THE ASILINAE OF OKLAHOMA

(ASILIDAE, DIPTERA)

by

KURT FRIEDRICH SCHAEFER

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Thesis Approved:

William J. Dyer
Thesis Adviser

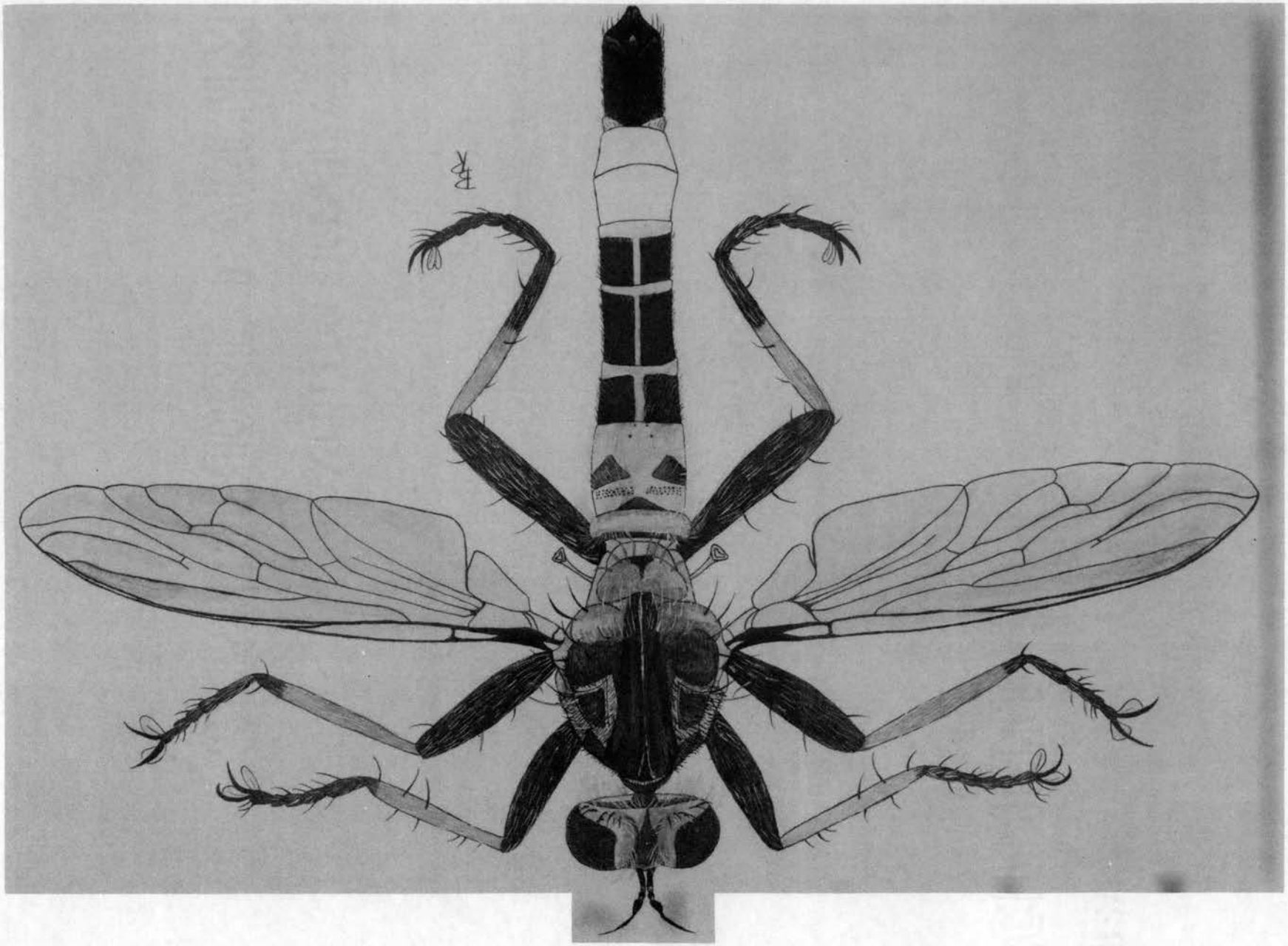
R R Walton

W. H. Irwin

D E Bryant

U. T. Waterfall

Lawrence Woodward
Dean of the Graduate School



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INTRODUCTION

The robber flies or assassin flies form a conspicuous segment of the dipterous fauna of Oklahoma. Because no taxonomic paper on these flies existed for the state, the present work with the subfamily Asilinae was initiated in the summer of 1959.

The relation of robber flies to other insects is comparable to that of Accipiter hawks to other birds. The adults are noted for their speed, agility, and predaceous feeding habits. At rest they habitually sit on leaves, stems, or the bare ground ready to pursue flying insects, large or small. Some are known to take larvae of the Lepidoptera, while others are cannibalistic. In certain genera, the adults mimic certain wasps and bees in appearance and sound produced; therefore, they are often confused with these forms. When disturbed, the adults usually fly a short distance and alight facing the disturber. The larvae are found in the soil and in decaying wood where they eat predaceously on other larvae, or possibly at times as scavengers.

The flies' apparent color is largely due to fine microscopic pollinose hairs often called dust. Adults in collections often become "greasy," however, and the ground color and pollinose hairs on the body are obscured. Placing pinned specimens in benzene or xylene for about a week usually restores the color and pollinosity.

I wish to thank my major advisor, Dr. W. A. Drew, for his earnest and thoughtful guidance, and the other committee members, Drs. D. E. Bryan, R. R. Walton, W. H. Irwin, and U. T. Waterfall, for their guidance in the

preparation of the paper. I also wish to acknowledge the following individuals and institutions for their loan of specimens: Drs. G. W. Byers, University of Kansas; H. R. Burke, Agricultural and Mechanical College of Texas; H. Brown, Oklahoma University; and U. Lanham, University of Colorado. The encouraging and informative letters from Dr. C. H. Martin, Oregon State University, the reading of the manuscript and the personal encouragement of Dr. A. E. Pritchard, Oklahoma City, have also been very helpful.

REVIEW OF THE LITERATURE

In the tenth edition of Systema Naturae, Linnaeus (1758) placed all Asilidae in the genus Asilus. In 1763 Scopoli erected the genus Erax, and Meigen in 1803 included Erax in Asilus and erected the genera Dasypogon, Leptogaster, and Laphria (Back, 1909). These genera were used, with few additions, by Fabricius, Wiedemann, and Walker (Back, 1909). Macquart (1834) erected the genus Mallophora. According to Hine (1919), in 1838 Macquart reused Erax Scopoli for a number of species mainly from North and South America. The characters of the genus Erax used by Macquart were not those used by Scopoli. At that time, the original species of Erax Scopoli had all been placed in other genera (Hine, 1919). In 1909, Kertesz identified Erax Scopoli as a distinct Palearctic genus, Erax Scopoli = Protophanes Loew (Martin, 1961). In the discussion of this genus, the problem will be considered. The genus Asilus was divided into groups by Loew (1848, 1849), with the groups being raised to generic level in 1860 (Hine, 1909). The validity of these genera has been an area of speculation for some time. A discussion of this genus will appear in subsequent pages.

Although Thomas Say (1823) described three species of Asilinae, all of which are present in Oklahoma, the first principal worker with Asilinae in North America was S. W. Williston (1885, 1893, 1901, 1908). His work paved the way for another American worker, James S. Hine (1909, 1911, 1919), whose outstanding contribution was with the genera Asilus, Erax, Proctacanthus, and Promachus.

The only previous works found for Oklahoma were those of R. D. Bird, a collector who is acknowledged by Curran (1931) as securing many fine specimens in Oklahoma, and of A. Earl Pritchard, a former student at Oklahoma A. and M. College (1932-35), who described two new species in the subfamily Asilinae, Proctacanthella jamesi and Promachus oklahomensis (Pritchard, 1935), and added many state collection records.

Synonymies of some species, particularly of Machimus, may be incomplete because of unavailability of T. Becker, et al., Katalog der Paläarktischen Diptera, 1903-1907. Hine (1909) states that the Nearctic species are listed at the end of the Asilinae.

SYSTEMATICS

The Subfamily Asilinae

Characteristics: Mystax (bristles between oral margin and antennae) usually well developed, third antennal joint with slender terminal style composed of two joints, basal joint small and indistinct, distal joint usually long and bristle-like, maxillary palpi one-jointed; marginal cell closed and petiolated before costa, two or three submarginal cells; tarsal pulvilli present, empodia bristle-like; genitalia external, ovipositor sometimes with circlet of spines; hypopygium of male consists of elongated, longitudinally-divided halves, upper and lower forceps. These upper forceps, gonoforceps or claspers, are characteristic of the males of some genera. The proctiger appears as a flap or projection between the upper forceps. The subfamily may be readily separated from the other subfamilies by the following key.

Key to Subfamilies

1. Palpi one-jointed 2
   Palpi two-jointed 3
2. Marginal cell open . . . . . Leptogastrinae
   Marginal cell closed and petiolated before reaching costa . Asilinae
3. Marginal cell open . . . . . Dasypogoninae
   Marginal cell closed and petiolated before reaching costa . . .
   . . . . . Laphrinae

Key to Genera

1. Antennal style bare 2

   Antennal style pectinate below . . . . . Ommatius

2. Tarsal claws thick almost to apices; abdomen broad 3

   Tarsal claws tapered to apices; abdomen narrow 4

3. First posterior cell open; face strongly gibbous below, not uniformly pilose . . . . . Mallophora

   First posterior cell closed and petiolated; face evenly and gently convex, evenly pilose . . . . . Mallophorina

4. Three submarginal cells (very long sectional crossvein formed between veins R_{2+3} and R_4) 5

   Two submarginal cells 6

5. Furcation of veins R_4 and R_5 before apex of discal cell, first submarginal cell without shadow . . . . . Efferia = Erax (part)

   Furcation of veins R_4 and R_5 beyond apex of discal cell, first submarginal cell with shadow . . . . . Promachus

6. Vein R_5 meeting costa before apex 7

   Vein R_5 meeting costa behind apex 8

7. Furcation of veins R_4 and R_5 not angulated at base nor bearing a stump . . . . . Proctacanthus

   Furcation of veins R_4 and R_5 angulated at base and/or bearing a stump . . . . . Efferia = Erax (part)

8. Metanotal slopes (below scutellum) bare . . . . . Proctacanthella

   Metanotal slopes hairy 9

9. Abdomen with bristles laterally before segmental apices 10

   Abdomen without bristles . . . . . Asilus

10. Facial gibbosity strongly developed and reaching above middle of face 11

Facial gibbosity weakly developed, not extended above lower third to half of face 12

11. Occipital bristles nearly straight or slightly curved at extreme apex . . . . . Machimus

Occipital bristles rather long and distinctly curved at almost right angles at or near apical third . . . . . Neoitamus

12. Ovipositor of female without apical spines; male genitalia compact, never leaving a large open space on apical half . . Neomochtherus

Ovipositor or female armed at apex with short, stout spines; forceps of male genitalia strongly curved and leaving a large open space on apical half as seen from above . . . . .Philonicus

Ommatius Wiedemann

Ommatius Wiedemann, 1821. Dipt. Exot., p. 213.

Emphysomera Schiner, 1866. Verhandl. Zool.-Botan. Ges. Wien 16: 845.

Genotype: Asilus marginellus Fabricius, 1781. Species Ins. 2: 464 (by designation of Coquillett, 1910).

Characteristics: Style of antennae long, pectinate below; metanotal slopes bare; narrow abdomen.

Key to Species

1. Marginal scutellar bristles absent, only long white hairs present . . . . . tibialis

Marginal scutellar bristles present 2

2. Veins R_4 and R_5 branching at or before apex of discal cell; femora, if black, only on apical fourth . . . . . gemma

Veins R_4 and R_5 branching well beyond apex of discal cell; hind femora of male basally two-thirds black, female middle half brownish . . . . . pretiosus

Ommatius gemma Brimley

Ommatius gemma Brimley, 1927. J. Elisha Mitchell Sci. Soc. 43(3-4): 205.

Characteristics: Length 9-11 mm, color gray; scutellum with short pile and two long bristles; legs largely yellow, tibiae and tarsi darker; costa of male wings dilated as in O. tibialis.

County records: Reported from Oklahoma by J. Wilcox (1936).

Ommatius pretiosus Banks

Ommatius pretiosus Banks, 1911. Canadian Entomol. 43: 129.

Characteristics: Length 11-13 mm, color red and gray; vestiture of head white, few long black hairs in mystax and upper occiput; thorax dorsally dark, two large white pollinose spots on each side in front, one over each wing base, two marginal scutellar bristles; legs largely yellow, apices of tibiae dark, hind and middle femora with two longitudinal rows of bristles on ventral sides, posterior row longer and white, anterior row black, fore femora each with single long white row; costal margins of wings not dilated.

County records: Choctaw, Osage, and Pawnee. Records indicate identifications by S. W. Bromley. Wilcox (1936) gives distribution as Arizona only.

July--August.

Ommatius tibialis Say

Ommatius tibialis Say, 1823. J. Acad. Nat. Sci. Phila. 3: 49.

Characteristics: Length 14-16 mm, color dark gray; vestiture of head white, antennae dark; mid-dorsal and broad lateral vittae dark; abdomen dark, sides and posterior margins of segments gray pollinosity; legs generally yellowish-red in color, femora with variable dorsal spots, tibial apices, tarsi black, hind femora with two longitudinal rows of ventral bristles of equal length, middle femora with three or four antero-ventral bristles, fore femora with only hairs; costal margins of male after union of subcostal vein to costa dilated and bent anteriorly, costal margins of female wings normal.

County records: Alfalfa, Craig, Delaware, Latimer, McCurtain, Nowata, Pawnee, and Washington.

June--August.

Mallophora Macquart

Mallophora Macquart, 1834. Hist. Nat. Dipt. 1: 300.

Genotype: Asilus bomboides Wiedemann, 1821. Dipt. Exot., p. 203 (by designation of Coquillett, 1910).

This genus is sufficiently characterized by the generic key; thus no further description is given.

Mallophora orcina (Wiedemann)

Asilus orcina Wiedemann, 1828. Aussereurop. Zweifl. Ins. 1: 477.

Mallophora orcina, Macquart, 1834. Hist. Nat. Dipt. 1: 302.

Characteristics: Length 16-22 mm, color black and yellow; pile of head, anterior, posterior portions of dorsum of thorax, hypopleurae,

metapleurae, some on each pair of coxae, first four dorsal abdominal segments yellow, dorsal medial portion of thorax, remainder of pleurae, legs, remainder of abdomen black; legs of male with small patch of white pile on fore and hind tarsi; wings brown; venter of abdomen with black pile.

Mallophora orcina mimics the bumble bee worker Bombus americanorum (Fabricius) (Bromley, 1950).

County records: Alfalfa, Cleveland, Latimer, Osage, and Payne.

July--October.

Mallophorina Curran

Mallophorina Curran, 1934. Fam. gen. N. Am. Dipt., p. 183.

Mallophora auctt.

Genotype: Mallophora guildiana Williston, 1885. Trans. Am. Entomol. Soc. 12(1): 60 (original designation).

This genus is sufficiently characterized by the generic key; thus no further description is given.

Systematics: Bromley (1951) synonymized Mallophorina with Mallophora because, as defined by Curran (1934), the genus has many intermediates in South America. Pritchard and Cole identified specimens as Mallophorina in a recent paper by Linsley (1960). Dr. Pritchard assures me that Mallophorina is a perfectly valid genus and that a revision by Cole will appear soon.

Key to Species

1. Posterior femora with long black hairs and yellow pile below; posterior tibiae black-haired on whole length dorsally, at least

some black reaching base . . . . . acra

Posterior femora with only yellow pile below; posterior tibiae white-haired dorsally . . . . . guildiana

Mallophorina acra (Curran)

Mallophora acra Curran, 1931. Am. Mus. Novitates 487: 21.

Mallophorina acra, Curran, 1934. Fam. gen. N. Am. Dipt., p. 184.

Characteristics: Length 9-11 mm, color yellowish-gray; mystax white to pale yellow with scattered black bristles throughout, palpi black-haired to entirely yellow; thorax clothed with yellowish-brown pollinosity and long white and yellow pile, mesonotum posteriorly with few large black bristles; tibiae dark red to yellowish, tarsi darker, pile and bristles black; abdomen dorsally dark, each segment with sides and apices yellowish-white pile except first segment white; genitalia red.

County records: Alfalfa, Beaver, Canadian, Choctaw, Cleveland, Ellis, Harper, Jefferson, Kiowa, McCurtain, Oklahoma, Payne, Roger Mills, Rogers, Texas, Woods, and Woodward.

May--August.

Paratypes are present in Oklahoma University Museum.

Mallophorina guildiana (Williston)

Mallophora Guildiana Williston, 1885. Trans. Am. Entomol. Soc. 12(1): 60.

Mallophorina guildiana, Curran, 1934. Fam. gen. N. Am. Dipt., p. 184.

Characteristics: Length 11-13 mm, color gray; vestiture of head, thorax white; basal joints of antennae with few black hairs; femora yellow, large black anterior spots, tarsi darker; side and posterior margins of

abdominal segments yellowish-white pile.

County record: Cimarron.

July.

Efferia Coquillett

Erax Macquart, 1838 (not Scopoli, 1763). Dipt. Exot. 1(2): 107.

Efferia Coquillett, 1893. Canadian Entomol. 25: 175.

Genotype: Efferia candida Coquillett, 1893. Canadian Entomol. 35: 176 (by designation of Coquillett, 1910).

Characteristics: Style bare, facial gibbosity prominent; metanotal slopes bare; abdomen narrow; ovipositor laterally compressed, except E. interruptus (Macquart) which is conical.

Systematics: The validity of the genus "Erax" of the Americas has been questioned earlier. Martin (1961) says that since discovery of the identity of Erax Scopoli in 1909 by Kertesz as Protophanes Loew, no change has taken place in use of the name "Erax" in the Western Hemisphere. Hine in 1919 favored use of "Erax" Macquart instead of a name change and erected a genotype from one of Macquart's species although Coquillett (1910) had designated one of Scopoli's species as genotype. Martin further says that since neither Erax Scopoli (Palearctic genus) nor "Erax" Macquart (homonym of Erax Scopoli) could stand for the American species, the only name available is Efferia Coquillett. The genus name Efferia Coquillett (1893) was proposed for an anomalous group of "Erax-like" species which had three submarginal cells instead of the common two. This proved to be not without exceptions, but the name remains for all American "Erax" Macquart. This genus has been divided into groups by Hine (1919), and in this paper his arrangement will be followed. Exceptions made to have the group name correspond to

nominal species within the group are caudata group for rufibarbis group and albibarbis group for barbatus group (Martin, 1962).

Key to Species

1. Ovipositor conical; upper forceps of male genitalia divided at apices, Figure 22 . . . . . interruptus

   Ovipositor laterally compressed; upper forceps not as above . . 2

2. Ovipositor divided at tip (as seen from above); proctiger of male genitalia divided, Figures 5 and 6 (caudata group) 3

   Ovipositor not divided at tip; proctiger of male genitalia not divided 4

3. Wings hyaline . . . . . bicaudatus

   Wings infuscated . . . . . barbata

4. Furcation of veins R_4 and R_5 distinctly before base of second posterior cell 5

   Furcation of veins R_4 and R_5 opposite or beyond base of second posterior cell 16

5. Three submarginal cells (very long sectorial crossvein formed between veins R_{2+3} and R_4) (anomalus group) 6

   Two submarginal cells (stramineus group) 7

6. Palpi with mostly black bristles; femora black anteriorly, red posteriorly, tibiae basally red . . . . . anomalus

   Palpi with pale bristles; femora black, tibiae basally yellow . . . . . candida

7. Furcation of veins R_4 and R_5 at or before middle of distance between base of second posterior cell and r-m crossvein . . . 8

   Furcation of veins R_4 and R_5 distinctly beyond middle of distance

between base of second posterior cell and r-m crossvein . . . 13

8. Femora black anteriorly, red posteriorly . . . . . varipes

Femora black 9

9. Mystax white 10

Mystax entirely or largely yellow 11

10. Thorax dorsally dark brownish-gray . . . . . argentifrons

Thorax dorsally yellowish-brown . . . . . argyrosoma

11. Upper occipital bristles yellow . . . . . bexarensis

Upper occipital bristles black 12

12. Palpal bristles largely black . . . . . texanus

Palpal bristles white . . . . . pallidulus

13. Palpi yellow-haired 14

Palpi largely black-haired . . . . . nemoralis

14. Wings hyaline; tibiae basally yellow; occipital bristles yellow . . . . . auripilus

Wings slightly clouded; tibiae basally red; upper occipital bristles black 15

15. Frontal bristles yellow; scutellar bristles black . . . . . plenus

Frontal bristles largely black; scutellar bristles black and yellow . . . . . prairiensis

16. Vein R_5 curved backward at tip, meeting costa at or behind apex of wing (aestuans group) 17

Vein R_5 curved forward, plainly meeting costa before apex of wing 20

17. Mystax black and white to pale yellow 18

Mystax entirely yellow . . . . . aurimystaceus

18. Tibiae largely bright yellow 19

Tibiae reddish-brown; mystax black and white . . . . . aestuans

19. Mesonotum, scutellum posteriorly with some pale bristles; mystax black and pale yellow . . . . . kansensis

Mesonotum, scutellum bristles all black; mystax black and white . . . . . belfragei

20. Scutellum conspicuously haired and with numerous marginal bristles (aridus group) . . . . . snowi

Scutellum with short hairs and usually not more than six marginal bristles 21

21. Palpi black-haired; male with ventral protruberances on segments four, five, and six (tuberculatus group) . . . . . tuberculatus

Palpi largely white or yellow; male not as above (albibarbis group) 22

22. Abdominal segments dorsally with dark spots or bands 23

Abdominal segments with pale yellowish-gray hairs . . . leucocomus

23. Abdominal segments each with black and gray band of subequal width . . . . . zonatus

Abdominal segments each with two large dark rounded spots, where black appears continuous, gray posterior margin much smaller than black . . . . . albibarbis

Efferia interruptus (Macquart) NEW COMBINATION

Asilus interruptus Macquart, 1834. Hist. Nat. Dipt. 1: 310.

Erax maculatus Macquart, 1838. Dipt. Exot. 1(2): 111.

Erax lateralis Macquart, 1838. Ibid. 116.

Erax ambiguus Macquart, 1846. Dipt. Exot. suppl. 1: 84.

Erax (Eristicus) villosus Bellardi, 1861. Saggio Ditterologia Messicana. 2: 49.

Neoeristicus villosus, Osten Sacken, 1878. Smithsn. Misc. Coll. 16(270): 81.

Erax interruptus, Johnson, 1909. Psyche 16: 33.

Characteristics: Length 22-27 mm, color yellowish-brown; mystax with white and black bristles, sometimes all white, beard white, palpi black; mid-dorsal thoracic stripe light to dark brown, bristles black; femora dorsally red, ventrally black, tibiae red, apices and tarsi dark; abdominal segments black with yellowish-gray pollinose spots on posterior corner not touching in middle, forming triangle, on segments one to four, segment five black narrowly margined gray, segments six and seven of male silvery, females similar, small black triangles on segments six and seven; ovipositor conical and about as long as last two segments; hypopygium dark red, Figure 22.

County records: Caddo, Canadian, Choctaw, Cimarron, Cleveland, Coal, Comanche, Craig, Ellis, Jackson, Latimer, Logan, McCurtain, McIntosh, Major, Murray, Oklahoma, Okmulgee, Osage, Pawnee, Payne, Pushmataha, and Woods.

June--September.

Efferia anomalus (Bellardi)

Erax anomalus Bellardi, 1861. Saggio Ditterologica Messicana. 2: 32.

Efferia anomalus, Coquillett, 1893. Canadian Entomol. 25: 175.

Characteristics: Length 18-26 mm, color grayish-white; vestiture of head pale yellow except for palpi and upper occipital bristles black; thoracic bristles black; male abdominal segments two to six with long white outwardly parted hairs, female with large black triangle on each segment, variable, sides and apical margins gray; ovipositor as long as

last three segments.

County records: Hine (1919) reports from Kansas to Texas.

Efferia candida Coquillett

Efferia candida Coquillett, 1893. Canadian Entomol. 25: 176.

Erax candida, Hine, 1919. Ann. Entomol. Soc. Am. 12(2): 119.

Characteristics: Length 15-30 mm, color grayish-white; vestiture of head white except for occasional upper occipital bristle black; thoracic bristles usually white, although supralars and marginal scutellars often black; abdomen silvery-white, male with long white outwardly parted hairs on segments two to four; hypopygium black, Figure 14.

County records: Beaver.

July.

Efferia bicaudatus (Hine) NEW COMBINATION

Erax bicaudatus Hine, 1919. Ann. Entomol. Soc. Am. 12(2): 138.

Characteristics: Length 21-29 mm, color male dark gray, female gray; mystax and beard white to pale yellow, palpi black, other vestiture pale, some ocellar bristles black; thoracic bristles of male black, marginal scutellars usually pale, female anterior thoracic bristles black, posterior large bristles pale, shorter ones black and pale; legs black, tibiae basally reddish, noticeable on first and second pairs; abdomen dorsally black, male with sides and apical margins yellowish-gray, segments six and seven silvery, female yellowish-gray; ovipositor as long as segments six and seven, Figure 6; hypopygium black, Figure 5.

County records: Alfalfa, Beaver, Cleveland, Harper, and Murray.

August--October.

Efferia barbata (Fabricius)

Dasypogon barbatus Fabricius, 1805. Syst. Antl., p. 169.

Asilus pogonias Wiedemann, 1821. Dipt. Exot., p. 169.

Asilus aestuans Wiedemann, 1821 (not Linnaeus, 1767). Dipt. Exot., p. 200.

Erax rufibarbis Macquart, 1838. Dipt. Exot. 1(2): 116.

Erax completus Macquart, 1838. Ibid., 117.

Asilus dascyllus Walker, 1849. List Dipt. British Mus. 2: 401.

Proctacanthus virginianus van der Wulp, 1882. Tijdschr. Entomol. 25: 109.

Efferia rava Coquillett, 1893. Canadian Entomol. 25: 176.

Characteristics: Length 16-30 mm, color dark grayish-brown; mystax and beard brownish-yellow to whitish-yellow, palpi black; bristles and hairs of thorax black; legs black, basal halves of tibiae dark reddish; wings rarely three submarginal cells; abdomen dark, segments six and seven of male silvery; ovipositor as long as last two segments.

County record: Cleveland.

October.

Efferia argentifrons (Hine) NEW COMBINATION

Erax argentifrons Hine, 1911. Ohio Nat. 11: 308.

Characteristics: Length 18-25 mm, color yellowish-brown; mystax, beard, palpi white-haired; dorsal thoracic bristles and hairs pale to almost all black; legs black, pile white, tibiae basally yellowish-red; segments one and two of abdomen of male clothed as thorax, apices of second and remaining segments with long white outwardly parted hairs, abdomen of female yellowish-gray with pale hairs; hypopygium black, Figure 19.

County records: Adair, Cimarron, Craig, Delaware, and Texas.

June--July.

Efferia argyrosoma (Hine) NEW COMBINATION

Erax argyrosoma Hine, 1911. Ohio Nat. 11: 310.

Characteristics: Length 23-25 mm, color grayish-white; vestiture of head largely white, upper occipital bristles black; anterior thoracic dorsum with short black hairs, posteriorly large black bristles, long white hairs, scutellum with long white hairs, marginal black bristles; femora black, base of tibiae reddish, remainder of tibiae and tarsi dark; legs clothed with long white hairs and black bristles; abdominal segments two to four of male with silvery pollinosity and long white outwardly parted hairs, segments five, six, and seven silvery, abdomen of female gray pollinosity; hypopygium black, Figure 15.

County record: Cimarron.

June.

Efferia auripilus (Hine) NEW COMBINATION

Erax auripilus Hine, 1916. Ohio J. Sci. 17: 22.

Characteristics: Length 16-24 mm, color yellowish; vestiture of entire body pale yellow to bright yellow except for some black bristles on posterior of mesonotum and leg bristles; femora black, tibiae yellowish, apices of tibiae and tarsi darker; abdominal segments two through five of male with dark dorsal spot, segments six and seven silvery, female yellowish-gray; hypopygium brown, Figure 13.

County records: Comanche and Harper.

June.

Efferia bexarensis (Bromley) NEW COMBINATION

Erax bexarensis Bromley, 1934. Ann. Entomol. Soc. Am. 27(1): 94.

Characteristics: Length 18-25 mm, color yellowish-brown; vestiture of head, posterior thorax yellow; legs with black bristles, tibiae yellow, apices and tarsi dark; segments of abdomen silvery in male, female yellowish-gray; ovipositor longer than segments six and seven; hypopygium reddish-brown, Figure 17.

County record: Kiowa.

July.

Efferia nemoralis (Hine) NEW COMBINATION

Erax nemoralis Hine, 1911. Ohio Nat. 11: 211.

Characteristics: Length 24-30 mm, color dark gray; mystax and beard pale yellow, frontal, upper occipital bristles black; mid-dorsal stripe of mesothorax dark, pollinose hair yellowish-brown and gray, bristles black; femora, apices of tibiae, tarsi black, remainder of tibiae reddish-brown; male abdominal segments one, two, and base of three dorsally black, apices of third and fourth with long white outwardly parted hairs, five and six silvery, seven dark, female segments with dorsally gray pollinose hairs except for dark spots on mid-line which become broader anteriorly; ovipositor as long as last four segments; hypopygium black, Figure 9.

County records: Craig, McCurtain, and Nowata.

June.

Efferia pallidulus (Hine) NEW COMBINATION

Erax pallidulus Hine, 1911. Ohio Nat. 11: 309.

Characteristics: Length 18-28 mm, color yellowish-gray; mystax very pale yellow, beard, palpi white haired, ocellar bristles black; thoracic bristles anteriorly pale yellow, posteriorly black and white, scutellar bristles white; tibiae basally yellowish-red, apical halves and tarsi dark; segments of abdomen silvery, male first four segments with long white outwardly parted hairs; ovipositor longer than last two segments, hypopygium black, narrowed toward apex where from lateral view appears evenly rounded.

County record: Cimarron.

June.

Efferia plenus (Hine) NEW COMBINATION

Erax plenus Hine, 1916. Ohio J. Sci. 17(1): 21.

Characteristics: Length 20-30 mm, color yellowish-brown; vestiture of head yellow, upper occipital bristles black, style twice as long as its segment; thoracic mid-dorsal stripe brown, hairs anteriorly black, posteriorly pale, large bristles black; legs dark, tibiae largely red, clothed with yellow hairs and black bristles; first three abdominal segments of male dark, with dark hairs above, venter with white hairs, fourth segment with long white outwardly parted hairs, remaining segments silvery; female yellow pollinosity; ovipositor as long as last three segments, black; hypopygium black, Figure 8.

County record: Greer.

July.

Efferia prairiensis (Bromley) NEW COMBINATION

Erax prairiensis Bromley, 1934. Ann. Entomol. Soc. Am. 27(1): 95.

Characteristics: Length 21-26 mm, color yellowish-brown; mystax, beard, palpi yellow, upper occipital bristles largely black; thoracic mid-dorsal stripe brown, bristles largely black, hairs black and yellow; femora and apices of tibiae dark, tibiae yellowish-red, all parts of legs clothed with yellow hairs, black bristles; wings pale brown; male seventh abdominal segment silvery and others with dark dorsal spot; ovipositor black, as long as last two segments; hypopygium red, Figure 10.

County records: Cleveland and Pittsburg.

June--November.

Efferia texanus (Banks) NEW COMBINATION

Erax texanus Banks, 1919. Ann. Entomol. Soc. Am. 12(2): 151.

Characteristics: Length 23-30 mm, color dark brown; mystax largely yellowish-red, beard white, vestiture of front, antennae, and upper occipital bristles black, lower occipitals yellowish-red, palpi mixed black and yellowish-red; thoracic bristles black, hypopleural and coxal bristles yellowish-red; femora black, basal halves of tibiae red, apical halves and tarsi dark, bristles black, long white hairs; abdominal segments black with sides and apical margins broadly silvery-gray, male six and seven silvery; hypopygium black, Figure 11.

County records: Adair, Alfalfa, Carter, Cleveland, Comanche, Delaware, Haskell, Latimer, McCurtain, Mayes, Murray, and Pittsburg.

June--August.

Efferia varipes (Williston) NEW COMBINATION

Erax varipes Williston, 1885. Trans. Am. Entomol. Soc. 12: 71.

Characteristics: Length 22-28 mm, color gray; vestiture of body white to slightly pale yellow; legs with black bristles, tibiae red, apices and tarsi dark; segments of abdomen gray; ovipositor as long as last two segments; hypopygium red, Figure 7.

County record: Cimarron.

June--July.

Efferia aestuans (Linnaeus) NEW COMBINATION

Asilus aestuans Linnaeus, 1767. Syst. Nat. 12: 1007.

Dasypogon aestuans, Fabricius, 1805. Syst. Antl., p. 164.

Asilus niger Wiedemann, 1821. Dipt. Exot., p. 196.

Asilus macrolabis Wiedemann, 1828. Aussereurop. Zweifl. Ins. 1: 458.

Asilus aestuans, Macquart, 1834. Hist. Nat. Dipt. 1: 312.

Erax incisuralis Macquart, 1839. Dipt. Exot. 1(2): 117.

Erax bastardi Macquart, 1839. Loc. cit.

Erax tibialis Macquart, 1839. Ibid., 118.

Erax aestuans, Osten Sacken, 1858. Smithsn. Misc. Coll. 3(102): 33.

Characteristics: Length 14-28 mm, color grayish-black; mystax largely black, beard white, palpi, bristles of front and upper occiput largely black, style longer than twice its segment; vittae of dorsum black, dorsal bristles of thorax black and white, scutellar bristles usually white; femora black, tibiae brown, apices and tarsi darker, bristles, hairs largely black; abdomen dorsally black, each segment with narrow

posterior gray margin, venter gray, last four segments of male silvery; ovipositor nearly as long as last four segments; hypopygium black, Figure 18.

County records: Records indicate this species to have statewide distribution.

May--August.

Efferia aurimystaceus (Hine) NEW COMBINATION

Erax aurimystaceus Hine, 1919. Ann. Entomol. Soc. Am. 12(2): 122.

Characteristics: Length 11-13 mm, color dark yellowish-gray; mystax yellow, beard white, palpi black; dorsum of thorax yellow brown pollinose hairs, mesonotum posteriorly with numerous long black bristles, scutellum with white hairs, marginal scutellars two to four, black; femora black, tibiae yellowish, tibial apices and tarsi darker; abdomen dark above with sides and venter yellowish-gray, ventrally segments three to six with small dense tufts of black hair, segments six and seven of male silvery; ovipositor about as long as last three segments; hypopygium black, Figure 26.

County records: reported by Hine (1919) from Clark County, Kansas.

Efferia belfragei (Hine) NEW COMBINATION

Erax belfragei Hine, 1919. Ann. Entomol. Soc. Am. 12(2): 121.

Characteristics: Length 10-11 mm, color grayish-black; mystax black and white, beard whitish-gray, all other vestiture of head black; dorsal thoracic bristles black, some white, pile of thorax white; femora, apices of tibiae and tarsi black; abdominal segments black dorsally with side and apical margins gray, segments six and seven of male silvery; hypopygium black, Figure 20.

County record: Murray.

May.

Efferia kansensis (Hine) NEW COMBINATION

Erax kansensis Hine, 1919. Ann. Entomol. Soc. Am. 12(2): 122.

Characteristics: Length 15-17 mm, color yellowish-brown; beard pale yellow, upper occipital bristles black; black and yellowish pile on thorax, black bristles, marginal scutellar bristles two, black; femora, apices of tibiae, tarsi black; abdominal pollinosity dark brown, sides, apical margins yellowish-gray, segment seven of male silvery; hypopygium black, Figure 24.

County records: Alfalfa, Beaver, Cimarron, Comanche, Grady, Harmon, Harper, Noble, Payne, Tillman, Woods, and Woodward.

May--August.

Efferia snowi (Hine) NEW COMBINATION

Erax snowi Hine, 1919. Ann. Entomol. Soc. Am. 12(2): 116.

Characteristics: Length 19-22 mm, color dark; vestiture of head pale yellowish to yellow, except palpal and ocellar bristles black; thoracic vittae black, bristles black; legs black, tibiae basally dark red; abdominal segments dorsally black (in female this depends on viewing angle), sides and narrow apical margins of segments one to three yellowish-gray, segment four black, encircled apically by silvery-gray, five with small dark spot dorsally, remainder and six and seven silvery; ovipositor as long as last three segments; hypopygium black, Figure 16.

County records: Alfalfa, Caddo, Carter, Cleveland, Comanche, Harper, Latimer, McCurtain, Murray, Oklahoma, and Woods.

April--June.

Efferia tuberculatus (Coquillett) NEW COMBINATION

Erax tuberculatus Coquillett, 1904. J. New York Entomol. Soc. 12: 34.

Characteristics: Length 15-17 mm, color gray; mystax white above, below and palpi black, style over two and one-half times as long as its segment; mid-dorsal thoracic stripe black, bristles usually all white; femora black, tibiae yellowish, apices of tibiae and tarsi brown, leg bristles black; ovipositor as long as last two segments; hypopygium black, Figure 23.

County records: Blaine, Cimarron, Cotton, Ellis, Murray, Texas, and Woodward.

June--August.

Efferia albibarbis (Macquart)

Dasypogon barbatus auctt. (not Fabricius, 1805).

Erax albibarbis Macquart, 1838. Dipt. Exot. 1(2): 117.

Erax pumilis Walker, 1855 (not Macquart, 1849). List Dipt. British Mus. 7(suppl. 3): 640.

Erax cinerescens Bellardi, 1861. Saggio Ditterologia Messicana 2: 39.

Erax tricolor Bellardi, 1861. Ibid., 40.

Erax pogonias, Williston, 1885 (not Wiedemann, 1821). Trans. Am. Entomol. Soc. 12: 198.

Erax furax Williston, 1885. Ibid., 67.

Efferia albibarbis, Martin, 1962. J. Kansas Entomol. Soc. 35(2): 251.

Characteristics: Length 13-20 mm, color yellowish-brown; beard, usually mystax, and palpal hairs white to yellow with some black, upper occipital bristles black; mid-dorsal stripe brown, not always distinct,

bristles of thorax usually white, sometimes black, scutellum with long white hairs, six or seven, white and/or black bristles; femora black, tibiae yellow, apices of tibiae and tarsi dark, legs clothed with dense short white hairs, bristles black and white; abdomen dorsally gray pollinosity, usually with rounded black spot on each side of segments two to five, and six and seven in female, six and seven silv ery in male, often with median gray stripe; ovipositor as long as last two segments; hypopygium reddish-black, Figure 21.

County records: Adair, Alfalfa, Beaver, Caddo, Cimarron, Cleveland, Comanche, Dewey, Ellis, Harmon, Harper, Jackson, Kiowa, LeFlore, Logan, Marshall, Murray, Okfuskee, Oklahoma, Osage, Pawnee, Payne, Roger Mills, Sequoyah, Texas, Woods, and Woodward.

May--August.

Efferia leucocomus (Williston) NEW COMBINATION

Erax leucocomus Williston, 1885. Trans. Am. Entomol. Soc. 12: 69.

Characteristics: Length 25-30 mm, color yellow; vestiture of entire body yellow, some black bristles on legs; third joint of antennae small, slightly longer than second, style three times as long as its segment; femora black, tibiae yellow, apices and tarsi dark; ovipositor and seventh segment of female abdomen dark, segments six and seven of male silvery; hypopygium reddish, Figure 12.

County records: Alfalfa, Cimarron, Cleveland, Comanche, and Woods.

April--August.

Efferia zonatus (Hine) NEW COMBINATION

Erax zonatus Hine, 1919. Ann. Entomol. Soc. Am. 12(2): 112.

Characteristics: Length 16 mm, color dark gray; vestiture of body largely white except mystax and palpi with some black hairs; dorsum of thorax yellowish-brown pollinosity; wings hyaline with costal vein slightly dilated after subcostal union; femora black, tibiae red, apices of tibiae and tarsi darker; gray and black bands of abdominal segments of about equal width, segments six and seven of male silvery, seven of female black; ovipositor as long as last three segments; hypopygium red with a ventral tuft of dark chestnut-brown hairs, Figure 25.

County record: Cimarron.

June--July.

Promachus Loew

Trupanea Macquart, 1838 (not Shrank, 1803). Dipt. Exot. 1(2): 91.

Promachus Loew, 1848. Linn. Entomol. 3: 390.

Telejoneura Rondani, 1863. Arch. Zool. Fisiol. 3(1): 48.

Trypanoides Becker, 1925. Entomol. Mitt. 14: 71.

Enagaedium Engel, 1930. Konowia 8: 459.

Genotype: Asilus maculatus Fabricius, 1775. Syst. Entomol., p. 794 (by designation of Coquillett, 1910).

Characteristics: Style bare, facial gibbosity not pronounced; vein R_5 reaching costa beyond tip of wing; tarsal claws pointed; abdomen narrow.

Key to Species

1. Abdominal segments distinctly banded, black and gray, subequal width 2

   Abdominal segments not banded 3

2. Thorax reddish-brown; femora red . . . . . hinei

Thorax yellowish gray; femora dark . . . . . vertebratus

3. Abdomen largely pale pile 4

Abdomen largely black with pale hairs noticeable on segments two to five on sides and apical margins . . . . . bastardii

4. Thorax clothed with yellowish-brown pollinosity 5

Thorax grayish-yellow . . . . . oklahomensis

5. Gray shadow in first submarginal cell wider than marginal cell; male genitalia longer than abdominal segments six and seven . . . . . fitchii

Gray shadow in first submarginal cell distinctly narrower than marginal cell; male genitalia shorter than abdominal segments six and seven . . . . . texanus

Promachus bastardii (Macquart)

Trupanea Bastardii Macquart, 1839. Dipt. Exot. 1(2): 104.

Asilus Laevinus Walker, 1851. Ins. Saundersiana Dipt. 1: 123.

Asilus ultimus Walker, 1951. Ibid., 136.

Promachus philadelphicus Schiner, 1867. Verhandl. Zool.-Botan. Ges. Wien 17: 389.

Promachus bastardii, Osten Sacken, 1878. Smithsn. Misc. Coll. 16(270): 78.

Characteristics: Length 20-30 mm, color black; mystax yellow, beard paler, palpal, upper occipital bristles black, lower ones pale, style almost twice the length of its segment; dorsal thoracic vittae darker brown; femora anteriorly black, posteriorly, tibiae, tarsi red, front tibiae and tarsi of male clothed with dense pale recumbent hairs; hypopygium dorsally with white hairs.

County records: Adair, Bryan, Carter, Cleveland, Comanche, Craig, Custer, Delaware, Harper, Kay, Latimer, LeFlore, Love, McCurtain, McIntosh, Mayes, Nowata, Oklahoma, Osage, Payne, Rogers, Sequoyah, and Washington.

June--August.

Promachus fitchii Osten Sacken

Trupanea apivora Fitch, 1865 (not Walker, 1858). 9th Rept. Nox. Ins. New York, p. 251.

Promachus Fitchii Osten Sacken, 1878. Smithsn. Misc. Coll. 16(270): 234.

Characteristics: Length 25-30 mm, color yellow; entire body clothed with yellow hairs except for large bristles of upper occiput, thorax, legs, and some on basal abdominal segments black; legs red, femora anteriorly black; ovipositor black with some yellow hairs; hypopygium about as long as segments five, six, and seven.

County records: Alfalfa, Beaver, Craig, LeFlore, Nowata, and Payne.

June--August.

Promachus hinei Bromley

Promachus rufipes Hine, 1911 (not Fabricius, 1805). Ann. Entomol. Soc. Am. 4(2): 166.

Promachus hinei Bromley, 1931. Ibid., 24(2): 435.

Characteristics: Length 30-35 mm; similar to P. vertebratus (Say).

County records: Cleveland, Comanche, Delaware, Kay, Latimer, LeFlore, McCurtain, Osage, Pawnee, Payne, Sequoyah, and Washington.

July--August.

Promachus oklahomensis Pritchard

Promachus oklahomensis Pritchard, 1935. Am. Mus. Novitates 813: 12.

Characteristics: Length 21-29 mm, color gray; vestiture grayish-yellow; similar to P. fitchii Osten Sacken, male genitalia differs in that upper forceps lack pronounced medial projections near middle of upper inner edge (best seen from below because proctiger usually rests on these projections).

County records: Cimarron and Greer.

June--July.

Promachus texanus Bromley

Promachus texanus Bromley, 1934. Ann. Entomol. Soc. Am. 27(1): 94

Characteristics: Length 22-32 mm, color yellowish-brown; similar to P. fitchii Osten Sacken.

County record: Cimarron.

June.

Promachus vertebratus (Say)

Asilus vertebratus Say, 1823. J. Acad. Sci. Phila. 3: 47.

Promachus vertebratus, Osten Sacken, 1878. Smithsn. Misc. Coll. 16(270): 78.

Characteristics: Length 27-31 mm, color yellowish-gray; head clothed with yellow pollinose hairs; thoracic mid-dorsal stripe brown; tibiae light red, apices and tarsi dark; wings brown; female abdominal segments six and seven black; genitalia black, male clothed dorsally with pale hairs.

County records: Ellis, Grant, Osage, Texas, and Woodward.

July--August.

Proctacanthus Macquart

Proctacanthus Macquart, 1838. Dipt. Exot. 1(2): 120.

Acanthodelphia Bigot, 1857. Ann. Soc. Entomol. France Ser. 3, 5: 545.

Proctacantha Scudder, 1884. Nomen. Zool., Univ. Index, p. 262.

Genotype: Proctacanthus philadelphicus Macquart, 1838. Dipt. Exot. 1(2): 123 (by designation of Coquillett, 1910).

Characteristics: Style bare, facial gibbosity prominent; abdomen usually longer than wings; ovipositor with circlet of spines above.

Key to Species

1. Abdomen red; proboscis apically triangular 2
   Abdomen gray; proboscis apically dorso-ventrally flattened . . . 3
2. Thoracic dorsum uniformly dark red . . . . . hinei
   Thoracic dorsum dark red with dark vittae . . . . . rufus
3. Proboscis with dorsally enlarged ridge 4
   Proboscis uniform, without enlarged ridge 6
4. Mystax usually pale yellow; male genitalia compact 5
   Mystax white; forceps of male genitalia elongate, curved at tips, enclosing open space beyond proctiger . . . . . nearno
5. Abdomen with stubby black bristles (larger than recumbent white hairs) on most segments, at least on two to four . . . . . micans
   Abdomen with a few long black bristles, no stubby ones . . milbertii
6. Palpi white; wings hyaline 7

Palpi black; wings brown . . . . . brevipennis

7. Femora black above, dark red below, or all dark red . . . . rodecki

Femora light red above, black below . . . . . duryi

Proctacanthus brevipennis (Wiedemann)

Asilus brevipennis Wiedemann, 1828. Aussereurop. Zweifl. Ins. 1: 431.

Proctacanthus brevipennis, Osten Sacken, 1858. Smithsn. Misc. Coll. 3(102): 35.

Characteristics: Length 20-28 mm, color dark brown; mystax pale, sometimes with few black bristles, beard lighter, palpi, upper occipital bristles black; thorax brown, distinct mid-dorsal stripe dark brown, bristles black, finer hairs white, hypopleural and coxal bristles pale; femora black anteriorly, posterior and tibiae brown, apices of tibiae and tarsi darker; wings uniformly brown; abdominal segments dark-grayish pollinosity; ovipositor dark; hypopygium red.

Systematics: Hine (1911) appears to have a typographical error in his synonomy of the species for he lists P. brevipennis as a synonym of P. "arno", but includes descriptions for both species.

County records: Alfalfa, Cleveland, Craig, Kiowa, and Latimer.

May--June.

Proctacanthus duryi Hine

Proctacanthus duryi Hine, 1911. Ann. Entomol. Soc. Am. 4(2): 160.

Characteristics: Length 26-28 mm, color yellowish-gray; bristles of entire body usually white, some black bristles on upper occiput, thorax, and legs; wings hyaline to very slightly cloudy brown at apices and along posterior margins; segments of abdomen grayish pollinosity; hypopygium red.

County records: Alfalfa, Beaver, Blaine, Cleveland, Comanche, Cotton, Harper, Love, McCurtain, Sequoyah, and Woods.

June--July.

Proctacanthus hinei Bromley

Proctacanthus rufus auctt. (not Williston, 1885).

Proctacanthus hinei Bromley, 1928. Psyche 35(1): 13.

Characteristics: Length 30-40 mm, color reddish; vestiture of face pale, frontal, antennal, upper occipital bristles usually black; thorax, legs, first abdominal segment dull reddish, bristles black, some white on prothorax and anterior two pairs of coxae, remainder of abdomen yellowish-red in male, female dull red; wings nearly hyaline, sometimes veins margined with brown; hypopygium red, wider than last segment.

County records: Alfalfa, Beaver, Blaine, Cleveland, Ellis, Harper, Jefferson, Logan, McCurtain, McIntosh, Major, Noble, Okfuskee, Oklahoma, Okmulgee, Osage, Texas, Woods, and Woodward.

June--August.

Proctacanthus micans Schiner

Proctacanthus micans Schiner, 1867. Verhandl. Zool.-Botan. Ges. Wien 17: 397.

Characteristics: Length 26-36 mm, color dark gray; mystax, beard, frontal and occipital bristles pale yellow to white, ocellar, upper occipital, palpal bristles black; thoracic vittae dark brown, bristles black long hairs white; legs reddish-brown, bristles black, femora black anteriorly, tibiae anteriorly and apically, tarsi darker; abdomen gray, male lighter gray posteriorly; ovipositor black; hypopygium red.

County records: Alfalfa, Cimarron, and Woods.

June--July.

Proctacanthus milbertii Macquart

Proctacanthus Milbertii Macquart, 1838. Dipt. Exot. 1(2): 124.

Asilus Agrion Jaennicke, 1867. Neue Exot. Dipt., p. 57.

Asilus missouriensis Riley, 1870. 2nd Rept. State Entomol. Missouri, p. 122.

Characteristics: Length 28-40 mm, color dark gray; mystax, beard, frontal, lower occipital bristles white to pale yellow, palpal, ocellar, upper occipital bristles mixed black and white; mid-dorsal vittae dark brown to black, thoracic bristles usually all black, fore and middle coxae pale; legs dark reddish-brown, bristles black, femora anteriorly black, tibiae anteriorly and apically, tarsi darker; abdominal segments dark gray, male posterior segments becoming lighter gray; hypopygium red.

County records: Alfalfa, Beaver, Canadian, Cleveland, Ellis, Grant, Harper, Haskell, Major, Murray, Noble, Osage, Pawnee, Payne, and Texas.

June--October.

Proctacanthus nearno Martin

Proctacanthus arno auctt. (not Townsend, 1895).

Proctacanthus nearno Martin, 1962. J. Kansas Entomol. Soc. 35(1): 187.

Characteristics: Length 28-36 mm, color brown; vestiture of head white, some upper occipital bristles black, palpi black and white; thorax yellow-brown pollinosity, vittae on dorsum brown, bristles black, finer hairs white; femora anteriorly black, poste ior and tibiae brown, tarsi darker; segments of abdomen dark above, sides gray pollinosity and pale pile; upper forceps of hypopygium curved in at tip enclosing space beyond proctiger

(as seen from above).

County record: Cimarron.

June.

Proctacanthus rodecki James

Proctacanthus rodecki James, 1933. Am. Mus. Novitates 596: 2.

Characteristics: Length 36-42 mm, color gray; vestiture white, upper occipital, ocellar, posterior thoracic, few abdominal bristles often black; antennal segments one and two red, third and style black, length of third segment three times width; thoracic vittae light to dark brown; legs dark red, bristles black, white recumbent hairs, tibiae anteriorly, apically and tarsi darker; abdominal segments of male becoming increasingly lighter gray posteriorly, female gray; hypopygium red.

County records: Alfalfa, Beaver, Caddo, Choctaw, Cimarron, Cleveland, Ellis, Harper, Kiowa, Payne, Texas, and Tillman.

May--August.

Proctacanthus rufus Williston

Proctacanthus rufiventris auctt. (not Macquart, 1838).

Proctacanthus rufus Williston, 1885. Trans. Am. Entomol. Soc. 12: 74.

Characteristics: Length 27-40 mm, color dull reddish; similar to P. hinei; male hypopygium red, narrower than last segment.

County records: Alfalfa, Cimarron, Ellis, Major, Osage, Texas, and Woodward.

June--August.

Proctacanthella Bromley

Proctacanthella Bromley, 1934. Ann. Entomol. Soc. Am. 27(1): 96.

Genotype: *Asilus cacopiloga* Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 166 (original designation).

Characteristics: Style bare, facial gibbosity weak, only developed near oral margin; metanotal slopes bare; white bristles on fore femora of female; vein R_5 ends in costa beyond tip of wing; abdomen narrow; ovipositor with terminal circlet of spines.

Key to Species

1. Abdomen with contrasting mid-dorsal row of dark spots; male genitalia with posteriorly directed fan of long bristles on either side of ninth sternite . . . . . *jamesi*

   Abdomen often dark without definite contrasting dark spots; male genitalia not as above 2

2. Crossvein, r-m, beyond middle of discal cell; forceps extended at least half their length beyond lower forceps . . . . . *leucopogon*

   Crossvein, r-m, at or before middle of discal cell; male genitalia not as above 3

3. Crossvein, r-m, at middle of discal cell; ninth abdominal male sternite with medial pencil of white hair-like bristles, extended posteriorly . . . . . *cacopiloga*

   Crossvein, r-m, before middle of discal cell; forceps of male genitalia with pair of hook-like processes at tips, sternites six through nine increasingly expanded . . . . . *wilcoxi*

Proctacanthella cacopiloga (Hine)

Asilus cacopiloga Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 165.

Proctacanthella cacopiloga, Bromley, 1934. Ann. Entomol. Soc. Am. 27(2): 110.

Characteristics: Length 15-18 mm, color yellowish-gray; vestiture white, most of palpal, some posterior thoracic bristles, leg bristles black; antennae black, style as long as its segment; mid-dorsal thoracic stripe brown, widely divided by lighter stripe, extending to transverse suture; legs reddish, femora of anterior pairs with black spots above, apical halves of hind pair entirely black, apices of tibiae, tarsi darker; abdominal segments usually dorsally dark.

County records: Records indicate this species to have statewide distribution.

June--September.

Proctacanthella jamesi Pritchard

Proctacanthella jamesi Pritchard, 1935. Am. Mus. Novitates 813: 13.

Characteristics: Length 19 mm, color yellowish-gray; vestiture generally white; antennae dark, tip of basal segment, second segment red, style slightly shorter than its segment; three dorsal thoracic stripes; legs reddish, femora, anterior pairs above, hind pair anteriorly dark; wings hyaline; genitalia reddish, ninth sternite of male truncately produced apically.

County record: Cimarron.

June.

Proctacanthella leucopogon (Williston)

Asilus (Rhadiurgus) leucopogon Williston, 1893. Kansas Univ. Quart. 2(2): 75.

Rhadiurgus leucopogon, Aldrich, 1905. Smithsn. Misc. Col. 46(1444): 283.

Asilus leucopogon, Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 166.

Proctacanthella leucopogon, Bromley, 1934. Ann. Entomol. Soc. Am. 27(1): 109.

Characteristics: Length 15-18 mm, color light gray; vestiture white; antennae black, style subequal to length of its segment; mid-dorsal thoracic stripe inconspicuous; legs reddish, femora with variable sized dark anterior spots, tibiae red, apices and tarsi darker.

County records: Beaver, Cimarron, Major, and Texas.

June--July.

Proctacanthella wilcoxi Bromley

Proctacanthella wilcoxi Bromley, 1935. Occas. Papers Mus. Zool. Univ. Mich. 304: 5.

Characteristics: Length 15-20 mm, color light brown; vestiture generally pale yellowish; antennal, some palpal, posterior thoracic and leg bristles black; antennae black, style equalling length of its segment; mid-dorsal thoracic stripe brown, widely divided by a light brown; legs reddish, fore and middle femora black above except apices and bases, hind pair all black except apices and bases red, fore and middle tibiae with anterior black streaks, hind pair basal portions red above, tarsi dark, white bristles below fore femora of male.

County record: Payne.

October.

Asilus Linnaeus

Asilus Linnaeus, 1758. Syst. Nat. Ed. 10, p. 605.

Asilus, Loew, 1849. Linn. Entomol. 4: 132.

Genotype: Asilus crabronifrons Linnaeus, 1758. Syst. Nat. Ed. 10, p. 605 (according to Coquillett, 1910, by designation of Latreille, 1810).

Systematics: In 1860, Loew stated that, though he was aware of the vagueness of some of the generic characters, he felt that they preserved the natural grouping of the species; and he raised his groups of Asilus to generic rank (Verrall, 1909). According to Hine (1909), the first to oppose Loew's genera was Schiner who in 1862 treated the genus Asilus in sensu lato, using Loew's groupings of the genus. Later, however, in a large work, Schiner used Loew's genera (Verrall, 1909). Williston (1908), the first American to object because of this vagueness, retained the genera as subgenera. Hine (1909) followed Williston's views but considered the names as groupings. Bromley, an ardent worker in the field, seemingly followed Hine's work; but, in one paper (1946), he referred to the groups as subgenera. The writers who favor Loew's genera appear to be in the majority; Aldrich (1905) and Curran (1934) used his genera in their works of American Diptera. In this work, I propose to use the genus in the sensu stricto as defined by Curran (1934).

Asilus sericus Say

Asilus sericus Say, 1823. J. Acad. Nat. Sci. Phila. 3: 48.

Asilus Herminius Walker, 1849. List Dipt. British Mus. 2: 410.

Characteristics: Length 20-28 mm, color golden-brown; mystax golden-yellow; palpal bristles black; face, thorax, and abdomen clothed with bright golden-yellowish pollinose hairs; abdominal segments without apical bristles; wings brown.

County records: Comanche and Craig.

June.

Machimus Loew

Machimus Loew, 1849. Linn. Entomol. 4: 1.

Tolmerus Loew, 1849. Ibid., 82.

Epitriptus Loew, 1849. Ibid., 108.

Genotype: Asilus chrysitis Meigen, 1820. Syst. Beschr. 2: 310 (by designation of Coquillett, 1910).

Characteristics: Style bare, one-half to as long as its segment; metanotal slopes hairy; vein R_5 reaching costa beyond wing apex; abdomen narrow.

Key to Species

1. Scutellar marginal bristles, two to four 2
   Scutellar marginal bristles, five or more . . . . . delicatulus
2. Wings hyaline, with varied degrees of clouding at apices and along posterior sides 3
   Wings entirely hyaline . . . . . formosus
3. Femora largely red, at least on posterior sides 4
   Femora black, except for preapical red bands 7
4. Thoracic bristles yellowish . . . . . prairiensis
   Thoracic bristles black 5

5. Abdomen yellowish-gray . . . . . johnsoni

   Abdomen dark gray 6

6. Wings with distinct clouded area in cells along posterior margins and apices, margins of veins hyaline; tibiae dull red. .tenebrosus

   Wings with clouded areas, margins of veins not hyaline; tibiae yellowish-red . . . . . antimachus

7. Femora black with pre-apical red bands, tibiae red with apical and medial dark bands . . . . . snowii

   Femora black 8

8. Upper forceps of male genitalia with tips bent downward, proctiger flattened, Figure 2 . . . . . notatus

   Upper forceps straight, proctiger angulate at apex, Figure 1 . . . . . virginicus

Machimus antimachus (Walker) NEW COMBINATION

Asilus antimachus Walker, 1849. List Dipt. British Mus. 2: 454.

Asilus (Tolmerus) antimachus, Bromley, 1946. Connecticut Geol. Nat. Hist. Survey Bull. 69: 40.

Characteristics: Length 16-20 mm, color light brown; mystax almost completely white, palpal bristles black, antennae black, style longer than its segment; thorax clothed with grayish pollinose hairs on pleura, yellowish near tergum, mid-dorsal and lateral stripes, dark brown; legs largely red, femora with variable black spot on anterior side; abdomen grayish-brown, apex of each segment lighter.

County record: McCurtain.

June.

Machimus delicatulus (Hine) NEW COMBINATION

Asilus delicatulus Hine, 1918. Ohio J. Sci. 18(8): 320.

Characteristics: Length 11 mm, color uniformly gray; body with white bristles; legs reddish; wings hyaline; last two segments of male and genitalia bright yellowish-red.

County record: Ellis.

July.

Machimus formosus (Hine) NEW COMBINATION

Asilus formosus Hine, 1918. Ohio J. Sci. 18(8): 321.

Characteristics: Length 18 mm, color gray; mystax pale yellow, black above, palpal bristles black; dorsal bristles of thorax black; legs reddish, black bristles, femora anteriorly dark; bristles of abdomen pale.

County record: Cimarron.

June--July.

Machimus johnsoni (Hine) NEW COMBINATION

Asilus johnsoni Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 159.

Characteristics: Length 17-21 mm, color yellowish-gray; mystax composed of large yellow bristles with few shorter black ones above, antennae black, style over half as long as its segment, upper occipital bristles coarse and black; thorax with distinct brown mid-dorsal stripe, scutellum with two black bristles at apex; legs largely reddish, femora with anterior sides black; wings reddish, hyaline margins along some veins; genitalia red.

County record: Pushmataha.

June.

Machimus notatus (Wiedemann) NEW COMBINATION

Asilus notatus Wiedemann, 1828. Aussereurop. Zweifl. Ins. 1: 451.

Asilus alethes Walker, 1849. List Dipt. British Mus. 2: 454.

Asilus (Tolmerus) notatus, Williston, 1893. Kansas Univ. Quart. 2(2): 74.

Tolmerus notatus, Aldrich, 1905. Smithsn. Misc. Coll. 46(1444): 282.

Asilus (Machimus) notatus, Bromley, 1946. Connecticut Geol. Nat. Hist. Survey Bull. 69: 41.

Characteristics: Length 14-18 mm, color dark gray; mystax with few black hairs above and many pale whitish-yellow hairs below, palpi and antennae black with black bristles; thorax clothed with grayish-yellow pollinose hairs, mid-dorsal stripe black and divided anteriorly by grayish line; legs black except for bases of tibiae, metatarsi red; hypopygium black, Figure 2.

County records: Comanche, Dewey, Hawkell, McCurtain, Payne, Pushmataha, and Roger Mills.

May--October.

Machimus prairiensis (Tucker) NEW COMBINATION

Asilus annulipes Macquart, 1838 (not Brullé, 1832). Dipt. Exot. 1(2): 149.

Tolmerus annulipes, Aldrich, 1905. Smithsn. Misc. Coll. 46(1444): 281.

Tolmerus prairiensis Tucker, 1907. Kansas Univ. Sci. Bull. 4(2): 93.

Asilus prairiensis, Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 61.

Characteristics: Length 14-20 mm, color light brown, almost all bristles are yellowish; mystax yellow, few short black bristles above,

antennae and palpi black with black bristles; tibiae dark at middle on anterior sides, apices, metatarsi red, other tarsi black; abdomen yellowish-brown with indistinctly marked gray posterior margins.

County records: Beaver, Cleveland, Oklahoma, Payne, and Pittsburg.

June--October.

Machimus snowii (Hine) NEW COMBINATION

Asilus annulatus Williston, 1893 (not Fabricius, 1775). Kansas Univ. Quart. 2: 70.

Asilus snowii Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 160.

Asilus (Tolmerus) snowii, Bromley, 1946. Connecticut Geol. Nat. Hist. Survey Bull. 69: 40.

Characteristics: Length 15-20 mm, color dark brown; mystax with black bristles above, white or pale yellowish below, antennal bristles black, style of third segment not over half its length; mid-dorsal stripes of thorax black, anteriorly narrowly divided by gray line; metatarsi reddish, black at apices, other tarsal segments black; posterior margins of abdominal segments a lighter color.

County records: Bryan, Carter, Choctaw, Cleveland, Delaware, LeFlore, Ottawa, Payne, and Washington.

June--August.

Machimus tenebrosus (Williston) NEW COMBINATION

Asilus tenebrosus Williston, 1901. Biol. Centrali Am. Dipt. 1: 328.

Machimus grisens Hine, 1906. Ohio Nat. 7: 29.

Characteristics: Length 17-20 mm, color brownish-gray; mystax black above, white below, antennae black, style equalling its segment; thorax

dark in ground color, clothed with gray pollinose hairs, wide, black mid-dorsal stripe divided anteriorly by narrow grayish line, scutellum with two black marginal bristles; legs red, bristles black, femora dark on anterior side; abdomen colored as thorax, apices of each segment light-colored, preceded by row of white bristles; eighth sternite of male produced below.

County record: Cimarron.

June--July.

Machimus virginicus (Banks) NEW COMBINATION

Asilus virginicus Banks, 1920. Proc. Entomol. Soc. Wash. 22: 31.

Characteristics: Similar to M. notatus (Wiedemann); hypopygium black, Figure 1.

County records: Comanche and McCurtain.

June.

Neoitamus Osten Sacken

Itamus Loew, 1849 (not Schmidt-Goebel, 1846). Linn. Entomol. 4: 84.

Neoitamus Osten Sacken, 1878. Smithsn. Misc. Coll. 16(270): 82.

Genotype: Asilus cyanurus Loew, 1849. Linn. Entomol. 4: 84 (by designation of Coquillett, 1910).

Neoitamus flavofemoratus (Hine)

Asilus flavipes Williston, 1893 (not Wiedemann, 1820). Kansas Univ. Quart. 2: 72.

Asilus flavofemoratus Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 153.

Neoitamus flavofemoratus, Fattig, 1945. Emory Univ. Mus. Bull. 3: 28.

Asilus (Neoitamus) flavofemoratus, Bromley, 1946. Connecticut Geol. Nat. Hist. Survey Bull. 69: 41.

Neoitamus (Asilus) flavofemoratus, Bromley, 1950. Ann. Entomol. Soc. Am. 43(2): 235.

Characteristics: Length 11-18 mm, color dark gray; mystax black in males, females black and white, facial pollinosity golden-yellow, other vestiture of head black; bristles of thorax largely black, four very long marginal scutellar bristles, row of large bristles on each side of black mid-dorsal stripe; fore and middle femora yellow with dorsal longitudinal black stripes, hind femora black, tibiae and basal halves of metatarsi yellow, remainder of tarsi dark; wings hyaline with apices slightly fumose, veins black; abdomen black with apical margins of segments narrowly gray.

County records: Caddo, Comanche, Johnston, and Marshall.

April--May.

Neomochtherus Osten Sacken

Mochtherus Loew, 1849 (not Schmidt-Goebel, 1846). Linn. Entomol. 4: 58.

Heligmoneura auctt. (not Bigot, 1858).

Neomochtherus Osten Sacken, 1878. Smithsn. Misc. Coll. 16(270): 82.

Genotype: Asilus pallipes Meigen, 1820. Syst. Beschr. 2: 245 (by designation of Coquillett, 1910).

This genus is sufficiently characterized by the generic key; thus, no further description is given.

Key to Species.

1. Style of third antennal segment very small, one-fourth as long as

its segment; femora picine . . . . . mesae

Style obviously differentiated, about as long as its segment; femora red, at least posteriorly . . . . . rubicundus

Neomoctherus mesae (Tucker) NEW COMBINATION

Tolmerus mesae Tucker, 1907. Kansas Univ. Sci. Bull. 4(2): 92.

Asilus mesae, Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 162.

Characteristics: Length 8-12 mm, color pale yellowish-brown; mystax composed largely of pale yellow bristles; antennae black; tibiae reddish, darker at apices, tarsi largely dark; abdominal segments posteriorly narrowly margined with lighter color; genitalia red.

County records: Dewey and Harper.

June.

Neomochtherus rubicundus (Hine) NEW COMBINATION

Asilus rubicundus Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 162.

Characteristics: Length 12 mm, color reddish; mystax pale yellow; antennae dark, second segment lighter than others; thoracic mid-dorsal stripe wide and dark; apices of tibiae darkened; genitalia red.

County records: Alfalfa, Beaver, Cleveland, Coal, Comanche, Harper, Oklahoma, Payne, Pushmataha, and Texas.

June--August.

Philonicus Loew

Philonicus Loew, 1849. Linn. Entomol. 4: 144.

Philonotus Neuhaus, 1886. Dipt. Marchica, p. 67.

Genotype: Asilus albiceps Meigen, 1820. Syst. Beschr. 2: 312 (original

designation).

Characteristics: Style bare, facial gibbosity not prominent; metanotal slopes hairy; apical margins of abdominal segments with bristles.

Key to Species

1. Wings uniformly reddish . . . . . rufipennis

   Wings fumose . . . . . limidipennis

Philonicus limidipennis (Hine) NEW COMBINATION

Asilus limidipennis Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 167.

Characteristics: Length 17 mm, similar to P.rufipennis; hypopygium black, Figure 4.

County records: Caddo, Kiowa, LeFlore, and Tillman.

June--July.

Philonicus rufipennis Hine

Philonicus rufipennis Hine, 1907. Ohio Nat. 7: 117.

Asilus rufipennis, Hine, 1909. Ann. Entomol. Soc. Am. 2(2): 168.

Characteristics: Length 15-18 mm, color brown; mystax, palpi white, upper occipital bristles largely black; mid-dorsal, and lateral thoracic stripes wide, dark brown, large bristles of mesonotum, two marginal scutellar bristles black; legs yellow, femora with anterior variable dark spots, bristles on legs black except under fore femora, long and white; abdomen dorsally dark, segmental apices with yellowish pollinosity; hypopygium black, Figure 3.

County records: Caddo, Carter, Choctaw, Cleveland, Comanche, McCurtain, Payne, Pushmataha, and Sequoyah.

June--July.

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PLATE I

Fig. 1. Machimus virginicus (Banks), lateral view of hypopygium.

Fig. 2. Machimus notatus (Wiedemann), lateral view of upper forceps, proctiger.

Fig. 3. Philonicus rufipennis Hine, lateral view of upper forceps.

Fig. 4. Philonicus limidipennis (Hine), lateral view of upper forceps.

Fig. 5. Efferia bicaudatus (Hine), lateral view of upper forceps, proctiger.

Fig. 6. Efferia bicaudatus (Hine), dorsal view of ovipositor.

Fig. 7. Efferia varipes (Williston), lateral view of upper forceps.

Fig. 8. Efferia plemus (Hine), lateral view of upper forceps.

Fig. 9. Efferia nemoralis (Hine), lateral view of upper forceps.

Fig. 10. Efferia prairiensis (Bromley), lateral view of upper forceps.

Fig. 11. Efferia texanus (Banks), lateral view of upper forceps.

Fig. 12. Efferia leucocomus (Williston), lateral view of upper forceps.

Fig. 13. Efferia auripilus (Hine), lateral view of upper forceps.

Fig. 14. Efferia candida Coquillett, lateral view of upper forceps.

Fig. 15. Efferia argyrosoma (Hine), lateral view of upper forceps.

Fig. 16. Efferia snowi (Hine), lateral view of upper forceps.

Fig. 17. Efferia bexarensis (Bromley), lateral view of upper forceps.

Fig. 18. Efferia aestuans (Linnaeus), lateral view of upper forceps.

Fig. 19. Efferia argentifrons (Hine), lateral view of upper forceps.

Fig. 20. Efferia belfragei (Hine), lateral view of upper forceps.

Fig. 21. Efferia albibarbis (Macquart), lateral view of upper forceps.

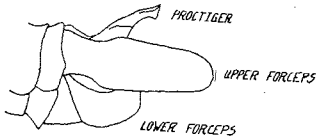
Fig. 22. Efferia interruptus (Macquart), lateral view of upper forceps.

Fig. 23. Efferia tuberculatus (Coquillett), lateral view of upper forceps.

Fig. 24. Efferia kansensis (Hine), lateral view of upper forceps.

Fig. 25. Efferia zonatus (Hine), lateral view of upper forceps.

Fig. 26. Efferia durimystaceus (Hine), lateral view of upper forceps.



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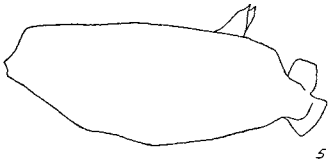

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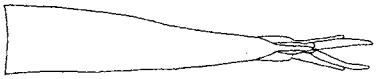

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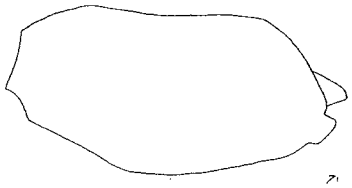

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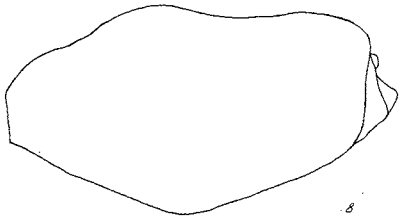

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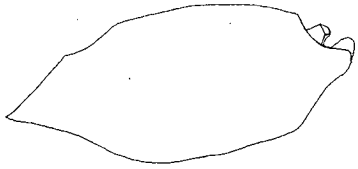

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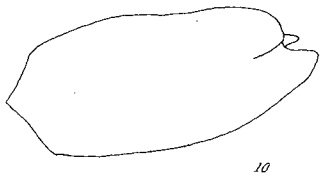

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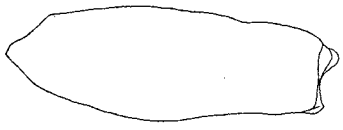

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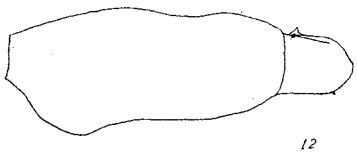

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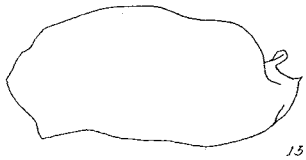

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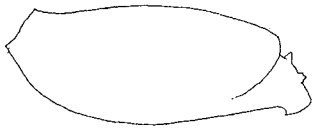

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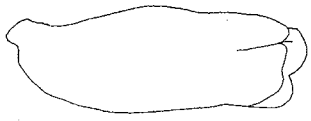

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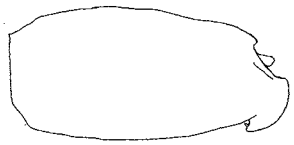

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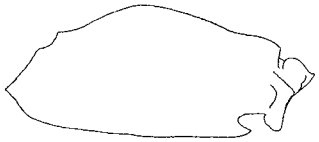

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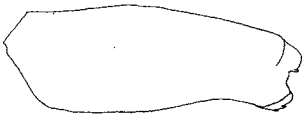

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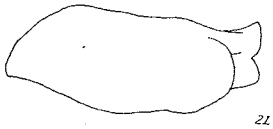

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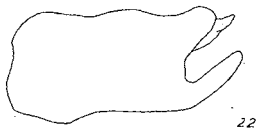

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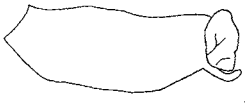

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VITA

Kurt Friedrich Schaefer

Candidate for the Degree of

Master of Science

Thesis: THE ASILINAE OF OKLAHOMA (ASILIDAE, DIPTERA)

Major Field: Entomology

Biographical:

Personal Data: Born at Chicago, Illinois, November 26, 1935, the son of Friedrich Erich and Ann Schaefer.

Education: Attended elementary school at Villa Park, Illinois; graduated from York Community High School, Elmhurst, Illinois, 1954; received the Bachelor of Science degree from Panhandle A. and M. College, Goodwell, Oklahoma, with a major in Biology, May, 1958; completed requirements for the Master of Science degree, August, 1962.

Professional experience: 1958-61, taught biology and chemistry at Amarillo High School, Amarillo, Texas; 1961-62, graduate assistant in botany, Oklahoma State University.

Member of Phi Sigma, The Entomological Society of America, The Kansas Entomological Society, Oklahoma Academy of Science, and associate member of the Society of Sigma Xi.