebraska, but judging from the recorded distribution of *cornigerus* Melsheimer and *filicornis* Say both are likely to occur in the state. In the former species the clypeal horn of the male is stout and fixed, while in the latter it is slenderer and movable.

Bolbocerosoma Schaeffer

1906. Schaeffer: Trans. Amer. Ent. Soc., xxxii, pp. 250, 254.

1923. Dawson and McColloch: Can. Ent. lv. pp.

SYNOPSIS OF THE SPECIES

1. Sutural interval and a rather large, slightly postmedian spot, black, remainder of elytra reddish brown.....*biplagiatum*

   Sutural interval of elytra and terminal half largely or entirely black 2

2. Smaller, length about 7 mm.; second elytral stria obsolete, fifth but feebly indicated, thus leaving six relatively broader dorsal interspaces to the humeri.....[*pusillum*]

   Larger, length 9 – 12 mm.; second and fifth elytral striae strong and deep like the others, thus making eight relatively narrower dorsal interspaces to the humeri.....*bruneri*

Bolbocerosoma biplagiatum Dawson and McColloch.

1923. *Bolbocerosoma biplagiatum* Dawson and McColloch, Can. Ent. lv. p.

Specimens examined: 1 ♂, from Oxford, collected June 4, 1918. This species is not uncommon in Kansas.

[**Bolbocerosoma pusillum** Dawson and McColloch.

1923. *Bolbocerosoma pusillum* Dawson and McColloch, Can. Ent. lv. p.

No specimens of this species are at hand from Nebraska, but it occurs frequently at Manhattan, Kansas, and may therefore be found in southern Nebraska, especially in the valley of the Republican river.]

Bolbocerosoma bruneri Dawson and McColloch.

1923. *Bolbocerosoma bruneri* Dawson and McColloch, Can. Ent. lv. p.

Specimens examined: 15 ♂, 15 ♀, from Maskell, Rulo, Louisville, Omaha, Lincoln, Fairmont, Carns, Humphrey, and Sowbelly Canyon in Sioux Co., collected from April to October.

Eucanthus Westwood

Only one species from the North American fauna has been referred to this genus.

1852. Westwood: Trans. Linn. Soc. Lond., xxi, p. 26.

Eucanthus lazarus Fabricius.

1775. *Scarabaeus lazarus* Fabricius, Systema Entomologiae, p. 11.

1870. *Bolboceras lazarus* Horn, Trans. Amer. Ent. Soc., iii, p. 49.

1906. *Bolboceras lazarus* Schaeffer, Trans. Amer. Ent. Soc., xxxii, p. 253.

1910. *Bolboceras lazarus* Blatchley, Coleoptera of Indiana, p. 937.

1910. *Eucanthus lazarus* Boucomont, Ann. Soc. Ent. France, lxxix, p. 336.

Specimens examined: 54 ♂, 70 ♀, from Nebraska City, South Sioux City, Omaha, Hooper, Fremont, Norfolk, Lincoln, Fairmont, West Point, Neligh, Holt Co., Exeter, Red Cloud, Halsey, Valentine, and Mitchell, collected from May 14 to August 31. *Lazarus* is seldom seen except at lights, but there it is often present in numbers, especially during June and July.

Geotrupes Latreille

1796. Latreille. Précis des Caractères générique des Insectes, Bordeaux, p. 6.

1868. Horn: "Geotrupes of Boreal America", Trans. Amer. Ent. Soc., i, pp. 313-322.

1880. Horn: "Contributions to the Coleopterology of the United States, No. 3", Trans. Amer. Ent. Soc., viii, p. 139-154. (Table for 9 species).

1888. Blanchard: "Some Account of our Species of Geotrupes", Psyche, v, pp. 103-110. (Descriptive notes and table).

1910. Blatchley: Coleoptera of Indiana, pp. 938-939. (Descriptive notes and table for 4 species).

SYNOPSIS OF THE SPECIES

1. Body above shining, more or less metallic; elytra distinctly striate 2

   Body above opaque, black; elytra not striate, but with rows of punctures ..... *opacus*

2. Striae of elytra without punctures; head without tubercles; basal marginal line of pronotum more or less incomplete medially ..... *semiopacus*

   Striae of elytra punctured; head with a median tubercle; basal marginal line of pronotum entire ..... *splendidus*

Geotrupes opacus Haldeman.

1853. *Geotrupes opacus* Haldeman, Proc. Acad. Nat. Sci. Phila., p. 362.

Specimens examined: 16 ♂, 26 ♀, from Omaha, Ashland, Lincoln, West Point, Holt Co., Halsey and Haigler.

Geotrupes semiopacus Jekel.

1865. *Geotrupes semiopacus* Jekel, Ann. Soc. Ent. France, (4) v, p. 612.

Specimens examined: 1 ♂, collected at Omaha in September, 1888.

Geotrupes splendidus Fabricius.

1775. *Scarabaeus splendidus* Fabricius, Systema Entomologiae, p. 18.

Specimens examined: 15 ♂, 19 ♀, from Maskell, Omaha, Weeping Water, Nebraska City, Lincoln and West Point.

The following note on the habits of this species seems worthy of record. During the month of June, 1905, while the writer was spading in his home garden he had occasion to remove a quantity of lawn clippings that had been piled on a bare spot of ground several weeks previously. In turning up the soil that had been covered by the clippings a rather large and neatly formed pod of dead grass was discovered, and along with it a female *splendidus*. Careful examination disclosed a branched tunnel with four additional food pods. One of the pods was preserved, and is before me at the present

writing, the others were placed in a box of moist soil, from which the beetles emerged the following August. The food pods were all pear-shaped, and very uniform in size, measuring about two inches in length by one inch in their greatest diameter. The pods are interesting because of their relatively large size, and from being composed entirely of clean, fresh grass blades. A greater bulk of clean food seems to be required than is the case with the more concentrated material (droppings of animals) most freqently used by the beetles in this section of the family *Scarabaeidae.*

GLAPHYRINI

Form oblong, not convex; remarkable for the long hairs on the legs and under surface; head and pronotum also, usually densely covered with long hairs; elytra spreading apart to the tips and pygidium exposed; adults frequenting flowers.

Amphicoma Latreille

1807. Latreille: Genera Crustaceorum et Insectorum, ii, p. 118.

1861. Horn: "Descriptions of New Genera and Species of Western Scarabaeidae, with Notes on Others Already Known", Trans. Amer. Ent. Soc., i, pp. 163-170. (Characterization of 2 species).

1882. Horn: "Notes on Some Little Known Genera and Species of Coleoptera", Trans. Amer. Ent. Soc., x, pp. 113-126.

1901. Fall: "Coleoptera of Southern California", Calif. Acad. Sci., pp. 139, 255. (List of species and descriptive notes).

Amphicoma vulpina Hentz.

1826. *Amphicoma vulpina* Hentz, Journ. Acad. Nat. Sci. Phila., v, p. 374, pl. 13, fig. 3.

Specimens examined: 1, from Dismal River in July.

TROGINI

Oblong, convex species, surface of body dull and roughened; living in dried decomposing animal matter; mandibles and labrum prominent; epimera of the mesothorax widely separated from the coxae by the sternum; abdomen with five ventral segments, amply covered by the elytra; terminal segment of the tarsus without erect setae between the claws.

Glaresis Erichson

1848. Erichson: Naturgeschichte der Insecten Deutschlands, vi, p. 925.

1885. Horn: "Descriptions of New North American Scarabaeidae", Trans. Amer. Ent. Soc., xii, pp. 117-128. (Descriptive notes on 3 species).

1907. Fall: "The North American Species of Glaresis", Psyche, xiv, pp. 23-26. (Descriptive notes and table for 4 species).

Glaresis phoenicis Fall.

1907. *Glaresis phoenicis* Fall, Psyche, xiv, pp. 24-26.

Specimens examined: 1, from Mitchell, June 29, 1916, collected by C. E. Mickel.

Trox Fabricius

The species of this genus are all carrion feeders, preferring this material after it is well rotted and dried. Many of the species are attracted in some numbers to lights at night. Whether collected at lights or in carrion the specimens are usually well encrusted with dirt and should be cleaned before mounting. This is easily done by holding them under running water and brushing with a camel's hair brush. It is highly probable that a renewed study of the genus *Trox* employing the characters to be found in the genitalia will somewhat modify our present understanding of the species and varieties, especially the latter.

1775. Fabricius: Systema Entomologiae, p. 31.

1854. Le Conte: "Descriptions of the Species of Trox and Omorgus Inhabiting the United States", Proc. Acad. Nat. Sci. Phila., vii, pp. 211-216.

1874. Horn: "Revision of the Species of *Trox* of the United States", Trans. Amer. Ent. Soc.,v, pp. 1-12. Descriptive notes and table for 21 species).

1910. Blatchley: Coleoptera of Indiana, pp. 941-947. (Descriptive notes and table for 15 species).

1922. Loomis: "New Species of the Coleopterous Genus Trox", Journ. Wash. Acad. Sci., xii, pp. 132-136. (Characterizes 3 forms from the southwest in the *scutellaris* section of the genus, and points out the specific value of the characters in the male genitalia).

SYNOPSIS OF THE SPECIES

1. Scutellum strongly narrowed near the base, with the sides angulate at the middle; sides of pronotum never margined with scales or stiff hairs 2

   Scutellum not narrowed at the base, the sides not angulate, but curved; sides of pronotum often margined with scales or hairs 6

2. Base of elytra distinctly narrowed, with the humeral angles very broadly and strongly rounded ..... [*scutellaris*]

   Base of elytra not more strongly narrowed and rounded than usual 3

3. Elytra with rows of very distinct tubercles 4

   Elytra with rows of feebly elevated, bare tubercles connected by elongate, tomentose spots ..... *suberosus*

4. Tubercles prominent, bare and shining, with tomentose spots behind them ..... *punctatus*

   Tubercles at least on the posterior side tomentose 5

5. Tubercles large and coarse, bare and shining anteriorly, and tomentose behind; first joint of antennae with dark brown hairs; antennal club dark ..... *scabrosus*

Tubercles much smaller, and more nearly covered with tomentum; first joint of antennae with rufous hairs; antennal club rufous or cinereous.....*asper*

6. Elytral intervals with continuous, single rows of short, erect, scale-like hairs; prosternum usually produced into a spine behind the anterior coxae .....*atrox*

Elytral intervals without continuous, single rows of short, erect scales 7

7. Larger species, length 8 – 12 mm. 8

Smaller species, length 5 – 7 mm. 10

8. Lateral margins of elytra serrated or roughened, especially toward the base 9

Lateral margins of elytra even or continuous, not serrated; scales of elytral striae arranged in double rows, more or less continuous basally especially on the first stria, elsewhere more or less interrupted.....*unistriatus*

9. Median, longitudinal sulcus of pronotum usually entire, at most feebly interrupted by a transverse ridge, sides of the sulcus nearly straight; elytral tubercles with semi-erect, brownish scales .....*tuberculatus*

Median, longitudinal sulcus of pronotum more or less interrupted medially by the narrowing of the sides and a feebly elevated, transverse ridge; elytral tubercles with semi-recumbent, yellowish scales .....*sonorae*

10. Discal area of pronotum not, or only slightly sulcate or impressed 11

Discal area of pronotum with four large, shallow impressions .....*insularis*

11. Elytral intervals more or less convex, with the scales arranged in short, longitudinal, double rows..... 12

Elytra black, shining, the intervals nearly flat, with very feeble transverse elevations, each bearing a transverse row of two or three short, erect, brownish hairs or scales.....*laticollis*

12. Anterior tibiae above the lateral tooth serrulate; alternate intervals of elytra more prominent, and with the pubescent spots more elongated .....*scaber*

Anterior tibiae above the lateral tooth simple, alternate intervals of elytra not differing noticeably from the others.....*aequalis*

[**Trox scutellaris** Say.
1824. *Trox scutellaris* Say, Journ. Acad. Nat. Sci. Phila., iii, pp. 238-239. Le Conte ed., ii, p. 140.

No specimens of *scutellaris* are at hand from Nebraska, but it is probable that a little careful collecting in the southwestern part of the state would reveal its presence. Since it is a wingless species it is not likely to be found except at carrion. The recorded distribution of the species is from Kansas to Mexico.]

Trox scabrosus Beauvois.
1805. *Trox scabrosus* Beauvois, Insectes recueillis en Afrique et en Amérique, p. 175, pl. 4b. fig. 4.

Specimens examined: 10, from Holt Co., Cherry Co., and the Sand Hills. This is the largest species of Trox, except *scutellaris,* to be expected in the Nebraska fauna. It measures 15-18 mm. in length.

Trox asper Le Conte.
1854. *Trox asper* Le Conte, Proc. Acad. Nat. Sci. Phila., p. 215.

Specimens examined: 3, two of which are labelled "Nebraska," and the other one "Lincoln, June, At light."

Trox suberosus Fabricius.
1798. *Trox suberosus* Fabricius, Systema Entomologiae, p. 31.

Specimens examined: 82, from Nebraska City, Omaha, South Bend, Lincoln, West Point, Fairmont, Minden, Pine Ridge, and Big Spring, collected from May to August. This is apparently our commonest large *Trox.* It occurs regularly at Lincoln about the electric lights, where 70 of the above listed specimens were taken.

Trox punctatus Germar.
1824. *Trox punctatus* Germar, Insectorum species novae, p. 113.

Specimens examined: 11, from McCook, Grant, Mitchell and Harrisburg.

Trox tuberculatus De Geer.

1778. *Trox tuberculatus* De Geer, Memoirs pour servir a l' histoire des Insectes, iv, p. 318, pl. 19, fig. 2.

Specimens examined: 25, all taken at Lincoln from April to July 9, at lights.

Trox sonorae Le Conte.

1854. *Trox Sonorae* Le Conte, Proc. Acad. Nat. Sci. Phila., p. 211.

Specimens examined: 17, from Lincoln, Harrisburg and the Pine Ridge region of Sioux and Dawes counties, collected from June to August.

Trox unistriatus Beauvois.

1805. *Trox unistriatus* Beauvois, Insectes recueillis en Afrique et en Amerique, p. 175, pl. 4 b. fig. 5.

Specimens examined: 25, from Lincoln and "Pine Ridge," collected from April to July.

Trox insularis Chevrolat.

1864. *Trox insularis* Chevrolat, Ann. Soc. Ent. France (4) iv, pp. 416-417.

1874. *Trox foveicollis* Horn, Trans. Amer. Ent. Soc., v, pp. 7, 10.

Specimens examined: 5, from Lincoln and West Point, taken during April and May.

Trox aequalis Say.

1832. *Trox aequalis* Say, New Species of Insects from Louisiana, p. 5. Le Conte ed., i, p. 301.

Specimens examined: 9, from Lincoln, collected from April to June.

Trox scaber Linnaeus.

1767. *Trox scaber* Linnaeus, Systema Naturae, ed. xii, p. 573.

Specimens examined: 2, from Lincoln and Fairmont, collected in July.

Trox atrox Le Conte.

1854. *Trox atrox* Le Conte, Proc. Acad. Nat. Sci. Phila., p. 214.

Specimens examined: 24, from Lincoln, Fremont, and Monroe Canyon, collected from April to July.

Trox laticollis Le Conte.

1854. *Trox laticollis* Le Conte, Proc. Acad. Nat. Sci. Phila., p. 213.

Specimens examined: 1, taken at Lincoln in June.

MELOLONTHINAE

Abdominal spiracles in part situated on the upper portions of the sternites, the last one usually visible behind the elytra; the rows of spiracles feebly diverging; ligulae usually firmly united with the mentum; the species feeding upon living vegetable matter.

SERICINI

Posterior coxae flat and broadly dilated; elytra more or less distinctly sulcate; labrum indistinct.

Serica Mac Leay

1819. Mac Leay: Horae entomologicae, i, p. 146.

1856. Le Conte: "Synopsis of the Melolonthidae of the United States," Journ. Acad. Nat. Sci. Phila., (2) iii, pp. 225-288. (Descriptive notes and table for 15 species).

1897-1902. Brenske: "Die Serica Arten der Erde," Berliner Entomol. Zeitschr, xlii, (Table of related genera), xlvii, (List of names in the genus for the world).

1910. Blatchley: Coleoptera of Indiana, pp. 956-958. (Descriptive notes and table for 7 species).

1919-1922. Dawson: "New Species of Serica," parts 1-5, Journ. N. Y. Ent. Soc., xxvii-xxx. (Descriptions and figures of 28 species.)

SYNOPSIS OF THE SPECIES

1. Surface of elytra bare, polished and shining 5

   Surface of elytra more or less opaque, often with a more or less distinct, iridescent bloom 2

2. Surface very opaque, in fresh, clean specimens velvety and showing a brilliant, iridescent sheen of rainbow colors when held at varying angles to the light 3

   Surface semi-opaque, not velvety, and without brilliant iridescence 4

3. Clypeus (viewed from the side) uniformly and rather closely covered with erect, brown hairs; surface lustre of pronotum similar in the male and female ..... *mystaca*

   Clypeus with only a few erect hairs anteriorly; surface of proontum more or less distinctly polished and shining in the female, and oqaque in the male ..... *sericea*

4. Pallid, yellowish brown in color with little or no iridescence, form more elongate and slender ..... *curvata*

   Dark brown to blackish, often with a distinct purplish sheen; form rather short and robust ..... *anthracina*

5. Color yellowish brown or ochraceous; notch between apical and lateral reflexed margins of clypeus deep, relatively broad, and and rounded at the bottom ..... *ochrosoma*

   Color varying from chestnut to a very dark reddish brown; clypeal notch less strongly developed, narrower and often acute at the bottom 6

6. Clypeus and mid-lateral areas of pronotum rather finely and very densely punctured, the punctures separated by less than half their own diameters; sutural margin and median line of front distinctly keeled or elevated ..... *evidens*

   Clypeus and pronotum more coarsely and less densely punctured, the punctures of the pronotum rather evenly distributed from side to side; sutural margin of front feebly, or not at all, carinated, raised median line of front usually obsolete 7

7. Claspers of male genital armature similar in shape and size ..... *intermixta*

Claspers of male genital armature distinctly dissimilar in size and shape 8

8. Color always chestnut; stalk of male genital armature nearly symmetrical .....*vespertina accola*

Color varying from chestnut to a very dark reddish brown; stalk of male genital armature distinctly shorter on the right side .....*campestris*

Serica vespertina accola Dawson.

1921. *Serica vespertina accola* Dawson, Journ. N. Y. Ent. Soc., xxix, pp. 164-165, pl. xii.

Specimens examined: 4 ♂, 8 ♀, from Lincoln, South Bend and West Point, collected during May and June.

Serica evidens Blatchley.

1910. *Serica carinata* Blatchley, Coleoptera of Indiana, pp. 956, 957.
1919. *Serica evidens* Blatchley, Can. Ent., xiii, p. 153. (New name).

Specimens examined: 4 ♀, from Nebraska City and Omaha, collected during April and May. This species also occurs in Illinois and Kansas as well as Indiana from which state it was originally described.

Serica intermixta Blatchley.

1910. *Serica intermixta* Blatchley, Coleoptera of Indiana, pp. 956, 957.

Specimens examined: 11 ♂, 3 ♀, from Hooper, South Bend, West Point, Neligh and Monroe Canyon in Sioux Co. *Intermixta* is one of the commoner and more widely distributed species of the genus. It is essentially northern in range, occurring abundantly throughout Canadian territory.

Serica campestris Dawson.

1919. *Serica campestris* Dawson, Journ. N. Y. Ent. Soc., xxvii, pp. 33-34, pl. vi.

Specimens examined: 41 ♂, 19 ♀, from Lincoln, Fairmont, Hooper and Brock, collected from March 28 to July

8, most of the specimens coming from Lincoln where they were taken at lights. This species also occurs in Kansas, Iowa, Illinois and Indiana.

Serica ochrosoma Dawson.

1919. *Serica ochrosoma* Dawson, Journ. N. Y. Ent. Soc., xxvii, pp. 38-39, pl. ix.

Specimens examined: 7 ♂, 1 ♀, from Halsey and Holt Co., collected in early June at lights. While possibly locally common, this species is rarely represented in the collections of the country.

Serica sericea Illiger.

1802. *Melolontha sericea* Illiger, Olivier's Entomologie, ii, part 5, p. 75, footnote A.

1922. *Serica sericea* Dawson, Journ. N. Y. Ent. Soc., xxx, pp. 154-156, pl. xi.

Specimens examined: 21 ♂, 27 ♀, from Omaha, Nebraska City, Ashland, South Bend, Hooper, Lincoln, West Point, Halsey, Monroe and Warbonnet Canyons in Sioux Co., collected from April 29 to August 2.

Serica mystaca Dawson.

1922. *Serica mystaca* Dawson, Journ. N. Y. Ent. Soc. xxx, pp. 160-161, pl. xiv.

Specimens examined: 1 ♂, collected at Nebraska City, April 29, 1916, under leaves. *Mystaca* is a widely distributed species, being recorded from eighteen states, but is apparently not common anywhere in its known range.

Serica curvata Le Conte.

1856. *Seriva curvata* Le Conte, Journ. Acad. Nat. Sci. Phila., (2) iii, p. 276.

1922. *Serica curvata* Dawson, Journ. N. Y. Ent. Soc., xxx, pp. 167-169, pl. xxiii.

Specimens examined: 13 ♂, from the Pine Ridge Re-

gion of Sioux and Dawes counties, collected at lights from June 23 to July 23. It is probable that *curvata* does not occur in Nebraska much to the south and east of the Pine Ridge Region in the northwestern part of the state.

Serica anthracina Le Conte.

1856. *Serica anthracina* Le Conte, Journ. Acad. Nat. Sci. Phila., (2) iii, p. 276.

1856. *Serica frontalis* Le Conte, Ibid. p. 276.

1856. *Serica robusta* Le Conte, Ibid. p. 276.

1869. *Serica valida* Harold, Col. Hefte, v, p. 123.

Specimens examined: 3 ♂, 1 ♀, from Mitchell and the Pine Ridge region, collected during June and July. This species, like the preceding, is a western form which probably does not extend its range far into the state. It is widely distributed in the Rocky Mountain and Pacific regions, and is highly variable in size and color. The writer has examined the Le Conte types and is responsible for the above cited synonymy. The name *valida* was merely a new name to replace *robusta* which was preoccupied.

MELOLONTHINI

Middle and hind tibiae with two spurs; last segment of tarsi with two erect setae between the claws; tarsal claws equal; last spiracle placed on the nearly obsolete suture between the fifth sternite and the propygidium.

Diplotaxis Kirby

1837. Kirby: Fauna Boreali-Americana, iv, p. 129.

1856. Le Conte: "Synopsis of the Melolonthidae of the United States," Journ. Acad. Nat. Sci. Phila., (2) iii, pp. 225-288. (Descriptive notes on 29 species.)

1909. Fall: "Revision of the Species of Diplotaxis of the United States," Trans. Amer. Ent. Soc., xxxv, pp. 1-97. (Descriptive notes and table for 95 species.)

SYNOPSIS OF THE SPECIES

1. Posterior margin of pronotum depressed below the level of the adjacent surface 7

   Posterior margin of pronotum not depressed..... 2

2. Hind angles of pronotum distinctly, usually rather strongly impressed 6

   Hind angles of pronotum feebly or not at all impressed..... 3

3. Pronotum viewed from above very distinctly wider just behind the middle than at the base, the side margins very strongly arcuate .....*subangulata californica*

   Pronotum viewed from above but little if any wider near the middle than at the base, the side margins much less strongly arcuate 4

4. Size smaller, 6-10 mm. in length; western species..... 5

   Size larger, 10-14 mm. in length; eastern species.....*tristis*

5. Clypeal margin rounded, feebly or just perceptibly emarginate at the middle; length 6-8 mm.....*carbonata*

   Clypeal margin subtruncate, moderately emarginate at the middle; length 8-10 mm.....*tenebrosa*

6. Anterior angles of pronotum obtuse, distinctly impressed, color averaging darker, rufo-testaceous to nearly black.....*obscura*

   Anterior angles of pronotum acute, feebly impressed, color lighter, rufo-testaceous .....*haydeni*

7. Depressed basal zone of pronotum relatively wide and complete from side to side..... 8

   Depressed basal zone of pronotum much narrower, nearly or quite obsolete at the middle.....*frondicola*

8. Clypeal margin almost evenly accurate from side to side, less strongly reflexed; head relatively wider.....*harperi*

   Clypeal margin subtruncate, often slightly emarginate at the middle, more strongly reflexed; head relatively narrower.....*basalis*

Diplotaxis tenebrosa Fall.

1909. *Diplotaxis tenebrosa* Fall, Trans. Amer. Ent. Soc., xxxv, pp. 13, 35-36.

No specimens of this species are at hand from Nebraska, but Mr. Fall records in his monograph a single specimen in the Bowditch collection labelled "Nebraska". Since *tenebrosa* is a fairly common species in the northwestern states one might reasonably expect to collect it in the Pine Ridge region of western Nebraska.

Diplotaxis haydeni Le Conte.

1856. *Diplotaxis haydeni* Le Conte, Journ. Acad. Nat. Sci. Phila., (2), iii, p. 272.

1856. *Diplotaxis innoxia* Le Conte, Ibid., p. 273.

Specimens examined: 88, from Cedar Bluffs, Dewey Lake in Cherry Co., North Platte, Haigler, Harrisburg, and the Pine Ridge region in Sioux Co., collected from April to August 1.

Diplotaxis obscura Le Conte.

1859. *Diplotaxis obscura* Le Conte, Coleopetra of Kansas and New Mexico, p. 9.

Specimens examined: 1, from Sioux County. Examples are also at hand from Custer, South Dakota and Newcastle, Wyoming. The species was described from the Black Hills, and is rather widely distributed in the Rocky Mountain Region.

Diplotaxis tristis Kirby.

1837. *Diplotaxis tristis* Kirby, Fauna Boreali-Americana, iv, p. 130.

Specimens examined: 3, from Lincoln, collected in latter May. *Tristis* is an eastern species scarcely to be expected this far west, but it has also been recorded from Kansas. The three specimens at hand are all small, (10 – 12 mm.) for the species which in the larger examples attains a length of 14 mm.

Diplotaxis subangulata californica Schaeffer.

1907. *Diplotaxis californica* Schaeffer, Journ. N. Y. Ent. Soc. xv, p. 66.

Specimens examined: 1, from Mitchell, Scottsbluff County, collected August 1, 1917 by E. J. Yates. This form, or as here listed subspecies, is probably not uncommon in western Nebraska, since it occurs rather abundantly all through the western states.

Diplotaxis carbonata Le Conte.

1856. *Diplotaxis carbonata* Le Conte, Journ. Acad. Nat. Sci. Phila., (2), iii, p. 270.

No specimens of this species are at hand. However, Mr. Fall records a specimen from Fort Robinson, Nebraska, and says that *carbonata* occurs southward to Arizona, being rather common in Colorado and New Mexico.

Diplotaxis frondicola Say.

1825. *Melolontha frondicola* Say, Journ. Acad. Nat. Sci. Phila., v, p. 198.

Specimens examined: 76, from Lincoln, South Bend, West Point and Carns, collected from May 11, to August 29. About a third of the specimens were collected at night feeding on oak leaves.

Diplotaxis basalis Fall.

1909. *Diplotaxis basalis* Fall, Trans. Amer. Ent. Soc., xxxv, pp. 19, 73.

Specimens examined: 85, from Dakota City, Hooper, Ashland, Lincoln, Osceola and Fairmont, collected from May 20 to July 25. Seventeen of the above listed specimens were taken at night feeding on elm leaves, and two on oak leaves. Doubtless a very extended series of this and the preceding species could be collected by inspecting foliage after dark with a lantern or a flash light. The other species of the genus here listed could also probably be collected with the greatest facility by this method.

Diplotaxis harperi Blanchard.

1850. *Diplotaxis harperi* Blanchard, Cat. de la coll. ent. Coleop. Mus. d'hist. nat. de Paris, p. 171.

Specimens examined: 17, from Omaha, Nebraska City and Lincoln, collected from April 30 to August 29. *Harperi* is an abundant and widely distributed species, especially through the eastern and southern states.

Diazus Le Conte

1859. Le Conte: "Coleoptera of Kansas and New Mexico," Smithsonian Contributions to Knowledge, xi, p. 9.

Diazus rudis Le Conte.

1859. *Diazus rudis* Le Conte, Col. Kan. and N. M., p. 9.

Specimens examined: 10, from the Pine Ridge region, Mitchell, Haigler, Culbertson and Halsey, collected from July 3 to 20.

Phyllophaga Harris

The species of this genus are commonly known as "June bugs" or May beetles, and their larvae are called white grubs. Both the beetles and their larvae are highly destructive to cultivated plants. This is more especially true of the larvae which burrow in the soil and feed heavily upon roots. They are difficult to combat, and their long life of two or three seasons renders them especially troublesome. The beetles do some damage as defoliators, collecting upon trees, shrubs and herbaceous plants in considerable numbers at twilight and gorging themselves with food until nearly daybreak, then they disperse and seek shelter, burying themselvs an inch or so in the soil.

1826. Harris: Massachusetts Agricultural Journal and Repository, x, p. 6.

1856. Le Conte: "Synopsis of the Melolonthidae of the United States," Journ. Acad. Nat. Sci. Phila., (2), iii, pp. 225-288. (Descriptive notes on 55 species.)

1887. Horn: "Revision of the Species of Lachnosterna of America North of Mexico," Trans. Amer. Ent. Soc., xiv, pp. 209-296. (Descriptive notes and table for 81 species.)

1888. Smith: "Notes on the Species of Lachnosterna of Temperate North America, with Descriptions of New Species," Proc. U. S. Nat. Mus., xi, pp. 481-525, pls. xlvii-lx. (Descriptive notes and figures of the genitalia of 87 species.)

1910. Blatchley: Coleoptera of Indiana, pp. 958-980. (Descriptive notes, table and figures for 35 species.)

1916. Glasgow: "Phyllophaga Harris (Lachnosterna Hope): A Revision of the Synonymy, and One New Species," Bull. Ill. State Lab. Nat. Hist., xi, pp. 365-379.

1920. Hays and McColloch: "Some Observations on the Genitalia of Lachnosterna," Ann. Ent. Soc. Amer., xiii, pp. 75-82, pl. viii. (Nine species figured and discussed.)

1920. Davis: "New Species and Varieties of Phyllophaga," Ill. Nat. Hist. Survey, xiii, pp. 329-338, pls. xl-xlv. (Descriptions of 8 new forms.)

SYNOPSIS OF THE SPECIES

1. Upper surface entirely bare and shining 9

   Upper surface, in part at least, more or less covered with scales, or sparse erect hairs, or with a bloom or "powder" (sometimes obscure in old or rubbed specimens) 2

2. Body above and beneath rather thickly covered by little yellowish scales which show a tendency to condense into broad stripes on the elytra ..... *lanceolata*

   Body not covered with scales 3

3. Upper surface entirely devoid of hair, thorax shining, but elytra covered with a bloom or powder 4

   Upper surface with at least a few erect hairs, sometimes conspicuous 5

4. Pronotum rather finely and closely punctured ..... *crassissima*

   Pronotum coarsely and much less closely pitted ..... *prunina*

5. Small, pale or yellowish species, 15 mm., or less in length 6

Large, dark, or reddish brown species, 17-25 mm. in length..... 7

6. Pronotum and elytra essentially similar in color and luster; hair long, dense and erect on pronotum and head, much shorter and recumbent on the elytra, except a few long hairs near the base.....*tristis*

Pronotum and elytra conspicuously different in color and luster, the former shining and nearly bare, the latter densely covered with a pale or whitish bloom, and almost devoid of luster....*lenis*

7. Pubescence of upper surface very sparse and inconspicuous, most evident on the pronotum.....*hirticula comosa*

Pubescence of upper surface conspicuous..... 8

8. Upper surface smooth and appearing highly polished under the hand lens; both of the terminal spurs of the hind tibiae jointed at the base, (17-20 mm.).....*crenulata*

Upper surface dulled by a fine bloom, which shows a slight iridescence under the hand lens; hind tibial spur next to the attachment of the tarsus jointed at the base, the outer spur fixed, (19-25 mm.).....*illicis*

9. Smaller (10-14 mm.), form slender and elongate, color yellow or testaceous 10

Larger (15 + mm.), form more robust and oval, color darker, reddish brown to dark brown..... 11

10. Antennae always 9-jointed; fixed spur of hind tibiae of male short .....*longitarsa*

Antennae 10-jointed (rarely 9-jointed); fixed spur of hind tibiae of male long, blunt at the apex, distinctly curved and slightly twisted on its own axis.....*gracilis*

11. Antennae 9-jointed .....*implicita*

Antennae 10-jointed 12

12. Males: Antennal club nearly as long as, or sometimes longer than, the preceding portion of the antenna; under surface of abdomen more or less flattened, grooved, or excavated on one or more segments..... 13

Females: Antennal club much shorter than the preceding portion of the antenna; under surface of abdomen usually smooth and convex 26

13. Fixed spur of hind tibiae cylindrical and curved inwardly to the middle where it is suddenly flattened and sharply bent outwardly, the terminal portion being straight and tapering to the tip ..... *futilis*

    Fixed spur of hind tibiae not sharply bent at the middle..... 14

14. Fixed spur of hind tibiae long, nearly parallel-sided, strongly, and roundly bent or bluntly hooked at the tip..... *vehemens*

    Fixed spur of hind tibiae not strongly and roundly hooked at the tip 15

15. Genital armature symmetrical, the claspers alike in size and shape 25

    Genital armature not symmetrical although sometimes nearly so 16

16. Genital armature viewed from the end showing principally the elevated edges of the chitinous plates 17

    Genital armature viewed from the end showing principally broadened surfaces, the edges of the plates directed inwardly instead of being elevated..... 21

17. Under surface of abdomen with a longitudinal, sharply impressed line which divides the transverse ridge on the fifth abdominal sternite ..... *bipartita*

    Under surface of abdomen without a sharply impressed longitudinal line 18

18. Genital armature usually large, the terminal portion expanded, distinctly wider than the stalk of the armature..... 19

    Genital armature much smaller, the terminal portion not expanded and scarcely, if any, wider than the narrowest portion of the stalk 20

19. Hind tibial spurs large, very broad and flat, the widest portion of the movable spur distinctly wider than the basal third of the first tarsal joint ..... *horni*

    Hind tibial spurs of average size and width, widest part of the movable spur not wider than the basal third of the first tarsal joint ..... *rugosa*

20. Pronotum very coarsely pitted, spurs of hind tibiae nearly equal in length ..... *corrosa*

Pronotum normally punctured, fixed spur of hind tibiae scarcely half as long as the movable spur.....*praetermissa*

21. Fifth abdominal sternite with a more or less well developed transverse ridge, the crest of which is usually somewhat darkened and roughened 22

Fifth abdominal sternite without a transverse ridge, the longitudinal impression of the under surface of the abdomen ending on this sclerite in a well defined, slightly roughened depression, rear edge of the sternite distinctly emarginate or notched at the middle .....*inversa*

22. Transverse ridge of fifth sternite strongly and evenly arched in the middle, and with the ends of the ridge attaining or overhanging the rear margin of the segment.....*fervida*

Transverse ridge of fifth sternite much less strongly bent, the ends not attaining or overhanging the margin of the segment 23

23. Transverse ridge of the fifth sternite bisinuate behind, evenly rounded in front, and strongly roughened on the prominent, flattened middle portion .....*draki*

Transverse ridge of fifth sternite more or less arched instead of bisinuate behind..... 24

24. Terminal portion of genital armature rounded with the tips of the two sides turned inwardly and nearly or quite touching....*fusca*

Terminal portion of genital armature triangular with the tips of the two sides distinctly separated, not turned inwardly.....*anxia*

25. Last abdominal sternite with a median triangular impression, the posterior margin of the impressed area distinctly bilobed .....*congrua*

Last abdominal sternite not so modified, the posterior margin not bilobed at the middle.....*glabricula*

26. Pubic process absent, superior genital plates nearly as broad as the interior plates, united and keeled at the middle, emarginate at the end.....*futilis*

Pubic process present 27

27. Pubic process distinctly divided, bilobed or split..... 29

Pubic process single..... 28

28. Pubic process as long as, or longer than, the supporting inferior plates ..... *congrua*

    Pubic process small, much shorter than the supporting plates.... *fusca*

29. Terminal portions of the pubic process rather long, slender, distinctly narrowed beyond the middle, and with the inner edges nearly parallel to the tips..... *inversa*

    Terminal portions of pubic process more or less distinctly divergent, the inner edges never parallel to the tip..... 30

30. Pubic process large, the basal portion distinctly larger and heavier than the terminal portion..... 31

    Pubic process smaller, the basal portion smaller than the terminal portion 32

31. Pronotum coarsely and rather densely punctured, with a slightly elevated smooth, median line..... *rugosa*

    Pronotum less coarsely and densely punctured, and without the smooth line through the middle..... *horni*

32. Pronotum coarsely pitted..... *corrosa*

    Pronotum moderately or finely punctured..... 33

33. Pronotum viewed from above wider across the base than at the middle; larger species, length 19 – 22 mm..... 34

    Pronotum wider across the middle than at the base; smaller species, length 15 – 19 mm. 35

34. Pubic process small and deeply divided, superior genital plates small; color usually dark or blackish brown..... *vehemens*

    Pubic process larger, less deeply divided, superior genital plates larger; color usually more of a reddish brown..... *draki*

35. Narrow rim or margin of sides of pronotum finely broken or serrated 36

    Narrow rim of margin of sides of pronotum entire, not serrated 37

36. Terminal portions of pubic process slenderer, somewhat tapering to their rounded tips..... *bipartita*

    Terminal portions of pubic process broader, not tapering, bluntly rounded or truncate at the ends..... *anxia*

37. Side margins of pronotum just in front of the hind angles slightly but distinctly emarginate; inferior and superior genital plates distinctly separated.....*fervida*

Side margins of pronotum not emarginate in front of the hind angles; inferior and superior genital plates not distinctly separated .....*praetermissa*

Phyllophaga lanceolata Say.

1824. *Melolontha lanceolata* Say, Journ. Acad. Nat. Sci. Phila., iii, p. 242. Le Conte ed., ii, p. 142.

Specimens examined: 26 ♂, 35 ♀, from South Bend, Lincoln, West Point, Brown Co., Thomas Co., Alliance, North Platte, Ogallala, McCook, Hitchcock Co., Imperial, Mitchell, and the Pine Ridge region of Sioux Co., collected from June 20 to August 27. *Lanceolata* is uncommon in eastern Nebraska, fairly common in the central part of the state, and abundant in the western counties, where in its larval, or white-grub, stage it is perhaps the most injurious species of the genus for the region. The beetles are diurnal, feeding in the open like potato beetles, and are found on weeds and herbaceous plants. The females lack the membranous wings and are very thick bodied. The males are distinctly smaller and fully winged.

Phyllophaga praetermissa Horn.

1887. *Lachnosterna praetermissa* Horn, Trans. Amer. Ent. Soc., xiv, p. 221.

Specimens examined: 29 ♂, 59 ♀, from Lincoln, Exeter, Hastings, Osceola, Central City, Grand Island and North Platte, collected from May 10 to June 26, at lights.

Phyllophaga longitarsa Say.

1824. *Melolontha longitarsa* Say, Journ. Acad. Nat. Sci. Phila., iii, p. 241. Le Conte ed., ii, p. 141.

Specimens examined: 6 ♂, 6 ♀, from Carns, Keyapaha Co., collected July 24, 1902 by W. D. Pierce.

Phyllophaga gracilis Burmeister.

1855. *Trichestes gracilis* Burmeister, Handbuch der Entomologie, iv, pt. 2, p. 361.

Specimens examined: 1 ♀, from Hogan's Bridge, Brown Co., August 3, 1902, collected by W. D. Pierce.

[**Phyllophaga glabricula** Le Conte.

1856. *Lachnosterna glabricula* Le Conte, Journ. Acad. Nat. Sci. Phila., (2), iii, p. 260.

No specimens of *glabricula* are at hand from Nebraska, but the species is not uncommon at Manhattan, Kansas. The species flies later in the season than most of the others, from the middle of June to the middle of August, and has probably on that account been overlooked in collecting. It doubtless occurs along the couthern border of the state.]

Phyllophaga futilis Le Conte.

1850. *Lachnosterna futilis* Le Conte, Agassiz Lake Superior, iv, p. 226.

Specimens examined: 400 ♂, 298 ♀, from Dakota City, Hooper, Ashland, West Point, Lincoln, Fairmont, Bradshaw, Osceola and Wood River, collected from May 10 to July 9. About half of the specimens were taken at lights, and 361 were taken on food plants as follows: elm, 276, dogwood 65, boxelder 5, prickly ash 4, rose 3, gooseberry 2, oak 2, willow 2, blackberry 1, and poplar 1. From this data it is readily apparent that *futilis* has a decided preference for elm. It is in fact our commonest species on that tree.

Phyllophaga congrua Le Conte.

1856. *Lachnosterna congrua* Le Conte, Journ. Acad. Nat. Sci. Phila., (2), iii, p. 243.

Specimens examined: 12 ♂, from Dakota City, Omaha and Lincoln, collected from May 21 to June 11, at lights.

Phyllophaga prunina Le Conte.

1856. *Lachnosterna prunina* Le Conte, Journ. Acad. Nat. Sci. Phila., (2), iii, p. 251.

Specimens examined: 1 ♂, from Ashland.

Phylophaga crassissima Blanchard.

1850. *Ancylonycha crassissima* Blanchard, Cat. de la coll. ent. Coléop. Mus. d'hist. nat. de Paris, p. 133.

Specimens examined: 3,532 ♂, 1,000 ♀, from Hooper, Fremont, Lincoln, Beatrice, Norfolk, Central City, Exeter, Hastings, Neligh, Holt Co., Grand Island, North Platte, Red Cloud and Wood River, collected from May 9 to August 1. By far the majority of these specimens were taken at lights, but the following food plant records are at hand: grasses and weeds, 134, *Amorpha canescens* 29, elm 24, blackberry 12, gooseberry, 6, dogwood 5, and boxelder 2. The preference of *crassissima* for grasses and weeds is significant. See notes under *rugosa*.

Phyllophaga inversa Horn.

1887. *Lachnosterna inversa* Horn, Trans. Amer. Ent. Soc., xiv, p. 241.

Specimens examined: 36 ♂, 8 ♀, from Maskell, West Point, Lincoln, Bradshaw, Osceola and Wood River, collected from May 19, to July 17. The only food plant record at hand is of a single female taken on the common weed *Amaranthus* sp.

Phyllophaga bipartita Horn.

1887. *Lachnosterna bipartita* Horn, Trans. Amer. Ent. Soc., xiv, p. 242.

Specimens examined: 134 ♂, 4 ♀, from Lincoln, Beatrice, Exeter and Red Cloud, collected from May to July 6, at lights.

Phyllophaga vehemens Horn.

1887. *Lachnosterna vehemens* Horn, Trans. Amer. Ent. Soc., xiv, p. 244.

Specimens examined: 168 ♂, 40 ♀, from Dakota City, Hooper, Fremont, Ashland, Lincoln, and Red Cloud, collected from April 21 to July 5, at lights and on the following food plants: poplar 14, willow 5, boxelder 4, elm 4. *Vehemens* is usually the first of our species to begin to fly in the spring, and while the flight continues for some time, the beetles are most in evidence in the earlier part of the season.

Phyllophaga fusca Froelich.

1792. *Melolontha fusca* Froelich, Naturforscher, xxvi, p. 99, pl. 3, fig. 3.

Specimens examined: 121 ♂, 185 ♀, from Nebraska City, Hooper, Fremont, Lincoln, Norfolk, West Point, Osceola, Bradshaw, Grand Island, Neligh, Halsey, Wood River and Red Cloud, collected from May 5 to July 9. A few specimens were taken on food plants as follows: dogwood 13, elm 11, ash 5, oak 2, gooseberry 1. *Fusca* is one of the comparatively few species in which the females seem to be more common than the males.

Phyllophaga horni Smith.

1889. *Lachnosterna hornii* Smith, Entomologica Americana, v, p. 95.

Specimens examined: 1 ♂, 2 ♀, from Lincoln, Nebraska City and Rulo, collected from April 26 to July 3. *Horni* is an eastern species the range of which probably does not extend far into the state.

Phyllophaga fervida Fabricius.

1781. *Melolontha fervida* Fabricius, Species Insectorum, i, p. 36.

Specimens examined: 7 ♂, from Fremont and Grand Island, collected at lights June 7 and 16, 1917.

Phyllophaga anxia Le Conte.

1850. *Lachnosterna anxia* Le Conte, Agassiz Lake Superior, iv, p. 226.

Specimens examined: 3 ♂, Lincoln, and Monroe Canyon in Sioux Co., collected from May 31 to June 28.

Phyllophaga draki Kirby.

1837. *Rhizotrogus drakii* Kirby, Fauna Boreali-Americana, part 4, p. 133.

Specimens examined: 1 ♂, 1 ♀, from Sioux Co. in June.

Phyllophaga corrosa Le Conte.

1856. *Lachnosterna corrosa* Le Conte, Journ. Acad. Nat. Sci. Phila., (2), iii, p. 249.

1920. *Lachnosterna corrosa* Hays and McColloch, Ann. Ent. Soc. Amer., xiii, p. 77, pl. viii.

Specimens examined: 76 ♂, 7 ♀, from Lincoln, West Point, Norfolk, Grand Island and Halsey, collected from May 18 to June 22. The only food plant record at hand is that of four specimens collected at Lincoln, feeding on *Amorpha canescens.*

In the Lincoln specimens the genital armature of the male is distinctly more angular in outline than in the other specimens here listed. Whether this variation is discontinuous or continuous is a point well worthy of future study because of its bearing upon specific and subspecific relationships.

Phyllophaga rugosa Melsheimer.

1844. *Ancylonycha rugosa* Melsheimer, Proc. Acad. Nat. Sci. Phila., ii, p. 140.

Specimens examined: 4,335 ♂, 462 ♀, from South Sioux City, Dakota City, Hooper, Fremont, Ashland, Nebraska City, Lincoln, Beatrice, West Point, Norfolk, Osceola, Neligh, Exeter, Fairmont, Bradshaw, Hastings, Grand Island, Halsey, Wood River and North Platte, col-

lected from May 10 to July 26. The great majority of the specimens were taken at lights, but the following food plant records were secured: elm 108, boxelder 64, *Amaranthus* 53, bluegrass, shepherd's purse and dandelion 51, willow 20, blackberry 10, poplar 9, oak 7, *Amorpha canescens* 1.

Since *rugosa* is doubtless the most destructive species in Nebraska cornfields, a significant point is brought out by the above data, namely that grasses and weeds, especially *Amaranthus,* prove highly attractive to the adult beetles. Since the females tend to lay their eggs close to the plants upon which they feed, it becomes evident that a weedy cornfield is much more liable to become infested than a clean one. Had the fondness of *rugosa* for *Amaranthus* been discovered earlier in the season during which most of the collecting was done, much more striking figures than the above could have been secured. The attractiveness of boxelder for this species is also worthy of note. See in this connection the food plant records under *crassissima.*

Phyllophaga implicita Horn.

1887. *Lachnosterna implicita* Horn, Trans. Amer. Ent. Soc., xiv, p. 262.

Specimens examined: 57 ♂, 138 ♀, from Lincoln, Nebraska City, Weeping Water, South Bend, Ashland, Fremont, Hooper, Dakota City, West Point, Norfolk, Osceola, Exeter, Fairmont, Neligh, Grand Island, Red Cloud, and Wood River, collected from May 9 to June 29. The following food plant records are at hand: elm 36, poplar 33 and willow 8.

Phyllophaga hirticula comosa Davis.

1920. *Phyllophaga hirticula comosa* Davis, Ill. Nat. Hist. Survey, xii, pp. 337-338, pl. xlv.

Specimens examined: 236 ♂, 127 ♀, from Lincoln, Ashland, Osceola and West Point. Food plant records are: oak 28, blackberry 15, *Amorpha canescens* 12, and elm 5.

Phyllophaga ilicis Knoch.

1801. *Melolontha ilicis* Knoch, Neue Beytrage zur Insectenkunde, p. 75, pl. i, fig. 28.

Specimens examined: 1 ♂, from Rulo, June 30, 1915, collected by L. Bruner.

Phyllophaga crenulata Froelich.

1792. *Melolontha crenulata* Froelich, Naturforscher, xxvi, pp. 92-94, pl. 3, fig. 2.

Specimens examined: 55 ♂, 40 ♀, from South Sioux City, Hooper, Ashland, West Point, Lincoln, Wood River and Halsey, collected from April to June 25. Most of the males were taken at lights and nearly all of the females feeding on foliage, distributed as follows: elm 14, dogwood 10, gooseberry 8, prickly ash 4.

Phyllophaga tristis Fabricius.

1781. *Melolontha tristis* Fabricius, Species Insectorum, i, p. 39.

Specimens examined: 21 ♂, 13 ♀, from South Bend, Lincoln, West Point, Halsey, Warren, and Chadron, collected from April 23 to May 19. Mr. H. H. Smith furnished the specimens from Warren, and reported that the species was flying in large numbers on the evening of May 19, 1918. On the same evening the heavy flight of *tristis* attracted the attention of Mr. L. M. Gates at Chadron, who sent in specimens for identification. Consequently even though comparatively few specimens are here recorded one may safely conclude that *tristis* is a rather common species in suitable localities over the state.

Phyllophaga lenis Horn.

1887. *Lachnosterna lenis* Horn, Trans. Amer. Ent. Soc., xiv, p. 287.

Specimens examined: 7 ♂, 7 ♀, from Lincoln, and Mitchell, collected from July to August 8. It may be that *lenis* is fairly common, but has been largely overlooked in collecting because of its late season of flight.

Polyphylla Harris

The males of the species in this genus have the antennal club enormously developed, often three or four times the length of the antennal stalk, while the females have the club of normal size. Specimens of the latter sex are usually difficult to find and are relatively rare in collections.

1842. Harris: Rept. Ins. Mass. Injurious to Vegetation, p. 30.

1856. Le Conte: "Synopsis of the Melolonthidae of the United States", Journ. Acad. Nat. Sci. Phila., (2) iii, pp. 225-288. (Descriptive notes on 6 species).

1881. Horn: "Revision of the Species of Polyphylla of the United States", Trans. Amer. Ent. Soc., ix, pp. 73-76. (Descriptive notes and table for 7 species).

1914. Casey: "A Review of the Genus Thyce and of the North American Species of Polyphylla", Memoirs on the Coleoptera, v, pp. 306-354. (Descriptive table for 49 forms).

SYNOPSIS OF THE SPECIES

1. Upper surface with conspicuous, longitudinal stripes of densely placed white scales, between the stripes the scales less closely placed and more or less yellowish, surface color largely obscured by the vestiture of scales.....*decemlineata*

   Upper surface obscurely striped, vestiture of scales not obscuring the brown surface color.....*hamondi*

Polyphylla hamondi Le Conte.

1856. *Polyphylla hamondi* Le Conte, Journ. Acad. Nat. Sci., Phila., (2), iii, p. 228.

Specimens examined: 10 ♂, from South Sioux City, Lincoln, North Platte, Carns, Brown Co., Halsey and Haigler, collected from July 1 to 22. *Hamondi* is also recorded from Illinois, Iowa and Kansas.

Polyphylla decemlineata Say.

1824. *Melolontha decemlineata* Say, Journ. Acad. Nat. Sci. Phila., iii, p. 246. Le Conte ed., ii, p. 145.

Specimens examined: 12 ♂, 5 ♀, from West Point, Neligh, Thedford, and Sioux Co. This species is much commoner westwardly, probably not occurring further to the east than West Point. Its range as limited by Mr. Casey extends over Nebraska, Kansas, Colorado and New Mexico.

Macrodactylini

Front coxae conical and prominent; abdominal segments freely articulated; labrum not connate with the clypeus; ligulae closely united with the mentum.

Dichelonyx Harris

1826. Harris: Mass. Agr. Repository, x, p. 6.

1837. Kirby: Fauna Boreali-Americana, iv, p. 133. Ibid. Can. Ent., iii, p. 211.

1856. Le Conte: "Synopsis of the Melolonthidae of the United States", Journ. Acad. Nat. Sci. Phila., (2), iii, pp. 225-288. (Descriptive notes on 13 species).

1876. Horn: "Revision of the United States Species of Ochodaeus and other Genera of Scarabaeidae", Trans. Amer. Ent. Soc., v, pp. 177-197. (Table and descriptive notes for 15 species).

1901. Fall: "Notes on Dichelonycha and Cantharis, with Descriptions of New Species in Other Genera", Trans. Amer. Ent. Soc., xxvii, pp. 277-310. (Table and descriptive notes for 25 species).

1910. Blatchley: Coleoptera of Indiana, pp. 951-953. (Table and descriptive notes for 6 species).

SYNOPSIS OF THE SPECIES

1. Clypeal angles rectangular; length 6 – 8 mm. ..... *truncata*

   Clypeal angles rounded; length 8 – 12 mm. 2

2. Margin of clypeus broadly reflexed; color uniformly testaceous ..... *testacea*

Margin of clypeus narrowly reflexed; elytra with a more or less well marked greenish or purple luster..... 3

3. Elytra with a darker stripe near the sides, more pronounced at the extremities; inner spur of hind tibiae of male with sides nearly parallel, and the tip blunt; hind tibiae testaceous..*subvittata*

Elytra without a darker stripe; inner spur of hind tibiae of male similar to the outer spur; hind tibiae more or less blackened at the apex.....*elongata*

Dichelonyx elongata Fabricius.

1792. *Melolontha elongata* Fabricius, Entomologia systematica, i, pt. 2, p. 170.

Specimens examined: 6 ♂, 11 ♀, from Omaha, Bellevue and Lincoln, collected during the month of May. This is a common eastern species the range of which probably does not extend across Nebraska to the westward.

Dichelonyx subvittata Le Conte.

1856. *Dichelonycha subvittata* Le Conte, Journ. Acad. Nat. Sci. Phila, (2), iii, p. 279.

Specimens examined: 6 ♂, 5 ♀, from Rulo, South Bend, Lincoln, and West Point, collected from May 22 to July 2. *Subvittata* like the preceding species is of eastern distribution.

Dichelonyx testacea Kirby.

1837. *Dichelonycha testacea* Kirby, Fauna Boreali-Americana, iv, p. 135. Ibid. Can. Ent., iii, p. 213.

Specimens examined: 16 ♂, 12 ♀, from West Point, "Pine Ridge", Warbonnet and Monroe canyons in Sioux Co., collected from May to July. *Testacea* ranges in Nebraska from the north.

Dichelonyx truncata Le Conte.

1856. *Dichelonycha truncata* Le Conte, Journ. Acad. Nat. Sci. Phila., (2), iii, p. 281.

Specimens examined: 71 ♂, 4 ♀, from Mitchell and

Warbonnet and Monroe canyons in Sioux Co., collected during the month of June. *Truncata* is a common western species reaching the state from that direction.

Macrodactylus Latreille

1825. Latreille: Familles naturelles du règne animal, p. 271.

1856. Le Conte: "Synopsis of the Melolonthidae of the United States", Journ. Acad. Nat. Sci. Phila., (2), iii, pp. 225-288. (Descriptive notes on 3 species).

1876. Horn: "Revision of the United States Species of Ochodaeus and other Genera of Scarabaeidae", Trans. Amer. Ent. Soc., v, pp. 177-197. (Table and descriptive notes for 3 species).

1910. Blatchley: Coleoptera of Indiana, pp. 953-954. (Descriptions for 2 species).

Macrodactylus subspinosus Fabricius.

1775. *Melolontha subspinosus* Fabricius, Systema Entomologiae, p. 39.

Specimens examined: 61 ♂, 64 ♀, from West Point, Scribner, Neligh, Halsey, Broken Bow, Keya Paha Co., Valentine, Cherry Co., "Pine Ridge", Imperial, Ogallala and Ainsworth, collected from June 3 to July 5. This is a destructive and widely distributed species, occurring abundantly during June and early July in central and western Nebraska.

HOPLIINI

Body more or less covered with yellow, brown or silvery scales; abdominal segments closely united; tibiae with only one spur; hind tarsi with a single large claw; front coxae large and prominent; larbum concealed beneath the clypeus.

Hoplia Illiger

1803. Illiger: Magazin für Insectenkunde, ii, p. 226.

1856. Le Conte: "Synopsis of the Melolonthidae of the United States", Journ. Acad. Nat. Sci. Phila., (2), iii, pp. 225-288. (Descriptive Notes on 12 species).

1880. Le Conte: "Short Studies of North American Coleoptera", Trans. Amer. Ent. Soc., viii, pp. 163-218. (Table, synonymy and notes for 12 species).

1910. Blatchley: Coleoptera of Indiana, pp. 949-950. (Table and notes for 5 forms).

Hoplia laticollis Le Conte.

1856. *Hoplia laticollis* Le Conte, Journ. Acad. Nat. Sci. Phila., (2), iii, p. 284

Specimens examined: 105 ♂, 6 ♀, from Lincoln, West Point, Holt Co., Spring View Bridge, Dewey Lake in Cherry Co., "Pine Ridge", Glen, and Monroe Canyon in Sioux Co., collected during June. *Laticollis* is apparently much commoner westwardly in the state. On June 26, 1911 the writer found it fairly swarming on a moist sandy road side in Monroe Canyon where in a few moments fifty-five specimens were taken, and several times as many more still remained on the sand. The following day the beetles had deserted the spot and the species was not again seen during the remaining ten days spent in the canyon.

PLEUROSTICTI

Abdominal spiracles, except the anterior ones, situated in the dorsal portion of the sternites, forming rows which diverge strongly; last spiracle usually visible behind the elytra; ligulae always firmly united with the mentum.

RUTELINI

Claws of all of the tarsi more or less unequal in size or shape, the difference sometimes slight.

Anomala Samouelle

1819. Samouelle: The Entomologists Useful Compendium, p. 191.

1884. Horn: "Notes on the Species of Anomala Inhabiting the United States", Trans. Amer. Ent. Soc., xi, pp. 157-164. (Table and descriptive notes for 12 species).

1906. Schaeffer. "Notes on Some Species of the Genus Anomala with Descriptions of New Species", Journ. N. Y. Ent. Soc., xiv, pp. 1-5. (Notes on 11 species).

1907. Schaeffer: "New Scarabaeidae", Journ. N. Y. Ent. Soc., xv, pp. 60-75. (Table to 22 species).

1910. Blatchley: Coleoptera of Indiana, pp. 981-985. (Table and descriptive notes for 8 species).

1915. Casey: Memoirs on the Coleoptera, vi, pp. 5-48. (Descriptive table for 62 forms).

SYNOPSIS OF THE SPECIES

1. Above yellowish testaceous, head, anterior portion of pronotum medially, and the scutellum a little darker.....*apacheana*

   Head, pronotum and sometimes the elytra, largely dark brown or black 2

2. Large species, length 10 – 12 mm.; elytra brown, usually with a well-marked dark spot a little before the middle of each..*binotata*

   Smaller species, length 6.5 – 9 mm. 3

3. Pygidium thinly clothed with pallid hairs; elytra light brown with the punctures and striae blackish; length about 8 mm. .....*ludoviciana*

   Pygidium bare, or with only a few apical hairs; elytra varying from largely light brown to entirely black; length about 7 mm. .....*innuba*

Anomala apacheana Wickham.

1913. *Anomala apacheana* Wickham, Psyche, xx, pp. 30-31.

Specimens examined: 1 ♂, taken at Haigler, July 5, 1911 by J. T. Zimmer. This species has been known only by the unique type, a male, taken at El Paso, Texas on July 9, by Mr. Wickham.

Anomala binotata Gyllenhal.

1827. *Melolontha binotata* Gyllenhal, Appendix to Schonherr's Synonymia Insectorum, p. 106.

Specimens examined: 34 ♂, 25 ♀, from Omaha, Pender, South Bend, Lincoln, West Point and Halsey, collected from May 10 to June 13. *Binotata* is an abundant and widely distributed species.

Anomala ludoviciana Schaeffer.

1906. *Anomala ludoviciana* Schaeffer, Journ. N. Y. Ent. Soc., xiv, p. 3.

Specimens examined: 8 ♂, from South Sioux City, South Bend, Norfolk, West Point, Neligh and the "Sand Hills", collected from June 24 to July 7.

Anomala innuba Fabricius.

1787. *Melolontha innuba* Fabricius, Mantissa Insectorum, i, p. 22.

Specimens examined: 10 ♂, from Lincoln, West Point and Fairmont, collected from June 21 to July 2. In this as well as several other species of the genus *Anomala* the color of the elytra seems to be inconstant. The majority of the specimens at hand have the elytra wholly black, but they vary from this condition to slightly streaked with brown, heavily streaked, or largely brown. *Innuba* is fairly common throughout most of the eastern and southern states.

Strigoderma Burmeister

1844. Burmeister: Handbuch der Entomologie, iv, pt. i, p. 310.

1907. Schaeffer: "New Scarabaeidae", Journ. N. Y. Ent. Soc., xv, pp. 60-75. (Descriptive notes and table for 5 species).

1910. Blatchley: Coleoptera of Indiana, pp. 985-986. (Description of *arboricola).*

1915. Casey: Memoirs on the Coleoptera, vi, pp. 48-62. (Descriptive table for 16 forms).

Strigoderma arboricola Fabricius.

1801. *Melolontha arboricola* Fabricius, Systema Eleutheratorum, ii, p. 174.

Specimens examined: 50 from South Bend, Louisville, Meadow, Cedar Bluffs, West Point, Neligh, Keya Paha Co., Brown Co., Cherry Co., Halsey, Dismal River, Haigler and Imperial, collected from June 16 to July 6. There is an inconstant tendency for the fourth and eighth elytral ridges to become stronger than the others.

Pelidnota Mac Leay

1819. Mac Leay: Horae Entomologicae, p, 157.

1915. Casey: Memoirs on the Coleoptera, vi, pp. 68-76. (Descriptive table to 16 forms).

Pelidnota punctata Linnaeus.

1758. *Scarabaeus punctatus* Linnaeus, Systema Naturae, ed. x, p. 350.

1910. *Pelidnota punctata* Blatchley, Coleoptera of Indiana, p. 986.

Specimens examined: 20 ♂, 24 ♀, from Rulo, Nebraska City, Omaha, and Lincoln, collected from June 16 to August 24, on grape vines, Virginia creeper and at lights. In the series at hand the length varies from 18 to 24 mm., the color from pale yellow to reddish brown, and the three elytral, black spots from small or partially obsolete to very heavy.

Cotalpa Burmeister

1844. Burmeister: Handbuch der Entomologie, iv, pt. i, p. 423.

1867. Horn: "Descriptions of New Genera and Species of Western Scarabaeidae, with Notes on Others Already Known", Trans. Amer. Ent. Soc., i, pp. 163-170. (Table to 4 species).

1871. Horn: "Descriptions of new Coleoptera of the United States, with Notes on Known Species", Trans. Amer. Ent. Soc., iii, pp. 325-344. (Table to 5 species).

1905. Wickham: "The North American Species of Cotalpa", Journ. N. Y. Ent. Soc., xiii, pp. 1-4. (Table to 7 species).

1915. Casey: Memoirs on the Coleoptera, vi, pp. 88-98. (Descriptive table for 18 forms).

SYNOPSIS OF THE SPECIES

1. Head smaller, width including the eyes about 4 mm.; punctures of elytra coarser and more closely placed, showing a strong tendency to be connected by shallow grooves or wrinkles, especially at the inner basal portion; scutellum more narrowly triangular ..... *subcribrata*

   Head larger, width including the eyes about 5 mm.; punctures of elytra distinctly smaller, and more sparsely placed, and not irregularly connected by shallow wrinkles; scutellum more broadly triangular ..... *lanigera*

Cotalpa subcribrata Wickham.

1905. *Cotalpa subcribrata* Wickham, Journ. N. Y. Ent. Soc., xiii, pp. 2-3.

Specimens examined: 37, from Omaha, Brady Island, Cherry Co., Halsey and Oshkosh, collected from May 19 to June 7. *Subscribrata* was described from Mendora, Kansas, and is apparently common in our Sand Hills region.

Cotalpa lanigera Linnaeus.

1758. *Scarabaeus lanigera* Linnaeus, Systema Naturae, ed. x, p. 350.

Specimens examined: 14, from Meadow, Nebraska City, South Bend, Fremont, West Point, Richland, Neligh, and Grand Island, collected from May 22 to July 3.

DYNASTINI

Claws of the tarsi, except the front ones of many males, equal; front coxae transverse and not prominent; labrum usually hidden under the clypeus; head and pronotum often more or less armed.

Cyclocephala Latreille

1829. Latreille: Cuvier's Règne animal, ed. 2.

1863. Le Conte: "New Species of North American Coleoptera", Smithsonian Miscellaneous Collections, pt. i, pp. 79-80. (Table and descriptive notes for 7 species).

1871. Horn: "Descriptions of New Coleoptera of the United States, with Notes on Known Species", Trans. Amer. Ent. Soc., iii, pp. 325-344. (Table and descriptive notes for 9 species).

1915. Casey: Memoirs on the Coleoptera, vi, pp. 124-158. (Descriptive table for 33 forms).

SYNOPSIS OF THE SPECIES

1. Clypeal suture rather strongly arched medially; sides of clypeus subparallel basally, and more abruptly convergent apically; general color paler.....*hirta*

   Clypeal suture nearly straight; sides of clypeus almost evenly, arcuately convergent apically; general color darker..... 2

2. Claws of anterior tarsi equal in size and similar to those of the middle and hind tarsi (females)..... 5

   Claws of anterior tarsi unequal in size; the front claw very much broader and more strongly bent (males)..... 3

3. Elytra with sparse, erect, yellow hairs, largely confined to the nearly obsolete costae; pygidium and body beneath with somewhat denser and longer hairs.....*villosa*

   Elytra bare except for a few short hairs at the apex and the usual short marginal hairs..... 4

4. Club of antenna distinctly longer than the stalk; claspers of genital armature emarginate at the middle of the outer side *longula*

   Club of antenna shorter than the stalk; claspers of genital armature emarginate just beyond the middle of the outer side, and with the emargination emphasized basally by a strong, oblique lobe or tooth.....*immaculata*

5. Side margin of the elytra slightly but distinctly widened or explanate just above the outer end of the hind coxal plates..... 6

   Side margin of the elytra plain and unmodified.....*longula*

6. Elytra much more strongly and coarsely sculptured, the large punctures tending to coalesce; sides of elytra but little or not at all clouded; body relatively shorter and broader in form....*villosa*

   Elytra less strongly and coarsely sculptured, the punctures smaller and more distinctly separated; sides of elytra immedi-

ately above and behind the explanate portion of the margin with a distinct, elongate and posteriorly evanescent dark spot .....*immaculata*

Cyclocephala hirta Le Conte.

1861. *Cyclocephala hirta* Le Conte, Proc. Acad. Nat. Sci. Phila., p. 346.

Specimens examined: 7 ♀, from Lincoln and Maskell, collected from June to August.

Cyclocephala villosa Burmeister.

1856. *Cyclocephala villosa* Burmeister, Handbuch der Entomologie, v, p. 54.

Specimens examined: 5 ♂, 4 ♀, from Lincoln, collected during June and early July.

Cyclocephala longula Le Conte.

1863. *Cyclocephala longula* Le Conte, Smithsonian Miscellaneous Collections, New Species, pt. i, p. 79.

Specimens examined: 1 ♂, from Haigler, collected July 5, 1911 by J. T. Zimmer.

Cyclocephala immaculata Olivier.

1789. *Melolontha immaculata* Olivier, Encyclopédie Méthodique, Insectes, v, p. 29, pl. 8, fig. 95.

Specimens examined: 120 ♂, 57 ♀, from Omaha, South Bend, Lincoln, Wymore, Fairmont and York, collected from May 3 to July 28.

Dyscinetus Harold

1869. Harold: L'Abeille, vi, p. 123.

1915. Casey: Memoirs on the Coleoptera, vi, pp. 165-173. (Descriptive table for 6 forms).

SYNOPSIS OF THE SPECIES

1. Pygidium with coarse, distinctly separated punctures; clypeus

with shallow punctures which coalesce transversely and form wrinkles ..... *puncticauda*

Pygidium finely and very densely wrinkled or roughened; clypeus finely and sparsely punctate..... *trachypygus*

Dyscinetus puncticauda Casey.

1909. *Dyscinetus puncticauda* Casey, Can. Ent., xli, p. 282.

Specimens examined: 5 ♂, 4 ♀, from Culbertson, North Platte, Gothenburg and Red Cloud, collected from June 13 to July 3, at lights. This is probably a very common species through central and western Nebraska.

Dyscinetus trachypygus Burmeister.

1856. *Chalepus trachypygus* Burmeister, Handbuch der Entomologie, v, p. 79.

Spcimens examined: 1 ♂, 1 ♀, from Lincoln, collected in May and June at lights.

Ligyrodes Casey

1915. Casey: Memoirs on the Coleoptera, vi, pp. 178-186. (Descriptive table for 5 forms).

SYNOPSIS OF THE SPECIES

1. Pronotum and elytra black or piceous, moderately shining; clypeal apex broader, less elevated and more deeply emarginate; median, external tooth of mandibles less strongly and acutely produced; male genital armature with the subterminal, lateral tooth of the claspers nearly as broad basally as high..... *relictus*

Pronotum piceous to black, elytra dark red, surface more strongly polished and shining; clypeal apex much narrower and more strongly elevated, and less deeply emarginate; median external tooth of mandibles more strongly and acutely produced; male genital armature with the subterminal, lateral tooth of the claspers only half as broad basally as high ..... n. sp. in MS Casey

Ligyrodes relictus Say.

1823. *Scarabaeus relictus* Say, Journ. Acad. Nat. Sci. Phila., v, p. 194. Le Conte ed., ii, pp. 296-297.

Specimens examined: 43 ♂, 45 ♀, from South Sioux City, Omaha, South Bend, Lincoln, Neligh, Halsey and McCook, collected from April 22 to October 7, mostly at lights.

Ligyrodes n. sp. in Ms. by Casey.

Specimens examined: 2 ♂, 1 ♀, from South Sioux City, collected from June 10 to July 8, 1912 by L. T. Williams.

Ligyrus Burmeister

1847. Burmeister: Handbuch der Entomologie, v, p. 542.

1875. Horn: "Synonymical Notes and Descriptions of New Species of North American Coleoptera", Trans. Amer. Ent. Soc., v, pp. 126-156. (Table to 4 species).

1915. Casey: Memoirs on the Coleoptera, vi, pp. 186-209. (Descriptive table to 33 forms).

SYNOPSIS OF THE SPECIES

1. Pronotum with an anterior, median impression and a blunt tubercle at the front margin of the impression; color brown, moderately shining ..... *gibbosus*

   Pronotum without the anterior impression and blunt tubercle; color black and not very shining..... *rugiceps*

Ligyrus rugiceps Le Conte.

1856. *Ligyrus rugiceps* Le Conte, Proc. Acad. Nat. Sci. Phila., viii, p. 21.

Specimens examined: 1 ♂, 1 ♀, from Lincoln, the female without further data, and the male labeled "July 7, 1914, E. M. Partridge". *Rugiceps* is an abundant and destructive species in the southern states, Georgia to Texas, where it is called the Sugar-cane Beetle because of its injury to that plant. Corn is frequntly killed by the burrowing of this insect into the base of the stalk below the surface of the soil.

Ligyrus gibbosus De Geer.

1768. *Scarabaeus gibbosus* De Geer, Mémoires pour servir à l' histoire des Insectes, iv, p. 322.

Specimens examined: 124, from Maskell, Omaha, Ashland, Nebraska City, Lincoln, West Point, Norfolk, Neligh, Fairmont, Bradshaw, Minden, Ravenna, McCook, and Mitchell. *Gibbosus* is an abundant widely distributed and rather variable species. It is commonly called the Carrot Beetle, because it frequently injures the roots of that plant. It is also destructive to beets, potatoes, parsnips and corn. The larvae are recorded as occuring in numbers around well rotted manure piles.

Aphonus Le Conte.

1856. Le Conte: Proc. Acad. Nat. Sci. Phila., viii, p. 21.

1915. Casey: Memoirs on the Coleoptera, vi, pp. 210-222. (Descriptive table for 18 forms).

Aphonus pyriformis Le Conte.

1847. *Bothynus pyriformis* Le Conte, Journ. Acad. Nat. Sci., Phila., (2), i, p. 88.

Specimens examined: 2♂, 6♀, from Minden, Oxford, Mitchell, Glen, and Sioux Co., collected from May 18 to July 20.

CETONIINI

Claws equal and simple; front coxae conical and prominent; Mandibles and labrum always covered by the clypeus; pygidium not covered by the elytra; epimera of mesothorax often visible from above at the sides of the elytra.

Euphoria Burmeister

1843. Burmeister: Handbuch der Entomologie, iii, p. 370.

1880. Horn: "Synopsis of the Euphoriae of the United States", Proc. Amer. Philos. Soc., xviii, pp. 398-408. (Table and descriptive notes for 14 species).

1910. Blatchley: Coleoptera of Indiana, pp. 997-999. (Table and notes for 5 species).

1915. Casey: Memoirs on the Coleoptera, vi, pp. 299-339. (Descriptive table to 38 forms).

SYNOPSIS OF THE SPECIES

1. Clypeal margin provided with four sharp, reflexed points or teeth ..... *pilipennis*

   Clypeal margin not dentate..... 2

2. Upper surface polished, iridescent green and cupreous; pronotum entirely bare; length 14 – 17 mm.; pygidium with a transverse row of four, large, rounded, pale, tomentose spots..... *fulgida*

   Upper surface opaque, or moderately shining; pronotum distinctly pubescent 3

3. Pronotum without lateral beading; hind tibiae of male with a long and very dense brush of hairs on the inner side..... *hirtipes*

   Pronotum with distinct lateral beading; hind tibiae of male normal 4

4. Pronotum densely pubescent,the dark surface color largely obscured by the short, pale hairs; elytra brown, with blackish mottlings which often show a tendency to be arranged in longitudinal rows ..... *inda*

   Pronotum not densely pubescent..... 5

5. Upper surface nearly black, shining, with a bronzed or greenish luster; elytra with well-separated, undulate and broken transverse lines of grayish tomentum..... *sepulchralis*

   Upper surface black or not, but without a greenish or metallic luster, and elytra without the transverse, undulate lines of tomentum ..... *kerni*

   A. Pronotum black margined at the sides and base with yellow, elytra yellow heavily and more or less confluently maculated, especially toward the center, with black..... variety *kerni*

   B. Abdomen and legs largely yellow or fulvous, upper surface similar to that in the variety *kerni*, but less heavily maculated, and with the black area of the pronotum more or less divided medially and strongly notched at the sides anteriorly by the yellow or fulvous border..... variety *clarki*

C. Black above and beneath.....variety *texana*

Euphoria fulgida Fabricius.

1775. *Cetonia fulgida* Fabricius, Systema Entomologiae, p. 48.

Specimens examined: 5 ♂, from Omaha and South Bend, collected during June and early July, on oak leaves. *Fulgida* is a common and widely distributed species. In life it possesses an astonishingly brilliant and beautiful opalescent quality of coloration, a large part of which is lost in the dried specimens.

Euphoria inda Linnaeus.

1758. *Scarabaeus indus* Linnaeus, Systema Naturae, ed. x, p. 352.

Specimens examined: 52 ♂, 26 ♀, from Louisville, South Bend, Ashland, Omaha, Fremont, Lincoln, West Point, Holdrege, Halsey, Haigler, Sidney, Mitchell and Monroe Canyon in Sioux Co., collected from March 30 to October. *Inda* is an abundant and widely distributed species, ranging from New York to California. A considerable amount of variation occurs, apparently correlated with the geographical distribution of the species. With a sufficient quantity of material at hand one could doubtless define a number of valid races, just as the ornithologists have done with the horned larks, song sparrows and others. In Nebraska two types of *inda* are recognizable, one with the upper surface distinctly shining as in the specimens received from New York, and the other very opaque and lusterless. The former occurs clear across the state, while the latter seems to be much less common eastwardly.

Euphoria kerni kerni Haldeman.

1852. *Euphoria kerni* Haldeman, Insects of Stansbury's Expl. and Surv. Great Salt Lake Valley, p. 374, pl. 9, fig. 10.

Specimens examined: 8 ♂, 23 ♀, from McCook, Curtis and Hitchcock Co., collected during June and early July, mostly on cactus blossoms.

Euphoria kerni clarki Le Conte.
1853. *Erirhipis clarki* Le Conte, Proc. Acad. Nat. Sci. Phila., p. 441.

Specimens examined: 5 ♀, from McCook and Hitchcock Co., collected along with the specimens just listed under the from the type locality (Cache la), Poudre River, Colorado. more heavily wooded districts.]

Euphoria kerni texana Schaufuss.
1863. *Euphoria texana* Schaufuss, Sitz. Ges. Isis, p. 113.

Specimens examined: 5 ♂, 3 ♀, from Curtis, McCook and Hitchcock Co., collected along with the specimens listed for the two preceding varieties.

The writer has preferred Dr. Horn's long accepted view, that these forms all belong to a single exceedingly variable species. Several specimens at hand from Colorado are exactly intermediate between *kerni* and *clarki,* and some of the specimens of *texana* show evident traces of the pale thoracic margins and elytral spots characteristic of the lighter forms. No evident structural characters are correlated with the color differences, the genital armatures of the males are identical in form, and all of the varieties occur together on the same flowers. The names therefore probably have but little taxonomic value, and are retained only for convenience in designating color variations.

Euphoria sepulchralis Fabricius.
1801. *Cetonia sepulchralis* Fabricius, Systema Eleutheratorum, ii, p. 156.

Specimens examined: 1 ♂, from Rulo, collected July 2, 1915 by E. M. Partridge. *Sepulchralis* is a very common species in the southern states.

Euphoria hirtipes Horn.
1880. *Euphoria hirtipes* Horn, Proc. Amer. Philos. Soc., xviii, pp. 398, 401.

Specimens examined: 44 ♂, 38 ♀, from West Point and Halsey, collected during April and May in ant nests.

Euphoria pilipennis Kraatz.

1883. *Stephanucha pilipennis* Kraatz, Berl. Ent. Zeitschr., xxviii, p. 384.

Specimens examined: 23 ♂, 14 ♀, from Lincoln, West Point, Holt Co., Sand Hills, Halsey and Haigler, collected from April 26 to September. In this species the elytra vary from pure black to heavily and confluently maculated with fulvous, and the pygidium may be either entirely black or with two more or less well-marked, pale, tomentose areas. *Pilipennis* is closely related to the eastern species *areata*, and may possibly be only subspecifically distinct.

Cremastochilus Knoch

1801. Knoch: Neue Beyträge zur Insectenkunde, p. 115.

1871. Horn: "Descriptions of new Coleoptera of the United States, with Notes on Known Species", Trans. Amer. Ent. Soc., iii, pp. 325-344. (Table for 12 species and 2 descriptions).

1880. Horn: "Monographic Revision of the Species of Cremastochilus and Synopsis of the Euphoriae of the United States", Proc. Amer. Philos. Soc., xviii, pp. 382-408. (Table and descriptions for 17 species).

1915. Casey: Memoirs on the Coleoptera, vi, pp. 340-370. (Descriptive table for 42 forms).

SYNOPSIS OF THE SPECIES

1. Reflexed rim of mentum deeply and broadly divided at the middle behind ..... *retractus*

   Reflexed rim of mentum entire behind..... 2

2. Ventral surface of abdomen opaque, the first four segments with narrow yellowish margins, surface conspicuously pubescent, the hairs short, very coarse, plumose and yellowish or pale fulvous in color..... *wheeleri*

   Ventral surface more or less shining, hairs simple, often inconspicuous or wanting..... 3

3. Pronotum with the sides distinctly set off from the discal area by rather strong, longitudinal depressions; color reddish brown ..... *saucius*

   Pronotum without longitudinal impressions defining a discal area 4

4. Posterior angles of pronotum continuous with the side margins; upper surface of body dull black..... *knochi*

   Posterior angles of pronotum not continuous with the side margins, separated by a very deep and strong, oblique groove; upper surface strongly shining..... *nitens*

Cremastochilus retractus Le Conte.

1874. *Cremastochilus retractus* Le Conte, Trans. Amer. Ent. Soc., v, pp. 54-55.

Specimens examined: 1, from Halsey in June.

Cremastochilus nitens Le Conte.

1853. *Cremastochilus nitens* Le Conte, Proc. Acad. Nat. Sci. Phila., p. 232.

Specimens examined: 36, from South Bend, West Point, Brady Island and Halsey, collected from May 5 to June 20.

Cremastochilus knochi Le Conte.

1853. *Cremastochilus knochii* Le Conte, Proc. Acad. Nat. Sci. Phila., p. 231.

Specimens examined: 69, from Omaha, South Bend, Lincoln, Fairmont, West Point, Cherry Co., Crawford, Monroe Canyon in Sioux Co., and Mitchell collected from March to September 12.

Cremastochilus saucius Le Conte.

1858. *Cremastochilus saucius* Le Conte, Journ. Acad. Nat. Sci. Phila., iv, p. 16.

Specimens examined: 1, from Haigler, May 23, 1914, collected by L. M. Gates. *Saucius* is recorded from Kansas and Colorado, and is probably not uncommon in the southwestern part of the state.

Cremastochilus wheeleri Le Conte.

1876. *Cremastochilus wheeleri* Le Conte, Ann. Rept. Ch. Eng. App. jj. p. 516.

Specimens examined: 9, from Lincoln, West Point, Halsey and Glen, collected from May to July 12.

Osmoderma Serville

1825. Serville: Entomological part of Encyclopédie méthodique, x, p. 702.

1910. Blatchley: Coleoptera of Indiana, pp. 1001-1002. (Descriptive notes on 2 species).

1915. Casey: Memoirs on the Coleoptera, vi, pp. 372-377. (Descriptive table for 8 forms).

SYNOPSIS OF THE SPECIES

1. Dorsal surface roughly and coarsely sculptured.....[*scaber*]

   Dorsal surface smooth or with the sculpture comparatively fine and sparse .....*eremicola*

[**Osmoderma scaber** Beauvois.

1805. *Trichius scaber* Beauvois, Insectes recueillis en Afrique et en Amerique, p. 58.

No specimens are at hand from Nebraska, but the species probably occurs along the Missouri River especially in the more heavily wooded districts.]

Osmoderma eremicola Knoch.

1801. *Cetonia eremicola* Knoch, Neue Beyträge zur Insectenkunde, p. 105.

Specimens examined: 2, from Warbonnet Canyon in Sioux Co., in July, and Monroe Canyon, August 27, 1908 (C. H. Gable).

Trichius Fabricius

1775. Fabricius: Systema Entomologiae, p. 40.

1876. Horn: "Revision of the United States Species of Ochodaeus and other Genera of Scarabaeidae", Trans. Amer. Ent. Soc., v, pp. 177-197. (Table and descriptive notes for 6 species).

1910. Blatchley: Coleoptera of Indiana, pp. 1003-1004. (Table and descriptive notes for 3 species).

1915. Casey: Memoirs on the Coleoptera, vi, pp. 380-391. (Descriptive table for 19 forms).

Trichius piger Fabricius.

1775. *Trichius piger* Fabricius, Systema Entomologiae, p. 41.

Specimens examined: 107 ♂, 19 ♀, from South Sioux City, Omaha, Bellevue, Meadow, South Bend, Nebraska City, Rulo and Lincoln, collected from May 30 to August, feeding in numbers on wild rose blossoms.

Valgus Scriba

1790. Scriba: Journal fur die Liebhaber der Entomologie, Frankfort, pt. i, p. 66.

1910. Blatchley: Coleoptera of Indiana, pp. 1004-1005. (Table and descriptive notes for 2 species).

1915. Casey: Memoirs on the Coleoptera, vi, pp. 391-394. (Descriptive table for 4 forms).

Valgus squamiger Beauvois.

1805. *Valgus squamiger* Beauvois, Insectes recueillis en Afrique et en Amérique, p. 59.

Specimens examined: 1 ♀, from South Bend. The species of this genus are recorded as hibernating beneath mullein leaves and in decaying wood, and later frequenting the flowers of red haw and dogwood.