

13187
13187

THE COPROPHAGOUS SCARABAEIDAE OF OKLAHOMA
AND KANSAS

W. J. Brown

Submitted to the Department of Entomology and to the
Graduate Faculty of the Oklahoma Agricultural and
Mechanical College in partial fulfillment of the re-
quirements for the degree of Master of Science,
July 3, 1924.

13187
13187

list

TABLE OF CONTENTS

Introduction1
The Secondary Sexual Characters4
Definition of the Group12
Systematic Synopsis of the Oklahoma and
Kansas Coprophagous Scarabaeidae13
Systematic Treatment of the Oklahoma and
Kansas Species14
Plates104
Index112

INTRODUCTION

It is the object of the present paper to treat the taxonomic phase of the Oklahoma and Kansas species of coprophagous Scarabaeidae. In the following pages, sixteen genera and seventy six species are described, and notes are given on their abundance and seasonal and geographical distribution within the two states. Three of these species are new to science. Three additional genera and eleven species are included without definite records of capture, because their known distribution makes their occurrence in Oklahoma and Kansas probable. The list is believed to be fairly complete. However, continued collecting will bring to light numerous additional species, some of which will be new to science.

The collection of the Oklahoma A. and M. College and the material collected by the author during the last ten months have formed the basis for the work on the Oklahoma species. Most of the specimens available for study were collected in the vicinity of Stillwater, and collecting in the southern, southwestern, and western parts of the state will undoubtedly increase our knowledge of the Oklahoma species. The work on the Kansas species has been based largely upon the Snow Entomological Collections of Kansas University and upon the author's collection. Numerous specimens from the Collection of Mr. W. Knaus have been available for study. The T. B. Ashton Collection of Purdue University and the Grèvecoeur Collection of Ottawa University consist largely of Kansas specimens

and have been studied also.

The authors and titles of the various papers on the coprophagous Scarabaeidae are given under each genus and species. In every case, the first reference given under each name is the citation of the original description. These papers have been used freely, but in general, no credit has been given them. Aside from the papers mentioned in the body of the work, there are several others that have been used, namely, LeConte and Horn's Classification of the Coleoptera of North America, Leug's "Catalogue of the Coleoptera," and the lists of Kansas Coleoptera published by Popmon, Snow, and Knuss in the Transactions of the Kansas Academy of Science.

Except in the genus *Cobodacus*, all length measurements are taken from the apex of the elytra to the most caudal portion of the body. The measurements of *Cobodacus* are from Horn who states that they were taken from the apex of the thorax to the tip of the elytra. All measurements of width are taken through the elytra in their widest part.

The author wishes to thank Professor G. E. Sanborn, under whose direction the work was undertaken and who has been of much aid to him in the preparation of the paper. Many thanks are also due Mr. Warren Knuss for the loan of numerous specimens which otherwise would not be described in this work. The author also wishes to express his appreciation for specimens and suggestions to

Professor J. J. Davis, Professor H. F. Wickham, Professor W. B.
Wilson, Mr. Charles Lieback, and Mr. F. F. Crevecoeur.

SECONDARY SEXUAL CHARACTERS

In few large groups of insects is sexual dimorphism as well developed as it is in the coprophagous Scarabaeidae. Peculiarly enough, students of the group have spent but little effort in the study of these characters. Very little concerning them has been published, and most of our knowledge of them has been gleaned by taxonomists who were seeking satisfactory characters to define the limits of species. A bibliography on this subject would therefore be a repetition of the bibliographies given for each genus in the following pages.

If present, sexual dimorphism in the Scarabaeidae is usually found in the protuberances, sculpture, and form of the head and thorax. More rarely it involves other parts of the body. In the following synopsis of the sexual characters of the Oklahoma and Kansas species of coprophagous Scarabaeidae, the sexual characters are described briefly, but as fully as they have been observed. In genera in which these characters are of value in separating and defining species, the sexual characters have been described in connection with the descriptions of species in the following pages. Where they are of no value in this way, they have been discussed under the generic headings of this synopsis.

Ganthos

In all the North American species of Ganthos with two exceptions, the sexes are easily distinguished by the form of the ant-

erior tibial spur. In the male the spur is broad and more or less deeply emarginate at the apex. It is slightly curved outwardly and has the outer angle more acute and frequently more prolonged than the inner. In old specimens, the angles and the emargination are frequently found to be lost through wear. The two exceptions mentioned above are obovata and depressipennis. In these species, the male anterior tibial spur resembles that of the female in which sex it is stout and curved outwardly. It tapers gradually to the apex which is acute.

According to Blanchard, the males have the pygidium slightly longer and more deflexed, and the last ventral segment is more deeply emarginate. These characters cannot be depended upon to distinguish the sexes in the Oklahoma and Kansas species.

Cheeridium

In the single species occurring in our territory, the sexual characters most strongly developed are those found in the spurs of the anterior tibiae. In the male the spur is subcircular, strongly deflexed, sessile, and has a diameter equal to one-third the length of the front margin of the tibial apex. The spur of the female is broad and not deflexed. It is curved inwardly and becomes rather suddenly acute at the apex. The pygidium of the male is slightly longer than that of the female. The last ventral segment is wider at its middle in the latter sex.

Pinotus

In our single species of *Pinotus*, the secondary sexual characters of the head are feebler than in usual in genera in which the head is tuberculate. In the male the median tubercle of the head is situated between the apices of the genae. The minor spur of the middle tibia is curved near the apex which is acute. In the female the median tubercle of the head is located between the front margins of the eyes. The minor spur of the middle tibia is not curved, and its apex is broadly rounded.

The form of the prothoracic declivity and protuberances vary greatly, but the variations do not seem to depend upon sex.

Copris

In the Oklahoma and Kansas species of *Copris*, the sexual characters are confined to the head and thorax. In *C. minutus* the median tubercle of the head and the thoracic protuberances are more prominent in the male than in the female. The tubercle of the head is sometimes produced into a short, slender horn in the former sex. In telling the males seem to be of two types. Males from eastern Oklahoma and Kansas are similar to the females in the structure of the head and thorax. Western males are readily distinguished from females by characters given in the description of the species.

Phanaeus

The sexual characters of our species of this genus are des-

cribed in the descriptions of species in the following pages. The characters are confined to the head and thorax and vary greatly in the males which often closely approach the females. However, the males may always be distinguished by the presence of the hind angles of the prothoracic declivity. These angles are sometimes feebly developed but are always distinct. There is no trace of them in the female.

In addition to the sexual characters described elsewhere, the males may be known by their lack of front tarsi. This is a generic character.

Oothophagus

In all species of this genus the last abdominal segment is broadly, arcuately, emarginate at middle in the male, and is therefore much narrower at the middle than at the sides. In the female the last abdominal segment is not emarginate at middle and is therefore of nearly equal width throughout. It is best to rely upon this character to separate the sexes of those species in which the sexual characters of the head, legs, and thorax are feebly or not at all developed.

With the exception of the character described above, the sexual characters of our species of the genus are described fully in the following descriptions of species. The characters are found in the sculpture of the head and in the form of the head, thorax, and fore legs. As usual, the characters of the male show great individual variation, but rarely, if ever, are they so feebly developed that

they will not enable the student to distinguish the sexes.

Aphodius

The sexual characters of the species of *Aphodius* are quite remarkable and are far more varied than are those of any other of our genera. In our species they are found in the head, thorax, fore legs, intermediate tibial spurs, and rarely in the elytra. They are often of value in separating the species and are therefore fully described in the descriptions of the species. In most of our species the sexual characters are well enough developed to enable the student to readily distinguish the sexes.

Atacnius

Of our species of this genus, *socialis* is the only one having characters which readily distinguish the sexes. The characters of this species are very remarkable and are fully described in the description of that species.

Rhyssenus

No sexual characters have been observed in this genus.

Ochodactylus

The sexual characters of the species of *Ochodactylus* are quite varied. In *muscula* the thorax and elytral intervals are less

closely punctured in the males than in the female. The male of kansana has a well developed transverse carina on the vertex. The carina is shorter and less developed or subobsolete in the female. In hiarmus the male has the frontal margin terminating on each side in an acute tooth, and the hind femur is toothed on its hind margin. These characters are absent in the female.

Bolboceras

The sexual characters of this genus are confined to the head and thorax. They are considered in the descriptions of the species.

Odontaeus

Like the preceding, this genus shows sexual dimorphism in the form of the head and thorax. The sexual characters are considered in the description of our single species and are characteristic enough to distinguish that species from any other known form.

Bolbocerosema

The sexes of this genus are readily distinguished by characters of the head and thorax. In bruneri the female has a transverse carina on the front and another on the thorax near the front margin. In the male the frontal carina is absent, and there is a short

tubercle on the clypeal suture. The thoracic carina is feebly developed at middle but is produced at each extremity into a short, blunt protuberance. Each protuberance is bounded externally by a rather deep, longitudinal groove which is bounded in turn by another blunt protuberance. The groove and second protuberance are very feebly developed in the female. The sexual characters of the other species of the genus are similar to those of *brumeri*;

Eucanthus

In the single species of *Eucanthus*, the male has a rather long, transverse clypeal tubercle which is more or less emarginate at apex and is slightly curved. There is a transverse carina on the vertex. Near the apex of the thorax there is a transverse ridge on each side of which is a blunt tubercle. In the female the clypeal tubercle is shorter and the carina of the vertex is elevated into a transverse tubercle which is as high as that of the clypeus. The ridge and tubercles of the thorax are less prominent than in the male. Individual males often approach the females in the sexual characters of the thorax, but the characters of the head will always separate the sexes.

Geotrupes

In this genus the sexual characters have been used to a large extent in defining the subgenera. Our species belong to the sub-

genera *Cnecotrupes* (*blackburnii* and *quana*) and *Onychotrupes* (*splendida*). In both of these groups the thorax is similar in form in the sexes, and the apical tooth of the anterior tibia is bent and prolonged internally in the male. In the females the apical teeth of the anterior tibiae have the usual form. In addition to this character, *Onychotrupes* has the middle tarsus of the male short and thick and the middle tibial claws thickened and chelate. These characters are absent in the female.

Cleotus

No sexual characters have been observed in this genus.

DEFINITION OF THE GROUP

The family Scarabaeidae is a very large group and is sharply defined by the form of the antennal club. According to habits, its species may be divided into two great groups, the scavengers and the leaf-chafers. The first of these groups is the old subfamily Leparosticti or Coprophaga and is the group considered in the present paper.* The group may be characterized as follows:

Ligula always separated from the mentum. Abdominal spiracles situated in the membrane connecting the dorsal and ventral corneous plates, the last one covered by the elytra.

The Leparostict Scarabaeidae are divided into nine subfamilies, five of which are known to occur in Oklahoma and Kansas. A sixth, also, probably occurs in this region.

*The subfamily Troginae has been raised to family rank. It is therefore not considered in this paper.

SYSTEMATIC SYNOPSIS OF THE OKLAHOMA AND
KANSAS COPROPHAGOUS SCARABAEIDAE

	Species known to occur in Oklahoma and Kansas.	Species included without definite records.
Subfamily COPRINAE		
Tribe Scarabaeini		
Genus: <i>Canthon</i>	10	
Tribe Coprini		
Genera: <i>Cheeridium</i>	1	
<i>Pinotus</i>	1	
<i>Copris</i>	2	
<i>Phanaeus</i>	3	
<i>Onthophagus</i>	9	
 Subfamily AEGIALIINAE		
Genus: <i>Aegialia</i>		2
 Subfamily APHODIINAE		
Genera: <i>Aphodius</i>	25	2
<i>Ataxius</i>	6	2
<i>Psephenobius</i>		1
<i>Rhyssalus</i>	2	
<i>Pleurophorus</i>		1
 Subfamily OCHODAEINAE		
Genus: <i>Ochodaeus</i>	3	3
 Subfamily GEOTRUPINAE		
Tribe Helbocerini		
Genera: <i>Helboceras</i>	2	
<i>Odontaeus</i>	1	
<i>Helbocerosoma</i>	3	
<i>Eucanthus</i>	1	
Tribe Geotrupini		
Genus: <i>Geotrupes</i>	3	
 Subfamily AGANTHOCERINAE		
Genus: <i>Gleocetus</i>	2	

SYSTEMATIC TREATMENT OF THE OKLAHOMA
AND KANSAS SPECIES

Key to the Subfamilies of Coprophagous Scarabaeidae
occurring in Oklahoma and Kansas.

- A. Abdomen with six visible ventral segments; body not contractile.
- B. Antennae 8- or 9-segmented.
- C. Posterior tibia with a single spur except in Gnathon microrrhina Say; pygidium exposed. ——— Goninae.
- CC. Posterior tibia with two spurs; pygidium entirely or partly covered.
- D. Mandibles visible beyond the clypeus. ——— Acialinae.
- DD. Mandibles concealed by the clypeus. ——— Ateiniinae.
- EE. Antennae 10-segmented. ——— Ochodacinae.
- EEE. Antennae 11-segmented. ——— Gestrupinae.
- AA. Abdomen with five visible ventral segments; body partially contractile. ——— Acanthocerinae.

Subfamily I. COPRINAE

Clypeus expanded so as to entirely cover the oral organs; mandibles principally membranous, with only the outer margin corneous; mentum emarginate; antennae 8- or 9- segmented, club 3-segmented. Epimera of metathorax covered. Ventral segments six, all connate. Pygidium exposed. Middle coxae oblique, widely separated; posterior tibiae with a single terminal spur except in Canthus bicicornis Say where there are two; tarsus usually without a bisetose onychium.

The beetles belonging to this subfamily live almost exclusively in excrement and decaying fungi. Six of the nine North American genera occur in Oklahoma and Kansas.

Key to Genera

- A. Middle and posterior tibiae slender, curved, scarcely enlarged at the extremity; head and thorax always unarmed. ----- Canthus.
 AA. Middle and posterior tibiae dilated at the extremity; usually one or both sexes with head or thorax armed.
 B. Third segment of labial palpus distinct.
 C. Anterior coxae very transverse, not prominent; size small
 ----- Theoridium.
 CC. Anterior coxae short, prominent; labial palpi dilated.
 D. All tarsi with distinct claws; front legs of male with tarsi.
 E. Elytra each with seven striae; thorax without carina beneath. ----- Pinojus.
 EE. Elytra each with eight striae; thorax with a transverse carina on sides beneath. ----- Copris.
 DD. Tarsi without claws; front legs of male without tarsi. ----- Phaenacis.
 BB. Third segment of labial palpi obsolete. ----- Canthobacis.

I. CANTHON Hoffmannsegg.

1817. Hoffmannsegg: "Entomologische Bemerkungen.....uber amerikanische Insecten....." Wiedem. Mag., I, P. 38.
 1859. Leconte: "Coleoptera of Kansas and Eastern New Mexico," Smithson. Cont. Knowl., XI, pp. 1 - 58
 1868. Harold: "Monographie der Gattung Canton," Berl. Ent. Zeitschr., XII, pp. 1 - 144

1870. Horn: "Notes on Some Genera of Coprophagous Scarabaeidae of the United States," *Trans. Am. Ent. Soc.*, III, pp. 42 - 51.
1885. Blanchard: "On the Species of *Canthon* and *Phanaeus* of the United States with Notes on Other Genera," *Trans. Am. Ent. Soc.*, XII, pp. 163 - 172.
1910. Blatchley: *Coleoptera of Indiana*, pp. 912 - 915
1922. Dawson: "A Synopsis of the Scarabaeidae of Nebraska," *University (of Nebr.) Studies* XIII, pp 173 - 244.

Sexes alike in appearance. Head or thorax never armed. Scutellum invisible. Epipleurae of elytra distinct, narrow. Anterior coxae slightly prominent internally; middle and posterior tibiae slender, curved, scarcely enlarged at apex; anterior tarsi distinct; claws without onychia.

Sixteen species and eight varieties of this genus occur in North America. Ten of these species are found in our territory. The beetles of the genus are popularly known as "tumble bugs" because of their habit of rolling balls of dung.

Key to the Species

- A. Prothorax beneath transversely convex; not excavated for the reception of the femora; species larger.
- B. Hind tibiae each with two apical spurs. ----- albicornis.
- BB. Hind tibiae each with one apical spur.
- C. Posterior femora not margined in front; clypeus quadridentate.
- D. Subhumeral stria not carinate.
- E. Hind femora with setigerous punctures; outer striae of elytra deeper than those of the disc; prothorax more coarsely granulate. ----- abensis.
- EE. Hind femora sparsely punctate, the setae fine; outer striae of elytra not deeper than those of the disc; prothorax more densely and much more coarsely granulate. ----- depressipennis.
- BB. Subhumeral stria carinate.
- F. Hind femora with coarse setigerous punctures; rather coarsely granulate; size larger, 7-9 mm. ----- pratensis.
- BB. Hind femora with fewer setigerous punctures; almost smooth; size smaller, 5.7 - 6.7 mm. ----- lecontei.
- CC. Posterior femora margined in front; clypeus bidentate.
- D. Prothorax and pygidium distinctly granulate.

- H. Eyes larger; color black.-----vicinus.
 III. Eyes smaller; color usually black tinged with cupreous.-----laevis.
 DD. Prothorax and pygidium finely scabrous, without distinct granules.-----shalvites.
 AA. Prothorax beneath with an entire transverse carina on each side and deeply excavated for the reception of the femora; species small.
 B. Clypeus bidentate.-----viridis.
 BB. Clypeus quadridentate.-----perolexus.

13038. Canthon nigricornis Say.

1823. Say: "Desc.....Exp. to Rocky Mts., "Jour. Ac. N. S. Phila., III, p. 207. LeConte ed., II, p. 133.

Broadly oval; black, subopaque or feebly shining. Clypeus quadridentate, the two innermost teeth much more prominent; genae obtusely angulate; head very sparsely and finely punctate without distinct granules, or impunctate and sparsely granulate. Thorax sparsely and finely but very distinctly granulate; median line faintly indicated on basal half. Elytra indistinctly striate, the intervals with fine granules which are more sparsely placed than those of the thorax; subhumeral stria not carinate. Pygidium roughened with rather fine granules. Underside of thorax transversely convex, not excavated for the reception of the femora; a small denticle on the underside margin near apex. Hind femora not margined in front, finely and sparsely punctate; hind tibiae each with two apical spurs. Length 6-8 mm.; width 4-5.3 mm.

The above description has been drawn from Texas specimens. No examples from either Oklahoma or Kansas are at hand. The species has been taken in Reno, Riley, Douglas, and Shawnee Counties, Kansas, and undoubtedly occurs in Oklahoma. It frequents sandy localities and is the only North American species having two spurs at the apex of each hind tibia.

13039. Canthon ebeneus Say.

1823. Say: "Desc.....Exp. to Rocky Mts., "Jour. Ac. N. S. Phila., III, p. 207. LeConte ed., II, p. 134.

Broadly oval; black, opaque. Clypeus quadridentate, the two innermost teeth more prominent; genae angulate, prominent, the sutural indentation acute; head rather coarsely, not densely granulate. Thorax closely and rather coarsely granulate, the median line rather faintly indicated on basal half. Elytra striate, the discal striae faintly indicated, the outer striae deep; intervals rather coarsely and closely granulate; subhumeral stria not carinate. Pygidium coarsely, densely granulate. Underside of prothorax transversely convex, not excavated for the reception of the femora; a small denticle on the underside margin near apex. Hind femora not margined in front and coarsely, sparsely, setigerously punctate; hind tibiae each with a single apical spur. Length 7-10 mm.; width 4.3 - 6.3 mm

Specimens examined; 73, collected in Payne County, Oklahoma, and numerous counties in Kansas during May, June, and August. The species undoubtedly occurs throughout both states being rare in the eastern sections but very abundant in the western halves where it is the most common of the ball rolling dung beetles.

13040. Canthon depressipennis LeConte.

1859 LeConte: "List of Coleoptera of Kansas and New Mexico," Smithsonian. Cont. Knowl., XI, p 11.

Similar to the preceding, but very much less coarsely granulate and opaque. Outer elytral striae not deeper than those of the disc.

The above definition of the species is taken from Horn. No. specimens are at hand, but the species is recorded from Coolidge in the Kansas lists. Blanchard also records it from Kansas. It probably occurs in Oklahoma, also.

13041. Canthon praticola LeConte.

1859. LeConte: "List of Coleoptera of Kansas and New Mexico," Smithsonian. Cont. Knowl., XI, p. 10.

Broadly oval; black, subopaque. Clypeus quadridentate, the two innermost teeth most prominent; genae obtusely angulate, the sutural indentation not deep or acute; head densely, not coarsely granulate, the clypeal region sometimes feebly shining. Thorax densely, not coarsely granulate, the median line faintly indicated on basal third. Elytra faintly striate, the outer striae no deeper than those of the disc; intervals with sparse, rather fine granules; subjugal stria distinctly carinate basally. Pygidium finely and sparsely granulate. Underside of prothorax transversely convex, not excavated for the reception of the femora; a small denticle on underside margin near apex. Hind femora not margined in front, coarsely, sparsely, and setigerously punctate; hind tibiae each with a single apical spur. Length 7-9 mm; width 4.4-5.3 mm.

Specimens examined; 11, from Hamilton, Logan, Cove, Wallace, and Gray Counties, Kansas. The species undoubtedly occurs throughout the western parts of Oklahoma. Besides the characters given in the key, pratensis may be known from aberrans by the less prominent genae and the form of the sutural indentation.

13044. Canthon lecontei Harold.

1868. Harold: "Monographie der Gattung Canthon," Berl. Ent. Zeitschr., VII, p. 110.

Broadly oval; black, subopaque. Clypeus quadridentate, the two innermost teeth larger and more prominent; genae obtusely angulate, the sutural indentation rather deep and obtuse; head densely, very finely granulate and very sparsely and finely punctulate; the clypeal region shining. Thorax granulate and punctulate similar to the head, the median line very short and faint. Elytra faintly striate, the subjugal stria very distinctly carinate basally; intervals granulate, the granules slightly coarser than those of the head, each interval with about three rows of small, shining, black spots. Pygidium finely, densely granulate. Underside of thorax transversely convex, not excavated for the reception of the femora, a small denticle on underside margin near apex. Hind femora not margined in front, very sparsely, setigerously punctate; hind tibiae each with a single apical spur. Length 5.7 - 6.7 mm.; width 3.8 - 4.3 mm.

Specimens examined; 64, from Payne County, Oklahoma, and Seward County and Medora, Kansas, taken during May and June. The Medora specimens were collected during the morning and were found crawling

over the sand or rolling rabbit droppings. The Payne County specimens were taken from burrows in sand or sandy soil in the afternoon. Each burrow contained from one to four rabbit pellets. In a few instances two beetles, a male and a female, were found in a single burrow.

The punctules of the head and thorax and the shining spots of the elytral intervals are distinct only in fresh specimens and are not at all observable in old or dirty examples.

Canthon probus Germ. is recorded from Kansas in the "Coleopterum Catalogus," part 38. G. abrasus LeConte was described from Kansas and was placed as a synonym of probus by Horn. Horn was followed in this subsequent authors, although there has been considerable confusion in defining probus. In spite of these instances it does not seem plausible to assume that probus is a Kansas species. In all probability lecontei is a synonym of abrasus and should be replaced in our lists by the latter name. The true probus is an eastern species. Specimens of probus are at hand from New Jersey. They differ from lecontei in having the sutural indentation of the clypeus deeper, the body (especially the head and thorax which are feebly bronzed or with an aeneous lustre) more shining, and the subhumeral carina usually more feeble or wholly absent.

13047. Canthon vicilens LeConte. (pl. 1, fig. 5)

1858. LeConte: "Cat. of Col. Boundary between Mexico and United States," Jour. Ac. N. S. Phila. (2), IV, p. 18.

Broadly oval; black, subopaque, never bronzed. Clypeus obtusely bidentate, the teeth and margin moderately reflexed; sutural indentation absent; head rather densely covered with moderate granules; eyes about one-half as wide as long. Granules of thorax similar to those of head; median line not impressed. Elytra faintly striate, the subhumeral stria not carinate; intervals granulate, the granules similar to those of the head and thorax but slightly less dense. Pygidium rather finely, not coarsely granulate. Prothorax transversely convex beneath, not excavated for the reception of the femora, a small denticle on underside margin near apex. Hind femora margined in front, setigerously punctate. Hind tibiae each with a single apical spur. Length 15.6 - 19.5 mm.; width 11.6 - 12.6 mm.

Specimens examined, 14, from Payne County, Oklahoma, and Douglas County, Kansas, taken during May, June, and July. Mr. Kams has recorded the species from McPherson, also. It occurs at the droppings of animals and is often found with laevigata. It sometimes occurs at electric light. The males and females have been found burying the dung ball together in Payne County.

13048. Gnathon laevigata Drury. (pl. 1, fig. 6).
1770. Drury: Exot. Ins., I, p. 79. Westwood ed., I
1837, p. 73.

Broadly oval; color variable, usually dull black with a bronzed lustre which is sometimes lacking. Clypeus obtusely bidentate, the teeth and margin moderately reflexed; sutural indentation absent; head closely and rather coarsely granulate; eyes distinctly less than half as wide as long. Granules of thorax similar to those of head; median impression almost or entirely absent. Elytra faintly striate, the subhumeral stria not carinate; intervals granulate, the granules similar to those of the head and thorax. Pygidium rather coarsely, not densely granulate. Prothorax transversely convex beneath, not excavated for the reception of the femora, a small denticle on the underside margin near apex. Hind femora margined in front and with a few setigerous punctures. Hind tibiae each with a single apical spur. Length 12.8 - 17 mm.; width 7.8 - 10.6 mm.

Specimens examined; 337, from Payne and Pawnee Counties, Oklahoma, and all parts of Kansas, taken from May 2 to October 3.

This species is one of our commonest beetles and is the best known

of our "tumble bugs". It is quite variable in size and color. Green and blue individuals are said to occur in the far south. Most of the specimens examined have a distinct cupreous or bronzed lustre, but in some of the examples this is entirely wanting. The male genitalia of the Payne County specimens show considerable variation.

The female beetle, often assisted by the male, conceals the ball of dung in loose soil or beneath a log or stone. The egg is deposited in the ball, within which the larva develops. On reaching maturity the larva pupates within the ball which it has reduced to a thin-walled sphere.

13050. Gnathon chalcites Haldeman.

1843. Haldeman: "Description of North American Species of Coleoptera," Proc. Ac. N. S. Phila., I, p. 304.

Broadly oval; upper surface distinctly bronzed, under surface black. Clypeus obtusely bidentate, the teeth and margin moderately reflexed; sutural indentation absent; head finely scabrous, without granules; eyes as in laevis. Thorax finely scabrous, without granules; median impression almost or entirely absent. Elytra faintly striate, the submarginal stria not carinate; intervals with moderate, sparse granules. Pygidium covered with very small, dense granules, almost smooth. Prothorax transversely convex beneath, not excavated for the reception of the femora; a small denticle on the underside margin near apex. Hind femora margined in front and setigerously punctate. Hind tibiae each with a single apical spur. Length 15-18.3 mm.; width 10.2-12.4 mm.

Specimens examined; 4, from Douglas, Jackson, and Doniphan Counties, Kansas, taken during August and September. The species is recorded by Blanchard from Indian Territory. It is apparently rare.

G. chalcites superficially resembles laevia but is easily separated from that species and from vigilans also by the scarabrous head, thorax, and pygidium. The bronze lustre is more conspicuous than in laevia, and chalcites is somewhat more robust, also.

13052. Gnathon viridis Remvois.

1805. Remvois: Insectes recueillis en Afrique et en Amerique, Paris, p. 23.

Broadly oval; cupreous bronzed or green, strongly shining. Clypeus bidentate, the teeth and margins somewhat reflexed; sutural indentation absent but gena obtusely prominent at suture; head alutaceous and sparsely punctulate, the punctures becoming closer apically. Thorax alutaceous and evenly, sparsely punctulate; median line not impressed. Elytra obsolete striate, alutaceous, and very sparsely and indistinctly punctulate. Pygidium alutaceous and sparsely punctulate. Prothorax transversely carinate beneath, excavated in front of the carina for the reception of the femora. Hind femora not margined in front. Hind tibiae each with a single spur. Length 4.8 mm.; width 3.2 mm.

Specimens examined; 2, one of which is from Texas. The other which was collected in Jackson County, Kansas on September 1, 1924, is cupreous bronzed. The Texas specimen is bright green. This little species seems to be rare in our territory. It undoubtedly occurs in Oklahoma and is said to live beneath decaying leaves in wooded areas.

13053. Gnathon vernalepis LeConte.

1847. LeConte: "Fragmenta Entomologica," Jour. As. N. S. Phila. (2), I, p. 85.

Broadly oval; dark brownish bronzed, shining. Clypeus quadridentate, the teeth slightly reflexed; sutural indentation absent but genae obtusely prominent at suture; head alutaceous and rather coarsely, not closely punctured. Thorax punctate similar to head, the punctures a little finer medially; median line not impressed. Elytra feebly but distinctly striate, the intervals very sparsely and finely punctate. Pygidium alutaceous and punctate. Prothorax transversely carinate beneath, excavated in front of the carina for the reception of the femora. Hind femora finely margined in front. Hind tibiae each with a single apical spur. Length 4 - 4.8 mm.; width 2.8 - 3.2 mm.

Specimens examined; 2, from Douglas County, Kansas, taken during April and May. The April specimen emerged from a piece of sod which had been planted in the laboratory a month before. The other was taken at electric light. Like the preceding, this species is said to live beneath dead leaves.

II. CHOERIDIUM Serville.

1825. Serville: Entomological Part of Encyclopedie methodique, X p. 356.

1835. Blanchard: "On the Species of *Ganthus* and *Phanaeus* of the United States with Notes on other Genera," Trans. Am. Ent. Soc., XII, pp. 163-172.

Labial palpi 3-segmented. Thorax transversely carinate beneath. Elytra finely striate. Anterior coxae very transverse, not prominent; middle and posterior tibiae dilated at their extremities.

One of the two North American species of this genus is very common in Oklahoma and Kansas.

13057. Gheeridius histaroides Weber.1801. Weber: Observations entomologiques, etc., Kili-
ise, p. 37.1910. Blatchley: Coleoptera of Indiana, p. 915, fig.
361.

Broadly oval, convex; purplish bronzed or blackish, shin-
ing. Clypeus acutely notched at middle, a prominent tooth
each side; head finely and not closely punctate in the clypeal
region, becoming almost smooth at vertex. Thorax sparsely and
indistinctly punctulate on disc, distinctly punctured at the an-
gles and along basal margin; a median impression on basal half,
a deep rounded impression on each side. Elytra rather finely
striate, the striae with a few indistinct punctures; intervals
smooth, broad. Tibiae dilated. Length 6 - 7 mm.; width 4 -
4.4 mm.

Specimens examined; 156, collected in Payne and Pawnee Count-
ies, Oklahoma, and in eastern Kansas from the droppings of ani-
mals. An occasional specimen is found beneath leaves, and, dur-
ing the winter, the species hibernates beneath leaves and other
cover. It is most abundant during April and May and disappears
for a time in mid-summer.

III. PINORUS Eriehson.

1847. Eriehson: "Consp. Ins. Col. Peruvana," Wagnann, Arch. F.
Naturg., VII, p. 108.
1870. Horn: "Notes on Some Genera of Coprophagous Scarabae-
idae of the United States," Trans. Am. Ent.
Soc., III, pp. 42-51.
1906. Schaeffer: "On Bradycinetus and Bolboceres of North America
with notes on other Scarabaeidae," Trans. Am.
Ent. Soc., XXXII, pp. 249-260.

Large, black species. Labial palpi 3-segmented, broad, compressed; first segment of antennae not receiving the others; front parabolic; genae in front of eye oblique, the angle obtuse. Thorax without carina beneath. Elytra 7-striate. Metasternum rectangular. Front tarsi distinct in both sexes and all tarsi with claws; hind tibia dilated at apex, outer edge crenulate, never with an oblique ridge or tooth, the spur obtuse and emarginate at apex; claws without onychia.

One of the two recognized North American species occurs in Oklahoma and Kansas.

13059. Proctos carolinus Linnaeus.

1767. Linnaeus: Systema Naturae, ed. 12, 11, p. 545.
1910. Blatchley: Coleoptera of Indiana, p. 918.

Very robust; black, shining. Head rugose and with a single tubercle which may not be well developed. Thorax rugose on anterior declivity, posteriorly sparsely and rather finely punctate. Elytra shallowly striate; striae with moderately close, very shallow punctures; intervals finely and very sparsely punctate. Ventral parts of thorax with reddish-brown hairs. Length 23-28 mm.; width 15-18 mm.

Specimens examined; 53, from Payne County, Oklahoma, and Douglas and Doniphan Counties, Kansas, taken from May 5 to September 23. This is our largest and among our most common species of coprophagous Scarabaeidae. It is most abundant in the spring and fall and becomes scarce in August. It sometimes occurs at electric light but is most commonly found in its burrows beneath fresh cattle dung. The mound of earth it throws up and its burrow are larger than those of any other species of burrowing dung beetle found in our territory.

This is the species known for so long in our lists as Georis carolinus L.

IV. COPRIS Geoffroy.

1762. Geoffroy: "Historie abrégée des insectes qui se trouvent aux environs de Paris," p. 87.
1870. Horn: "Notes on Some Genera of Coprophagous Scarabaeidae of the United States," Trans. Am. Ent. Soc., III, pp. 42-51.
- 1906 Schaeffer: "On Bradycinetus and Bolbosceras of North America with notes on other Scarabaeidae," Trans. Am. Ent. Soc., XXXII, pp. 249-260.
1910. Blatchley: "Coleoptera of Indiana, pp. 915-916
1932. Dawson: "A Synopsis of the Scarabaeidae of Nebraska," University (of Nebr.) Studies XIII, pp. 173-244.

Labial palpi 3-segmented, broad, compressed; first segment of antennal club not receiving the others; clypeus semicircular; gnaea rectangularly produced, angle acute. Thorax with a transverse carina on sides beneath. Elytra 8-striate. Metasternum rectangular. Front tarsi distinct in both sexes and all tarsi with claws; hind tibiae compressed, the outer edge with an oblique ridge or tooth near the middle, spur long and acute; claws without onychium. Color black.

Two species of this genus are very common in Oklahoma and Kansas. They make burrows beside or beneath the droppings of animals and carry a quantity of the excrement into them.

Key to the Species.

- A. Distinctly shining; clypeus rather closely punctate at sides, smooth or nearly so at middle; length 8-10 mm. — ~~minutus~~.
- AA. Head and thorax opaque, elytra feebly shining; clypeus uniformly, densely punctate from side to side; length 13-18 mm. — ~~tullius~~.

13062. Copris minutus Drury.

1773. Drury: Illustr. exot. Ins., II, p. 78, pl. 35, fig. 6.

Broadly oval, convex, black, distinctly shining. Clypeus acutely, not deeply notched at middle, sparsely and finely punctate at the sides, a tubercle or short curved horn arising from

the region of the clypeal suture; genae moderately punctate. Thorax rather coarsely and moderately closely punctate, the punctures fine and less dense on each side of the median line which is distinctly impressed on basal two-thirds and coarsely, rather closely punctate; lateral thoracic margin not sinuate near apex; front of prothorax either without protuberances or produced at middle into a very short, broad projection with a low, blunt tubercle on each side. Elytra striate, the striae with close, rather coarse punctures; intervals convex, impunctate. Pygidium, femora, and metasternum except at middle moderately punctate. Abdominal segments coarsely punctate at base. Length 8.5 - 10 mm.; width 4.8 - 6 mm.

Specimens examined; 57, from Payne County, Oklahoma and eastern Kansas. This species is abundant in these localities during all the months of the year except July and August. It winters commonly in its burrows beneath the droppings of animals and sparingly in excrement and beneath other cover. The burrows are preferably made in moist, loose soil, and for this reason, *g. minutus* is more common in woodlands than in treeless pastures.

13065. *Georgis pallens* Olivier.

1789. Olivier: *Ent. Hist. Nat. Ins. Col.*, I, p. 118, pl. 11, fig. 98, pl. 19, fig. 88.

Broadly oval, convex, black, subopaque. Clypeus acutely, rather deeply notched at middle. Head uniformly punctate, the punctures rather coarse and dense; a tubercle or horn arising from the region of the clypeal suture. Thorax coarsely and densely punctate, a pit and oblique raised line on each side; the lateral margin sinuate near apex; the median line very feebly impressed near base. Elytra striate, the punctures of the striae transverse, not close; intervals convex, finely and shallowly punctate. Pygidium coarsely and rather densely punctured. Body beneath with moderate, not dense punctures. Length 13-18 mm.; width 7.6 - 10 mm.

Specimens examined; 63, from Payne and Pawnee Counties, Oklahoma, and various parts of Kansas, taken from April 22 to November 16. This is the species so long known in our lists as *g.*

macrotisus Say. Unlike Q. minutus, tullius prefers to burrow in the harder soil of open pastures. Two individuals are often found in a single burrow.

The males of the specimens studied are of two types. Those from Payne County, Oklahoma, and eastern Kansas have the frontal tubercle small, and the thorax is without a trace of protuberances and not strongly declivous in front. They measure from 13 to 14.5 mm. Males from western Kansas have the frontal protuberance developed into a long, slender horn, and the thorax has four blunt protuberances and is strongly declivous in front. Two of these males are at hand, and they measure 15.3 and 18 mm. Specimens similar to the first type described above do occur in Western Kansas also.

V. PHANAEUS MacLeay.

1819. MacLeay: *Hornae Entomologicae*, I, pt. 1, p. 124.
 1885. Blanchard: "On the Species of *Canthon* and *Phanaeus* of the United States with Notes on other Genera," *Trans. Am. Ent. Soc.*, XII, pp. 163-173.
 1910. Blatchley: *Coleoptera of Indiana*, p. 917.

Labial palpi 3-segmented, broad, compressed; first segment of antennal club hollowed, receiving the others. *Metasternum* rhomboidal. Front tarsi of males absent; all tarsal claws wanting. Colors often brilliant.

Three of the seven North American species occur in Oklahoma and Kansas. They are usually brilliant, and their habits are simi-

lar to those of our species of *Copris*.

Key to the Species.

- A. Punctures of elytra deep.
 B. Thorax with the hind angles **very** broadly rounded, the side margins in front serrate; thoracic declivity with the sides converging behind in well developed males. (pl. 1, fig. 3)-----*difformis*.
 BB. Thorax with the hind angles much less broadly rounded, the side margins in front entire or nearly so; thoracic declivity with the sides diverging behind in well developed males (pl. 1, fig. 4).-----*cornifex*.
 AA. Punctures of elytra shallow.-----*triancularis*.

13071. *Phanaeus difformis* LeConte.

1847. LeConte: "Fragmenta Entomologica," Jour. Ag. N. S. Phila. (2), I, p. 86.

Broadly oval, somewhat flattened above. Color variable; green or blue; the disc of the thorax usually more or less cupreous; body beneath black with a bluish or greenish lustre. Head rugose; clypeus entire or very feebly sinuate at apex. Thorax rugose; hind angles very broadly rounded; side margins in front serrate. Elytra striate; intervals with very large, dense, deep punctures. Length 16.5 - 24 mm. ; width 10.2 - 14 mm.

Male.-- Head with a horn which is usually short but sometimes as long as the thorax. Declivity of thorax large, angulate behind, the sides converging behind in well developed individuals.

Female.-- Head tuberculate. Declivity of thorax small, not angulate behind.

Specimens examined; 28, from the western parts of Oklahoma and Kansas. The species undoubtedly occurs throughout the western halves of both states. It invariably makes its burrows in sand and is often found mixed with the following species in collections.

13072. *Phanaeus cornifex* Linnaeus.

1767. Linnaeus: System Naturae, I, p. 846.

Broadly oval, somewhat flattened above. Color green, the

disc of the thorax cupreous; elytra sometimes bluish; body beneath green. Head rugose; clypeus entire or feebly sinuate at apex. Thorax rugose; hind angles obtuse; side margins in front entire or nearly so. Elytra striate; intervals with very large, dense, deep punctures. Length 13.6 - 21.7 mm.; width 8.4 - 12.5 mm.

Male.-- Head with a horn which is usually short but sometimes as long as the thorax. Declivity of thorax large, angulate behind, the sides diverging behind in well developed individuals.

Female.-- Head tuberculate. Declivity of thorax small, not angulate behind.

Specimens examined: 178, from Payne and Pawnee Counties, Oklahoma, and various parts of Kansas, taken from April 4 to October 24. The species disappears in June and is not found again until August. Unlike the preceding species, carinifer burrows in clay or loam and is also found in sand.

The sides of the prothoracic declivity do not diverge in undeveloped males and often appear to converge somewhat, thus resembling differsis. According to Blanchard, the side margins of the prothorax are entire in carinifer. However, many of the specimens at hand have the margins slightly and often indistinctly serrate. The hind angles of the prothorax are the most reliable character for separating carinifer and differsis. In Payne County where carinifer, the eastern species, begins to be replaced by differsis, the western species, individuals are sometimes found with the hind prothoracic angles intermediate. Such specimens cannot be satisfactorily assigned to either species.

13073. Phanacis triangularis Say.

1823. Say: "Desc.....Exp. to Rocky Mts.," Jour. Ac. N. S. Phila., III, p. 206. LeConte Ed., II, p. 132.

Broadly oval, somewhat flattened above. Color variable; opaque, black, dull cupreous, or green. Head rugose; clypeus feebly sinuate at apex. Thorax rugose, the hind angles very broadly rounded; side margins in front serrate or entire. Elytra striate; intervals with very large, dense, shallow punctures. Length 17.2 - 22.6 mm.; width 10.5 - 13.4 mm.

Male.-- Head with or without a horn which is variable in length when present. Declivity of thorax angulate behind, the sides diverging in well developed individuals.

Female.-- Head unarmed. Thorax simple, convex.

Specimens examined; 4, from Douglas County, Kansas. The species is apparently rare in our territory. It is recorded from Texas and therefore probably occurs in Oklahoma.

VI. ONTHOPHAGUS Latreille.

1807. Latreille: Genera Crustaceorum et Insectorum, p. 141.
 1878. Horn: "Synonymical Notes and Descriptions of New Species of North American Coleoptera," Trans. Am. Ent. Soc., V, pp. 126-156.
 1910. Blatchley: Coleoptera of Indiana, pp. 917-920.
 1914. Schaeffer: "A Short Review of the North American Species of Onthophagus," Jour. N. Y. Ent. Soc., XXII, pp. 290-300.
 1922. Dawson: "A Synopsis of the Scarabaeidae of Nebraska," University (of Nebr.) Studies, XXII, pp. 173-244.

Third segment of labial palpus obsolete; antennae 9-segmented. Scutellum invisible. Anterior coxae large, conical, protuberant; middle and hind tibiae gradually thickened; tarsal claws distinct; onychium long.

Nine of the twenty North American species occur in Oklahoma and Kansas. The species make their burrows beneath manure and fungi in much the same way as do the species of *Copris*.

O. brevifrons which is known only by the original description is not included in the following key.

Key to the Species

- A. Thorax uniformly black, shining.-----gonroides.
- AA. Thorax variable in color, never shining when black.
- B. Prothorax granulate.
- C. Opaque; elytra granulate; vertical carina of male rarely produced on each side.-----hecate.
- CC. Shining; elytra punctate; vertical carina of male acutely elevated at each extremity.-----guatemalensis.
- BB. Prothorax punctate.
- C. Clypeus truncate or rounded at apex.
- D. Thorax more or less protuberant in front.
- E. Prothorax and elytra uniformly green, shining; in well developed males the prothoracic process broad and deeply emarginate at apex and the vertical carina elevated into an acute tubercle on each side.-----grahni.
- EE. Prothorax aeneous, shining; elytra piceous with aeneous tint, less shining; in well developed males the prothoracic process broad and short and the vertical carina elevated into a long, slender horn at each extremity.-----lanae.
- ED. Thorax not protuberant in front but simply convex; color black, very feeble shining-----newyorkensis.
- CC. Clypeus distinctly emarginate at apex.
- D. Strongly shining, color cupreous.-----gribicollis.
- DD. Feebly shining or subopaque; color black.-----knauti.

13076. Oathophagus gonroides; Horn

1861. Horn: "Descriptions of New Species of North American Coleoptera," Trans. Am. Ac. of S., VII, pp 75-76.

"Broadly oval, convex, black, polished. Clypeus nearly semi-circular, vaguely emarginate at middle, separated from the front by a slight ridge in the line of the suture, surface transversely wrinkled. Front coarsely punctate. Vertex with a strongly elevated transverse ridge arcuate to the front at middle and on each end elevated into a sharp angle or short horn. Thorax broader than the elytra, anteriorly retuse, the vertical partition evenly punctured at middle and sparsely punctured in the concave spaces at the side, disc of thorax moderately densely punctured at middle in front, very obsolete posteriorly, or almost smooth along the base.

Elytra broader than long, each with seven feebly impressed, obsoletely punctured striae, the outer sinuous; intervals slightly convex, sparsely obsoletely punctulate. Prothorax beneath at sides, the metasternum at sides, coarsely punctate, each abdominal segment with a row of fine punctures. Anterior tibiae tridentate. Length .40 - .50 inch; 10 - 12.5 mm."

"The three specimens before me are males, which vary in the development of the cephalic ridges. The anterior tibial spur is arcuate at tip. This is the largest species known in our fauna, as well as the only one with a polished surface. The mentum is acutely emarginate in front. The general resemblance of this species to a small Copris carolina has suggested the name."

The above are Horn's original description and remarks.

Schaeffer states that "the female has a smaller clypeus with oblique sides and emarginate anterior margin; the carinae are stronger than in the male, the posterior one is somewhat depressed at middle."

The species is recorded from Kansas and undoubtedly occurs in Oklahoma. It seems to be quite rare.

13080. Orthopagus hecate Panzer.

1794. Panzer: Faun. Ins. Am. Bor. Prodr., p. 5, pl. 1 fig. 3.

Broadly oval; blackish, opaque; sparsely clothed with greyish hairs. Head transversely rugose. Thorax moderately densely granulate. Elytra finely striate, the intervals cheagined and each with two or more rows of rather fine granules. Pygidium punctate the base finely cheagined and with a few small granules. Body beneath punctate, shining. Length 5.8 - 9 mm.; width 3.6 - 5 mm.

Male. -- Clypeus produced at apex into a reflexed, slender, triangular process; at middle not rugose but finely, sparsely punctulate; carinae feeble; the upper often indistinct. Prothoracic process of well developed individuals broad and elongate, emarginate at apex and with a bidentate process at middle of emargination. Anterior tibiae elongate and arcuate.

Female.-- Clypeus without triangular process and smooth median area; carinae strongly developed. Prothorax slightly protuberant at middle or with a slight depression each side of middle of front margin. Front tibiae not elongate and less arcuate.

Specimens examined; 178, from Payne County, Oklahoma, and various parts of Kansas. The species is abundant throughout both states. It is found from April to November and occurs about fungi and carrion, but is most common at the droppings of animals.

The thorax of hacata sometimes has a distinct aneous lustre. According to Schaeffer "the elytra in some specimens from Kansas and Texas have a very few pale spots at sides and apex." All of the specimens at hand have uniform blackish elytra.

13081. Orthopagus guatemalensis Bates.

1886. Bates: Biol. Cent. Am. Col., II, pl. 2, p. 73, tab. V, figs. 16 and 16a.

Broadly oval; dark bluish or bluish green, body beneath and sometimes the elytra blackish, feebly shining; body sparsely clothed with grayish hairs. Thorax rather closely granulate. Elytra finely striate, the intervals very finely chagrined and each with two or more rows of half bearing punctures. Pygidium punctate, the base very finely chagrined and without granules. Body beneath punctate, shining. Length 5.7 - 7 mm.; width 3.8 - 4.1 mm.

Male.-- Clypeus produced at middle into a reflexed, broad process; head sparsely punctate, rugose at the sides; carinae feeble, the upper often indistinct and always acutely produced on each side. Prothoracic process nearly as in hacata. Anterior tibiae elongate and arcuate.

Female.-- Clypeus without reflexed process; head rugose, especially in the clypeal region and at sides, punctures distinct only on the front between the carinae which are strongly developed. Prothorax slightly protuberant at middle. Front tibiae less slender, less elongate, and less arcuate.

Specimens examined; 118, from Payne County, Oklahoma, and Medora Kansas. These from Medora were taken by Mr. W. Kansas who states that the species is abundant there during May. The Oklahoma specimens were taken in April and May and were found beneath the droppings of animals. In Payne County the species becomes very abundant in sandy localities. It is probably common throughout the western parts of both states.

13082. *Gasterocercus arabama* Fausser.

1749. Fausser: *Funn. Ins. Am. Bor. Prodr.*, p. 5, pl. I, fig. 2.

Broadly oval; metallic green, shining; sparsely clothed with greyish hairs. Thorax sparsely and moderately coarsely punctured. Elytra finely striate, the intervals with two or three rows of hair bearing punctures. Pygidium rather sparsely punctured. Body beneath punctate, shining. Length 7 - 7.5 mm.; width 4 - 4.2 mm.

Male.-- Clypeal margin broadly reflexed, slightly elevated and subtruncate at middle; head sparsely punctate, sparsely rugose at the sides; clypeal carina distinct; vertical carina very feeble at middle, elevated into an acute tubercle on each side. Prothoracic process of wall developed individuals broad, deeply emarginate at apex, the angles diverging and with a small tooth-like process near the tip of each. Anterior tibiae elongate, slender, and arcuate.

Female.-- Clypeus less broadly reflexed, strongly rugose; head back of clypeal carina sparsely punctate, the punctures closer at the sides; carinae simple, strongly developed. Prothorax slightly protuberant at middle in front. Anterior tibiae less elongate, less slender, and less arcuate.

Specimens examined; 3, from Payne County, Oklahoma, and Douglas County, Kansas, taken from cow dung during May and October.

Horn states that the clypeal carina is nearly obliterated in the male. In the two male specimens at hand it is very distinct but less developed than in the female. It is said that this

species is sometimes bright bronze and that the elytra are sometimes bluish.

13084. Onthophagus jama Panzer.

1794. Panzer: Faun. Bor. Am. Bor. Prodr., p. 5, tab. 1, fig. 3.

Broadly oval; color piceous with aeneous or cupreous tint, shining; surface sparsely clothed with hair. Clypeus rounded, the margin conspicuously reflexed. Thorax rather coarsely, not densely punctate. Elytra finely striate, the intervals each with two or three ill-defined rows of small punctures. Pygidium and metathorax rather coarsely, not densely punctate. Length 5.8 - 6 mm.; width 3.2 - 3.8 mm.

Male.-- Head punctate, the punctures very small and sparse in the clypeal region, larger and denser and sometimes intermixed on the front and vertex. Clypeal carina obliterated at middle, produced at each extremity into a long slender horn. Prothorax produced at middle in front into a short, broad projection. Front tibiae slightly elongate.

Female.-- Not at hand.

There is a single example of this species labeled "Kan." in the Purdue University collection. The specimen belongs to the variety striatulus Beauvois which has the elytra more or less testaceous at the base and apex.

The above description was drawn from three males from Pennsylvania and Massachusetts. Horn states that the female has "the clypeus deeply punctured and transversely wrinkled, the clypeal carina strong and attaining the side margin of the head, the vertical carina still stronger and slightly arcuate or sinuate." He also states that the thorax of the female is slightly protuberant in front.

13086. Onthophagus pennsylvanicus Harold.

1871. Harold: Col. Hefte, VIII, p. 115.

Broadly oval; blackish, feebly shining; sparsely clothed with inconspicuous greyish hairs. Clypeus entire or feebly truncate at middle. Thorax rather finely, not densely punctate. Elytra finely striate, the intervals each with two rows of hair bearing punctures. Pygidium and body beneath sparsely punctate, shining. Length 3.4 - 5 mm.; width 2 - 3 mm.

Male.-- Head with very few punctures which are more numerous at the sides and often intermixed with sparsely placed small punctules; head without carinae or with upper carina faintly indicated. Anterior tibiae slightly more elongate and slender than in the female.

Female.-- Head sparsely punctate, the clypeus more closely punctured and more or less rugose; clypeal carina moderately and vertical carina feebly developed.

Specimens examined; 108, from Payne County, Oklahoma, and Douglas County, Kansas, taken from April 3 to October 24. It is our smallest species and is probably abundant in the droppings of animals throughout both states.

13087. Onthophagus cribricollis Horn.

1881. Horn: Descriptions of New Species of North American Coleoptera, Trans. Kan. Ac. of S., VII, p. 75.

Broadly oval; cupreous, shining; sparsely clothed with greyish hairs. Head rather coarsely and closely punctate; carinae well developed, the anterior short. Thorax coarsely, moderately closely punctate. Elytra finely striate, the intervals irregularly biserially punctate. Pygidium and body beneath coarsely, sparsely punctate.

Male.-- Clypeus not roughly punctate; clypeal carina less than one-half as long as the distance between the genae in the region of the clypeal carina. Anterior tibiae slightly more slender and elongate than in the female.

Female.-- Clypeus roughly punctate; clypeal carina one-half as long as the distance between the genae in the region of the clypeal carina.

Specimens examined; 4, three males from Payne County, Oklahoma,

and one female from Douglas County, Kansas. The Payne County specimens were taken on September 6, 1924 and April 10, 1924. The female was collected on June 9, 1922.

A male before me agrees in every respect with the original description and with the specimens described above except in its secondary sexual characters which resemble those of knausi. It has the carinae feebly developed, the thorax produced in front into a short, blunt lobe, and the anterior tarsi slender, elongate, and arcuate. This specimen was taken March 6, 1924, by sifting debris from the floor of a woods near Stillwater, Oklahoma.

It is probable that the habits of this species are similar to those of Gnathon viridis, as all of the Oklahoma specimens were found in moist woods where there was much decaying vegetation.

----- Gnathon knausi n. sp.

Broadly oval; black, upper surface feebly shining except the elytra which are opaque; surface sparsely clothed with short, coarse, erect, brownish hair. Head feebly bronzed; clypeus notched at middle. Thorax one-fourth wider than long; surface coarsely, shallowly, and densely punctate, the punctures separated by distances which are not more than equal to their own diameters except at base where they are slightly less dense, some of the punctures giving rise to hairs. Elytra equal in width to the thorax, finely striate, the intervals finely chagrined and each with a row of hair bearing punctures, two rows sometimes evident near the base. Pygidium with sparse punctures similar to those of the thorax, finely chagrined and opaque except at apex where it is smooth and shining. Metasternum and femora with sparse, coarse punctures and sparsely clothed with hairs. Abdominal segments finely chagrined; each with a row of punctures along base at middle, the punctures forming several confused rows at the sides. Anterior tibia punctate on anterior face, quadridentate externally and denticulate above and between the teeth. Length 4.4 - 5 mm.; width 2.8 - 3 mm.

Male.-- Head without trace of carinae, rather finely and not closely punctate; clypeus with margin strongly reflexed, the apical margin rather feebly emarginate; gnae prominent. Thorax at middle in front produced into a short, broad, triangular lobe. Anter-

ior tibiae long and slender, arcuate, the apex with a pencil of yellowish hairs.

Female.-- Head with two carinae, one on the frontal suture, the other between the eyes; clypeus rugose, anteriorly deeply emarginate, a triangular reflexed tooth on each side of the emargination; front rather **densely** punctate and slightly wrinkled; genae rather closely punctate, less prominent. Thorax without trace of protuberance. Anterior tibia not elongate or arcuate, without a pencil of hairs.

Holotype: male, "Morris Co., Kans., VIII-25-22, W. J. Brown."

Allotype: female, "Douglas Co., Kans., X-15-1921, W. J. Brown."

Paratypes: 2 males and 2 females. Three of these are from Douglas County, Kansas, and were taken by the author. One was collected June 12, 1923, and another April 23, 1923. The third is without date. The fourth paratype, a male, is in the T. B. Ashton Collection of Purdue University and is labeled "Kan."

This species has many of the characters of *G. anthracinus* Harold and traces out to that species in Schaeffer's key. It may be known from that species by the thoracic puncturation in which it is approached by *tuberculifrons*, a species which it resembles in no other way. There is no indication of a prothoracic projection in the female of *kansasi*.

I have named this species in honor of Mr. W. Kansas who has given me much aid in my study of the Scarabaeidae.

13094. *Gathophasus brevifrons* Horn.

1281. Horn: "Descriptions of New Species of North American Coleoptera," Trans. Kan. Ac. of S., VII, p. 76.

"Oval, slightly oblong, robust, convex. Head and thorax more shining, varying in color from bluish to violet or greenish metallic. Clypeus short and broad, very obtuse in front, the margin broadly reflexed, surface scarcely not densely punctured, suture 2-

indistinct. Front more densely and finely punctured. Vertex with a feebly elevated transverse sinuous ridge. Thorax very little wider than the elytra, anteriorly retuse, and concave at the sides, surface coarsely but sparsely punctured, with finer punctures intermixed, more densely punctured at the middle of the protuberance. Elytra broader than long, finely seven-striate, the striae obsolete distally punctulate, the outer striae arcuate, intervals flat, irregularly biserially punctulate, each puncture with a short, erect hair; surface opaque, finely granulate, and with slight purple lustre. Body beneath sparsely punctate, abdomen with a few finer punctures at the sides. Anterior tibiae quadridentate, the upper tooth smaller. Length .40 inch; 10 mm. Of this species I have seen four males. It resembles *Janus*, but is larger, more elongate, thorax more retuse in front, and with a differently formed clypeus and cephalic ornamentation."

Kour's types were from Kansas and Texas. The species is unknown in collections and does not seem to have since been recorded.

Subfamily AEGIALINAE

Mandibles and labrum distinctly visible beyond the clypeus; head more or less verrucose. Body usually winged but generally very feebly so. Legs stout and strongly fossorial; anterior tibiae very broad and with large external teeth; tarsi with a small bisetose onychium.

This subfamily contains the single genus, *Aegialia*. No species are recorded from either Oklahoma or Kansas, but it is probable that the two species given below occur in these states.

AEGIALIA Latreille.

1807. Latreille: *Genera Crustaceorum et Insectorum*, I, p. 86.
 1871. Horn: "Synopsis of Aphodiini of the United States,"
Trans. Am. Ent. Soc., III, pp. 284-297.
 1887. Horn: "A Monograph of the Aphodiini Inhabiting the
 United States," *Trans. Am. Ent. Soc.* XIV, pp
 1-110.
 1922. Dawson: "A Synopsis of the Scarabaeidae of Nebraska,"
University (of Nebr.) Studies, XXII, pp. 163-244.

Key to the Species

- A. Thorax with distinct basal marginal line. ----- *conferta*.
 AA. Thorax without basal marginal line. ----- *missinae*.

A. conferta Horn is known from Indiana, Illinois, Washington, Southern California, and Georgia, and *A. missinae* LeConte is recorded from Michigan, Massachusetts, and Nebraska.

Subfamily II. APHODIINAE

Species small and oblong, convex, or cylindrical in form. Clypeus expanded so as to entirely cover the oral organs; antennae 9-segmented, club 3-segmented. Epimera of metathorax covered. Pigidium entirely or partly covered by the elytra. Ventral segments six, free. Middle coxae oblique, contiguous; posterior tibiae each with two spurs; tarsus with a small bisetose onychium.

The species of this tribe live chiefly in excrements. Three of the nine North American genera are known to occur in Oklahoma and Kansas, and two others may be found in this region.

Key to Genera

- A. Head never roughly granulate; thorax not transversely grooved.
 B. Outer apical angle of hind tibia obtuse (pl. 2, fig. 1, 2, 5, 6).-----Aphodius.
 BB. Outer apical angle of hind tibia prolonged, spiniform. (pl. 4, fig. 3).-----Atacnius.
 AA. Head usually roughly granulate; thorax transversely grooved.
 B. Hind tarsi with triangular segments.-----Pannobius.
 BB. Hind tarsi with elongate, usually cylindrical joints.
 C. Thorax without scale-like marginal hairs; thoracic grooves short, lateral.-----Pleurophorus.
 CC. Thorax with scale-like marginal hairs; thoracic grooves entire.-----Thrasyna.

VII. APHODIUS Illiger.

1798. Illiger: *Kugeln und Verschiedenes der Käfer Preussens, etc.*, p. 15.
 1870. Horn: "Description of the Species of Aphodius and Dialytes of the United States," *Trans. Am. Ent. Soc.*, III, pp. 110 - 134.
 1887. Horn: "A Monograph of the Aphodiini Inhabiting the United States," *Trans. Amer. Ent. Soc.*, XIV, p. 1 - 110.
 1910. Schmidt: "Coleoptera Lamellicornia, Family Aphodiidae," *Gen. Ins.*, Fasc. 110, 185 pp., 3 pl.
 1910. Blatchley: *Coleoptera of Indiana*, pp. 927-935.
 1922. Dawson: "A Synopsis of the Scarabaeidae of Nebraska," *University (of Nebr.) Studies*, XXII, p. 163-244.

Head more or less convex, tuberculate or not, rarely roughly granulate; eyes not concealed. Thorax never transversely grooved, rarely broader than the elytra. Elytra simply striate, the intervals never costiform. Mesosternum carinate or not. Ventral segments free. Front tibiae strongly toothed on outer margin; hind tibiae usually with transverse carinae, the outer apical angle obtuse; hind tarsi with cylindrical segments.

Over a hundred species of *Aphodius* are found in North America, and twenty three of these are known from Oklahoma and Kansas. Two additional species that may occur in our territory are included in the following table.

Aphodius alternatus Horn is recorded from Lawrence in the Kansas lists. This species is extremely western in distribution, and the Kansas record, no doubt, is due to erroneous determination. *A. alternatus* is not included in the following table and descriptions.

In using the following tables, one must take care to correctly place old or worn specimens. The spinules at the apices of the hind tibiae, the front tibial spurs, the teeth of the fore tibiae, and the clypeus are often worn down or broken in old specimens. Some of the pubescent species often lose all of the elytral hairs except those on the sides near the apices.

The species naturally fall into several more or less well defined groups. Horn has designated these by letters, and the letters in the following table refer to Horn's arrangement. The descriptions are constructed with special reference to characters separating the species within the group. The key must be relied upon for the group characters. All of the Oklahoma and Kansas species belong to the subgenus *Aphodius*.

The species of *Aphodius* are among our most numerous scavengers. They occur in great numbers in the droppings of horses and cattle. Several species are on the wing in large numbers during the spring and fall, and a number of the species frequent electric lights.

Key to the Species

- A. Apices of hind tibiae fimbriate with short, equal spinules (pl. 2, fig. 2); head more or less tuberculate.
- B. Thorax with a distinct basal marginal line.
- C. Clypeus quadridentate (group A); posterior tibiae fimbriate internally with long hairs. ----- denticolatus.
- CC. Clypeus not quadridentate.
- D. Mesosternum not carinate between the coxae (group B).
- E. Clypeus angulate each side of emargination; color black. ----- abusus.
- EE. Clypeus subangulate each side of emargination; elytra reddish brown. ----- atrifidus.
- EEE. Clypeus broadly rounded each side of emargination.
- F. Thorax black; elytra red. ----- finestarius.
- FF. Both elytra and thorax blackish. ----- ruricola.
- DD. Mesosternum carinate between the coxae (group C).
- E. First segment of hind tarsus not longer than the two following; color entirely black. ----- granarius.
- EE. First segment of hind tarsus equal in length to the three following; elytra usually red and black. ----- vittatus.
- BB. Thorax without basal marginal line (group D). ----- lividus.
- AA. Apices of hind tibiae fimbriate with longer, unequal spinules (pl. 2, fig. 1); head tuberculate or not.
- B. Elytra opaque (group H). ----- lutulentus.
- BB. Elytra more or less shining.
- C. Thorax not narrower at base than at apex.
- D. Elytra not pubescent, or very slightly pubescent and with the fore tibiae punctate on their anterior faces (pl. 3, figs. 2,3); clypeus without a transverse ridge (group I).
- E. Side margins of thorax usually explanate; a broad, shallow depression just before each hind thoracic angle and thorax with very large, shallow punctures in our species.
- F. Side margins of thorax explanate; large thoracic punctures confined to the sides; gense at least moderately prominent.
- G. Elytral intervals impunctate.

- H. Clypeus without trace of granules.-----halderani.
- HH. Clypeus distinctly granulate.-----lexensis.
- GG. Elytral intervals very distinctly punctate.-----oklahomensis.
- FF. Side margins of thorax not explanate; entire surface of thorax with large punctures; genae scarcely prominent, very obtuse.-----gamborai.
- EE. Side margins of thorax not explanate; thorax without depressions before the hind angles; thoracic punctures not unusually large.
- F. Front tibiae punctate on their anterior faces; first segment of anterior tarsus longer than the second.
- G. Posterior tibiae stout (pl. 2, fig. 6); first segment of posterior tarsus not as long as the three following.-----rubeolus.
- GG. Posterior tibiae slender (pl. 2, fig. 5); first segment of posterior tarsus longer than the three following.-----stercorosus.
- FF. Anterior faces of front tibiae impunctate.
- G. Species never in any part black.
- H. Upper tooth of anterior tibia normal in size; species larger.
- I. Color uniformly reddish or pale reddish brown; length 4.5 - 6.5 mm.-----concolor.
- II. Color yellowish testaceous the thorax and suture slightly darker; length 4.5 - 5 mm.-----concoloratus.
- HH. Upper tooth of anterior tibia very small (pl. 3, fig. 4); size small; 3-3.5 mm.-----humani.
- GG. Species with head and thorax black, color of other parts variable.
- H. Clypeus distinctly angulate each side of emargination.
- I. Elytra entirely black.-----bicolor.
- II. Elytra yellow maculate, with black.-----serval.
- HH. Clypeus broadly rounded each side of emargination.
- I. Elytra yellow maculate with black.-----distinctus.
- II. Elytra entirely black, the apices usually paler.-----terminalis.
- DD. Elytra more or less pubescent; fore tibiae smooth

on their anterior faces except in *A. tenuistriatus* Horn in which the pubescence is very conspicuous (pl. 3, fig. 1)

E. Genae at least moderately prominent; head and thorax largely black.

F. Elytra entirely yellow, merely the suture darker. ----- ~~subtruncatus.~~

FF. Elytra clouded with fuscous.

G. Sides of thorax fimbriate with rather long hair; elytral intervals finely punctured. ----- ~~walshii.~~

GG. Sides of thorax not fimbriate; elytral intervals coarsely punctured. ----- ~~laevigata.~~

HH. Genae not at all prominent (pl. 2, fig. 3); entire surface ferruginous. ----- ~~tenuistriatus.~~

GG. Thorax narrower at base than at apex; humeri of elytra dentiform (group M.) ----- ~~shannoni.~~

13112. *Aphodius dentigulatus* Haldeman.

1843. Haldeman: "Descriptions of North American Coleoptera," Jour. Ac. N. S. Phila. (2). P. 104.

Oblong, slightly broader posteriorly; piceous, shining, the clypeal and elytral margins, underside, and legs brownish, the abdomen paler; entire margin fimbriate with yellowish hairs. Head rather coarsely punctate; frontal suture elevated; clypeus transversely carinate at middle, broadly emarginate at middle in front, on each side toothed and with another tooth externally; genae moderately prominent obtuse. Thorax narrower than the elytra, slightly narrowed in front; surface sparsely covered with evenly disposed large and small punctures. Elytra a little wider behind the middle; rather deeply striate, the striae distinctly but not closely punctured; intervals slightly convex, very finely alutaceous, and with fine punctures very sparsely placed near the striae. Mesothorax not carinate between the coxae. Metathorax and abdomen sparsely punctured. Anterior tibiae strongly tridentate, coarsely serrate above the teeth. Posterior femur with a row of punctures along the posterior margin near apex. First segment of posterior tarsus not longer than the two following. Length 6.4 - 6.8 mm.; width 2.8 - 3 mm.

Male. -- Head less densely punctured, the elevations more prominent. Anterior tibial spur stouter. Upper spur of middle tibia less than one-third the length of the lower.

Female. -- Head more closely punctured, the elevations less prominent. Anterior tibial spur slender. Upper spur of middle tibia half as long as the lower.

Specimens examined; 3 males, one of which was collected in Gove County, Kansas. The remaining two are labeled "Kansas." All of the specimens are without date labels. The species is western in distribution and does not extend very far eastward into Kansas. It will undoubtedly be found in western Oklahoma.

13117. *Anhedina albana* Fall.

1907. Fall: "The Coleoptera of New Mexico," Trans. Am. Ent. Soc., XXXIII, p. 242.

Oblong, robust, strongly convex, slightly broader posteriorly; black, shining, legs dark reddish brown. Head trituberculate, roughly punctate-rugose before the tubercles, punctate behind them; clypeus broadly emarginate, an acute, moderately reflexed tooth each side of the emargination; genae very prominent but obtuse. Thorax almost as wide as elytra at base, somewhat narrowed in front; the surface covered with rather coarse and sparse, unequal punctures which are closer along the sides, especially near the front angles. Elytra slightly inflated, rather deeply striate, the striae crenately, not closely punctured; intervals slightly convex, finely and very sparsely punctate. Metathorax and femora sparsely punctate. Abdomen strongly glutaceous, subopaque. Anterior tibiae serrate above the teeth. First segment of posterior tarsus shorter than the two following. Length 4-5 mm.; width 2 - 2.7 mm.

No sexual characters have been observed.

Specimens examined; 103, from Payne County, Oklahoma, and Finney County, Kansas. The Oklahoma specimens were taken from April 8 to May 5, 1924. They were most abundant in dung on sandy soil and occurred with *furiosa*, *granaria*, and *vitulina*. The species will probably be found throughout the western parts of both our states but is undoubtedly more abundant in Oklahoma.

13119. *Anhedina finetaria* Linnaeus.

1758. Linnaeus; Systema Naturae, ed. 10, Holmiae, I, p. 348.

Oblong oval, strongly convex; black, shining, elytra red, legs dark reddish brown, the tarsi paler. Head sparsely and finely punctate, somewhat rugose in front; front trituberculate; clypeus with a transverse carina, broadly emarginate at apex and broadly rounded on each side; genae prominent and very obtuse. Thorax very convex, a reddish yellow space at each front angle; surface with very large, sparsely and irregularly placed punctures with very fine punctures intersixed. Elytra almost parallel, rather deeply striate, the striae coarsely punctured; intervals finely and sparsely punctate. Body beneath sparsely punctate, the punctures becoming dense at the sides of the metasternum. Anterior tibiae serrate above the teeth. First segment of posterior tarsus equal to the three following. Length 7-8.2 mm.; width 3.8 - 4.2 mm.

Male.-- Frontal tubercles more prominent. Thorax convex, a large shallow depression just behind middle of front margin. Anterior tibial spur stouter. Upper spur of middle tibia stout, less than half the length of the lower.

Female.-- Frontal tubercles less prominent. Thorax smaller and less convex, not impressed in front. Spur of anterior tibia slender. Upper spur of middle tibia half as long as the lower.

Specimens examined; 138, from Payne and Pawnee Counties, Oklahoma, and Douglas, Gove, and Logan Counties, Kansas. The species is one of our most abundant beetles and probably occurs throughout both states. It occurs in the adult state almost throughout the year, being least common in August and the latter part of July. The winter is spent in old manure and beneath cover of other kinds. *A. fuscicornis* is a native of Europe and has been introduced into our country.

Aphodius putridus Herbst is said by Horn to occur from the Atlantic coast to Colorado and New Mexico. Therefore it may be found in our territory.

13127. *Aphodius fuscicornis* Melshöimer, (pl. 3, fig. 2).

1846. Melshöimer: "Descriptions of New Species of Coleoptera of the United States," Proc. Ac. N. S. Phila., II, p. 136.

Oblong oval, very convex; piceous or dark reddish brown, the abdomen, sometimes the clypeal margin, and the elytral margins paler. Head sparsely punctate, more or less rugose in front; front distinctly trituberculate; clypeus broadly emarginate at middle, obtusely rounded on each side; genae feebly prominent, very obtuse. Thorax very convex, somewhat narrowed in front; surface with sparse, intermixed punctures which are closer near the angles. Elytra rather deeply striate, the striae crenately punctured; intervals feebly convex, very finely and sparsely punctulate. Metasternum and abdomen sparsely punctate. Anterior tibiae serrate above the teeth. Posterior femora very finely and sparsely punctate. First segment of posterior tarsus a little longer than the two following. Length 4.2 - 5.5 mm.; width 2.3 - 2.8 mm.

Male.-- Frontal tubercles more prominent. Thorax slightly larger. Spur of anterior tibia slightly stouter.

Female.-- Frontal tubercles less prominent. Thorax slightly smaller. Spur of anterior tibia a little more slender.

Specimens examined; 78, from Payne and Pawnee Counties, Oklahoma, and Douglas and Morris Counties, Kansas, taken during April, May, June, October, and November. The species is also recorded from Saline County in the Kansas Lists. It is one of our commonest species of *Aphodius* and is widely distributed.

13131. *Aphodius granarius* Linnaeus.

1767. Linnaeus: *Systema Naturae*, ed. 12, I, 2, p. 547.

Oblong, oval, convex; piceous, the legs paler, shining. Head trituberculate, punctate-rugose in front, sparsely punctured behind; clypeus with a very feeble transverse ridge, very broadly emarginate at apex, broadly rounded each side; genae very feebly prominent and very obtuse. Thorax convex, slightly narrowed in front; surface with sparse large and small punctures. Elytra striate, the striae crenately punctured; intervals slightly convex, finely and very sparsely punctulate, the first interval as wide or wider than the second. Metasternum and femora almost smooth. Abdomen subopaque, rugulose. Anterior tibia more or less serrate above the teeth. First segment of posterior tarsus slightly shorter than the two following. Length 4.3 - 5.2 mm.; width 2 - 2.3 mm.

Male.-- Frontal tubercles prominent. Thorax larger, more convex; surface more sparsely punctate, almost smooth on the disc.

Anterior tibial spur stouter.

Female.-- Frontal tubercles less prominent. Thorax smaller, less convex; surface with the punctures less sparse than in the male. Anterior tibial spur more slender.

Specimens examined; 63, from Payne and Pawnee Counties, Oklahoma, and Douglas, Clark, and Hamilton Counties, Kansas, taken from January to June inclusive. The species probably occurs throughout both our states. It is one of our commonest species of *Aphodius* and was introduced into this country from Europe.

13132. *Aphodius vittatus* Say.

1825. Say: Jour. Ac. N. S. Phila., V, p. 191.

Oblong oval, convex; black, shining; the elytra usually with the disc reddish, the suture and the margins blackish, rarely almost entirely red or black; legs dark brown, the tarsi paler. Head alutaceous, sparsely and finely punctate; front trituberculate; clypeus very feebly, broadly emarginate, very broadly rounded each side of the emargination; genae very feebly prominent. Thorax convex, slightly narrowed in front; surface rather closely punctate, the punctures unequal in size and regularly distributed. Elytra parallel; finely alutaceous; rather deeply striate, the striae crenately punctate; intervals flat, sparsely and finely punctate. Body beneath alutaceous and finely, sparsely punctate. Middle and posterior femora very finely and sparsely punctate. Anterior tibiae obsolete serrate above the teeth. First segment of hind tarsus equal in length to the three following. Length 3.8 - 4.8 mm.; width 1.7 - 2.1 mm.

Male.-- Frontal tubercles somewhat more prominent. Spur of anterior tibia slightly stouter.

Female.-- Frontal protuberances less prominent. Spur of anterior tibia more slender.

Specimens examined; 49, from Payne and Pawnee Counties, Oklahoma, and Douglas County, Kansas, taken during April, May, and June. The species is recorded from western Kansas in the Kansas lists and is probably more abundant in the western parts of both states than in the eastern sections. As will be seen from the above description, the elytra are quite variable in coloration.

13134. Aphodius lividus Oliver.

1790. Oliver: Entomologie, II, Paris, p. 66.

Oblong, oval, convex; brownish yellow, the posterior part of entire head, disc of thorax, scutellum, and sutural intervals of elytra brown; surface shining. Head moderately punctate; front trituberculate; clypeus emarginate, broadly rounded each side; genae feebly prominent, obtuse. Thorax convex, slightly narrowed in front; surface with a few very coarse punctures and with very fine punctures intermixed. Elytra almost parallel; rather deeply striate, the striae crenately punctured; intervals almost flat, very finely and sparsely punctate. Body beneath brown or brownish yellow, very finely and sparsely punctate. Mesosternum not carinate between the coxae. Hind femora stout, very finely and sparsely punctate. First segment of hind tarsus slightly longer than the two following. Length 4 - 4.5 mm.; width 2 - 2.2 mm.

Male.-- Frontal tubercles more prominent. Thorax larger, more sparsely punctured, more convex. Anterior tibial spur slightly stouter. Upper spur of middle tibia slightly shorter.

Female.-- Frontal tubercles less prominent. Thorax somewhat smaller, less sparsely punctured, less convex. Anterior tibial spur more slender. Upper spur of middle tibia slightly longer.

Specimens examined; 53, from Payne County, Oklahoma, and Douglas, Jackson, and Franklin Counties, Kansas, taken during May, June, July, August, September, and October. The species was introduced into our country from Europe. It is quite common in our territory and is attracted to electric lights. It prefers manure that is on bare soil.

13147. Aphodius lutulentus Haldeman (pl. 2, fig. 4).

1842. Haldeman: Proc. Ac. N. S. Phila., I. p. 304.

Oblong, moderately elongate, convex; black, subopaque, humeri and elytral apices sometimes reddish. Head densely and evenly punctate, the punctures moderate in size; front rather feebly trituberculate; clypeus broadly and shallowly emarginate, acutely angulate each side of the emargination; genae very prominent but obtuse. Thorax variable in the sexes; densely, not coarsely, evenly punctate, the median line impunctate for a short distance of the disc. Elytra at base not wider than the thorax; humeri slightly dentiform; disc striate, the striae crenately punctured; intervals flat, longi-

tudinally strigose and coarsely, sparsely punctate. Body beneath and femore finely, sparsely punctured. Mesosternum not carinate between the coxae. Abdomen alutaceous. First segment of hind tarsus subequal in length to the two following. Length 5.6 - 7.6 mm.; width 2.7 - 3.4 mm.

Male.-- Frontal tubercles somewhat more prominent. Thorax with sides parallel and arcuate near the front angles, feebly shining, the punctures slightly sparser at middle. Spur of anterior tibia subequal in length to the first four tarsal segments, very stout and broad. Upper spur of middle tibia very stout, obtuse. Posterior edge of hind femur very broadly and obtusely angulate. Posterior tibiae broad and flat, the transverse ridges feebly indicated.

Female.-- Frontal tubercles somewhat less prominent. Thorax gradually narrowed in front, opaque, the punctures not less dense at middle. Spur of anterior tibia slightly longer than the two basal tarsal segments, slender. Upper spur of middle tibia slender, longer, and pointed. Hind femora and hind tarsi unmodified.

Specimens examined; 56, from Payne County, Oklahoma, taken during October, November, December, and January. The species was found only in dung on the hard soil of open pastures. The two specimens taken during December and January were apparently attempting to overwinter in old manure.

Fresh specimens of this species are sparsely pubescent, but most cabinet specimens are without hairs. The sexual characters are remarkable. Horn writes that he has seen specimens without the clypeal emargination and angulation.

13160. Anhodius iowensis Wickham.

1913. Wickham: "New North American Elateridae and Scarabaeidae," *Psyche*, XX, p. 28.

Oblong, moderately elongate, more parallel and less convex than usual. Head and thorax black, the lateral margins rufopiceous; scutellum black; elytra reddish castaneous; body beneath piceous; legs reddish castaneous. Head subobsoletely trituberculate; sparsely and very finely punctate behind the tubercles; anteriorly rather finely and sparsely granulate, the granules becoming coarser apically; clypeus broadly and rather feebly emarginate, very broadly rounded each side of the emargination; genae prominent, obtuse. Prothorax moderate-

ly convex; scarcely narrowed anteriorly; lateral margin rather broadly explanate; sides sparsely punctate, the punctures shallow and very large, closer near the margins and cribrate in the broad impression before each hind angle, a few very fine and indistinct punctures intermixed; disc impunctate at middle; basal marginal line absent. Clypeus slightly broader behind; finely and sharply striate, the striae closely punctured; intervals flat, impunctate. Mesosternum not carinate between the coxae. Metasternum sparsely punctate. Abdomen rather closely punctate, alutaceous. Hind femur with a short row of coarse punctures near the apex. First segment of hind tarsus not as long as the three following. Length 7.6 - 8 mm.; width 3.6 mm.

Male.-- Thorax less closely punctate on the sides. Anterior tibial spur stout, slightly broader at middle, strongly curved. Minor spur of middle tibia short, curved and truncate at the apex where it is slightly broader. Middle and posterior femora each with a densely hairy space on basal half of posterior margin.

Female (allotype).-- Thorax somewhat more closely punctate on the sides. Anterior tibial spur rather long, slender, gradually tapering to apex, strongly curved. Minor spur of middle tibia slightly longer, gradually tapering to the apex which is acute. Middle and posterior femora without hairy areas.

Specimens examined; 3, from Douglas County, Kansas. One, a male, is without date. Its determination was verified by Professor Wickham. The other, a female and the allotype, was found crawling on a sidewalk in Lawrence on November 20, 1923. It differs from the original description of the species in the structure of the minor spur of the middle tibia and from the male at hand in that and the other character given in the above description of the female.

A. iowensis should not be separated in Leng's catalog from the other species having the lateral thoracic margins explanate. It is very closely allied to brevicollis LeConte and should immediately follow that species in the catalog.

In the original description of iowensis, the mesosternum is said to be "bluntly carinate between the coxae." In both the specimens at hand the mesosternum is without a visible carina.

-----, *Aphodius oklahomensis* n. sp.

Oblong, moderately elongate and convex. Head black, the clypeal margins broadly rufescent on the sides and more narrowly so at apex; thorax black, the lateral margins rufescent, most broadly so near the front angles; elytra dark rufescent, the humeri and apices paler; meso- and metathorax black; abdomen, femora, and tarsi testaceous-rufous, the tibiae darker; entire surface strongly shining. Head moderately convex, without trace of tubercles; surface with very sparse, extremely fine punctules which gradually disappear apically on the clypeus and become more distinct and less sparse on the vertex; genae rather closely and finely punctate; clypeus without granules. Clypeus anteriorly with a broad, shallow, rounded emargination, the angles on each side very broadly rounded; sides of clypeus very feebly arcuate, strongly divergent posteriorly; genae prominent but obtuse. Thorax moderately convex, about three-fourths as long as wide; slightly narrowed in front, the margins moderately arcuate and rather broadly explanate; front angles obtuse; hind angles very broadly rounded but distinct; base rather strongly arcuate, without marginal line. Thoracic disc impunctate at middle; sides with rather close, very large punctures which extend further internally on the basal half and which are vibrata along the basal two-thirds of the lateral margins and in the broad depression before each hind angle; region between the area of large punctures and the impunctate area with sparse, very fine punctures which disappear gradually medially. Scutellum small, finely punctate at base. Elytra at base a little narrower than the prothorax, gradually wider posteriorly to slightly behind middle and then arcuately converging to apex; humeri obtuse; surface finely and sharply striate; striae closely punctured, the punctures separated by distance subequal to their diameters; intervals almost flat, sparsely and finely punctate. Mesosternum opaque, coarsely alutaceous medially, punctate-rugose on each side and between the coxae; intercoxal portion feebly convex. Metasternum sparsely punctate at middle, densely so on the sides. Abdomen alutaceous, sparsely clothed with short yellowish hairs; surface punctate, the punctures moderately close and coarse, dense at the sides. Femora with very sparse, rather indistinct, fine punctures. Anterior tibia strongly tridentate externally, rather feebly serrulate above the upper tooth, the spur rather slender and rather strongly curved. First segment of anterior tarsus much shorter than the second. Minor spur of middle tibia about one-half as long as the major, acute at apex. Posterior tibiae fibrillate at apex with unequal spinules. First segment of posterior tarsus almost as long as the three following. Length 7 mm.; width 3.5 mm.

Holotype: "Payne County, Oklahoma, XI-16-1923, W. J. Brown; taken on the wing."

The form of the spurs of the anterior and middle tibiae make it

probable that the specimen is a female. In color oklahomensis resembles lowensis quite closely but is immediately distinguished from that species by the sculpture of the head and elytra. The species seems most closely allied to depressinaculus but differs in the sculpture of the head and thorax.

13153. Aphodius haldemani Horn.

1887. Horn: "A Monograph of the Aphodiini Inhabiting the United States," Trans. Am. Ent. Soc., XIV, p. 33.

Oblong, more parallel and less convex than usual. Head and thorax black, the margins dark rufo-testaceous; scutellum black; elytra reddish castaneous; body beneath black; abdomen rufo-testaceous; legs reddish castaneous; surface strongly shining. Head very sparsely and finely, indistinctly punctulate; front without trace of tubercles; clypeus broadly and rather feebly emarginate, very broadly rounded each side; genae prominent, obtuse. Thorax moderately convex; slightly narrowed in front; lateral margins rather broadly explanate, more broadly so near the hind angles where there is a broad, shallow depression on each side; surface with large, shallow punctures near the lateral margins, the punctures becoming dense in the depressions and extending medially for a short distance along the base; basal marginal line absent. Elytra parallel slightly narrower than the thorax at base; very feebly striate, the striae with fine close punctures; intervals flat, impunctate. Mesosternum not carinate between the coxae. Metathorax punctured at sides, smooth at middle. Abdomen closely punctate. Hind femur with a row of coarse punctures near the apex, punctate along the hind margin near base. First segment of hind tarsus subequal in length to the three following. Length 8.9 - 9.3 mm.; width 4.3 - 4.6 mm.

Male.-- Anterior tibial spur elongate, triangular, broadest and truncate at apex. Punctured areas on basal two-thirds of hind margins of middle and hind femora densely hairy. Minor spur of middle tibia one-half as long as the long spur, broadest and truncate at apex.

Female.-- Anterior tibial spur stout, curved, acute at apex. Punctured areas on basal two-thirds of hind margins of middle and hind femora not hairy. Minor spur of middle tibia more than one-half as long as the long spur, acute at apex.

Specimens examined; 3, from Lawrence and Onaga, Kansas. The

Lawrence specimen was taken on the wing November 29, 1922. One of the Onaga specimens bears the date October 14, 1906. The species is also known to occur in Texas. It is very rare and is notable for its large size and highly polished surface. The punctures of the head are not visible in old or dirty specimens.

The specimens from which the above description was drawn agree very well with Horn's description of haldemani except as to color. In his key Horn describes the color as "entirely rufo-ferruginous" and in the original description as "rufo-testaceous". It is therefore possible that the specimens at hand are not the true haldemani.

The Onaga specimens were collected by Mr. Grevecoeur who writes in a letter that he was given the name haldemani for the species by Mr. Hugo Kahl about twenty years ago.

-----, Aphodius sanborai n. sp.

Oblong, moderately elongate, convex. Head black, the clypeal margins rather broadly testaceous-rufous; thorax black, the anterior angles beneath and abdomen blackish; legs rufo-castaneous; thorax beneath and abdomen blackish; legs rufo-castaneous; entire surface strongly shining. Head moderately convex; not tuberculate; surface rather finely and sparsely punctate, the punctures coarser and closer on the vertex; pale margin of clypeus sparsely and finely granulate. Clypeus anteriorly moderately deeply emarginate, the emargination broad and rounded, the angles on each side broadly rounded; sides of clypeus feebly arcuate, strongly divergent posteriorly; genae very feebly prominent and very obtuse. Thorax moderately convex; about three-fourths as long as wide; very slightly narrowed in front, the side margins converging in apical third and with a distinct sinuation on basal third; margins not explanate; front angles obtuse; hind angles very broadly rounded but distinct; basal marginal line fine but very distinct. Entire disc of thorax with very large, shallow, irregularly spaced punctures with sharp, fine punctures sparsely intermixed, the former becoming cribrate

before the hind angles where there is a large, shallow depression on each side. Scutellum small. Elytra at base a little narrower than the prothorax, only slightly broader behind; humeri obtuse; surface finely and sharply striate, the striae rather closely punctate; intervals flat, finely and sparsely but distinctly punctate. Mesosternum densely punctate, the process between the coxae impunctate and broadly and feebly convex anteriorly. Metasternum punctate, finely and sparsely so at middle, closely and coarsely on the sides; an impunctate, alutaceous area on each side along the posterior margin. Abdomen alutaceous, coarsely and closely punctured on the sides, base, and apex; impunctate medially; surface sparsely clothed with brownish yellow hairs. All the femora finely and sparsely punctate, most of the punctures of the posterior feeble and indistinct. Anterior tibia very strongly tridentate externally, rather feebly serrulate above the upper tooth; the spur slender, slightly curved, and very acute at apex. First segment of anterior tarsus very much shorter than the second. Minor spur of middle tibia slender, acute at apex, more than half as long as the long spur. Posterior tibia fimbriate at apex with unequal spinules. Hind tarsus rather elongate, slender, the first segment almost as long as the three following. Length 5.4 mm.; width 2.7 mm.

Holotype: "Payne County, Oklahoma, XI-9-1923, W. J. Brown; taken on the wing."

The specimen is very probably a female as the spurs of the fore and middle tibiae show no sexual modification. It was taken just south of Stillwater.

The species is placed in series I-a because of the general facies, the sculpture of the head, and the puncturation of the thorax, which are of the same general type as is found in iovensis, brevicollis, and oklahomensis. Besides, the depressions before the hind thoracic angles are characteristic of that series.

A. senborni is not at all closely allied to any of the species with explanate thoracic margins but has most in common with discrepansigulus and oklahomensis. It should immediately follow the species of series Ia in our lists.

The situation of the basal third of the thoracic side margin is somewhat like that found in luxatus, a species which approaches sanhorni in no other way. By Horn's tables, sanhorni runs to couplet five of series I-d but it is not at all closely allied to any of the species of that couplet. The color of sanhorni is much like that of ionensis. To the best of my knowledge, sanhorni resembles no described North American species in the form and sculpture of the thorax which is very characteristic.

It gives me pleasure to dedicate this species to Professor C. R. Sanborn under whose supervision this paper has been prepared and who has been of much aid to me in my study of the Scarabaeidae.

13159. Ashodius rubeolus Beauvois (pl. 2, fig. 6; pl. 3, fig. 3).
1805. Beauvois: Insectes recueillis en Afrique et en
Amerique, Paris, p. 90.

Oblong, oval, convex; rufo-ferruginous, shining; head, thorax, and sutural intervals of elytra darker. Head sparsely, finely, and evenly punctate; front not tuberculate; clypeus broadly and feebly emarginate, broadly rounded each side of the emargination; genae scarcely prominent, obtuse. Thorax convex, narrowed in front; surface at middle very sparsely and finely punctulate, the punctules becoming more numerous on the sides where coarse punctures are sparsely intermixed; basal marginal line distinct. Elytra almost parallel; finely but distinctly striate, the striae with fine well spaced punctures; intervals flat, very finely and sparsely punctulate; a few short, yellowish hairs near lateral margin on apical half. Mesosternum distinctly carinate between the coxae. Metasternum and hind femora very finely and sparsely punctulate, the latter very broad. Anterior tibiae punctate on their anterior faces. First anterior tarsal segment shorter than the second. Posterior tibiae stout. First segment of hind tarsus distinctly shorter than the three following. Length 3.2 - 4 mm. ; width 1.5 - 2 mm.

No sexual characters have been observed.

Specimens examined: 56, from Payne County, Oklahoma, and Douglas and Hamilton Counties, Kansas, taken during April, May, June and

August. The species undoubtedly occurs throughout both states. Its color is somewhat variable. It prefers dung on sandy soils and frequents electric lights. The species is quite common.

The basal marginal line of the thorax and the pubescent spaces of the elytra are characters which were overlooked by Horn. The former has been noted by Blatchley. The elytral hairs are frequently absent in old cabinet specimens but are always conspicuous in newly collected material.

The long basal segment of the anterior tarsus and the punctate faces of the fore tibiae are very unusual characters. They are found only in two other Oklahoma and Kansas species of *Aphodius*, namely, *stercorosus* and *ternistratus*.

13162. *Aphodius stercorosus* Melchaiser (pl. 2, fig. 5; pl. 3, fig. 2).
1844. Melchaiser: Proc. Ac. N. S. Phila. II, p. 136.

Oblong, oval, convex; rufo-testaceous, shining; head and thorax darker, elytra more or less clouded. Head sparsely, finely, and evenly punctate; front not tuberculate; clypeus broadly, feebly emarginate, broadly rounded each side of the emargination; genae scarcely prominent, obtuse. Thorax convex; slightly narrowed in front; surface at middle very finely and sparsely punctulate, the punctures becoming more numerous, coarser, and intermixed on the sides; base without marginal line. Elytra almost parallel; finely striate, the striae with fine and well spaced punctures; intervals flat and very finely, sparsely, and indistinctly punctulate. Mesosternum carinate between the coxae. Metasternum almost impunctate. Anterior tibiae punctate on their anterior faces. First anterior tarsal segment longer than the second. Hind femora less broad than in the preceding species. Posterior tibia slender. First segment of posterior tarsus distinctly longer than the three following. Length 3.6 - 4 mm.; width 1.6 - 2 mm.

Male.-- Thorax less coarsely and sparsely punctured than in the female.

Female.-- Thorax more sparsely and coarsely punctured than in the male.

Specimens examined; 34, from Payne and Pawnee Counties, Oklahoma, and Douglas County, Kansas, taken during April and May. The species is recorded from "eastern Kansas" in the Kansas lists. It seems to be somewhat less common than rubeolus with which it occurs. The color is somewhat variable.

Horn states that the punctures of the head and elytral striae are less conspicuous in the male than in the female and that "the sides of the elytra near the apex are slightly pubescent". These characters are not observable in the specimens at hand.

13164. Anhodius ruficornis Say.

1823. Say! Jour. Ac. N. S. Phila., III, p. 214. LeConte ed., II, p. 138.

Oblong, rather elongate, convex; uniform rufo-ferruginous, shining. Head impunctate at middle, posteriorly and laterally with very sparse, fine, subobsolete punctures, the punctures distinct along the posterior border; front not tuberculate; clypeus broadly and feebly emarginate, rounded on each side of the emargination; genae feebly prominent, obtuse; margins of head fimbriate with rather short, thick, reddish brown hairs except in the clypeal emargination. Thorax convex, slightly narrowed in front, the sides almost parallel posteriorly, the margins finely fimbriate; surface very finely, indistinctly, and sparsely punctate, the sides with coarser punctures which are more sparsely placed than the fine; basal marginal line very fine. Elytra almost parallel; deeply striate, striae with sparse and fine punctures; intervals convex, impunctate. Mesosternum not carinate between the coxae. Metasternum with fine and very sparse punctures at middle, coarsely and more closely punctate on the sides. Abdomen coarsely, rather closely punctate. Posterior femur with a row of coarse punctures near the apex. First segment of posterior tarsus subequal in length to the three following. Length 7.2 - 9.5 mm.; width 3.2 - 4.6 mm.

Male.-- Anterior tibial spur somewhat stouter and shorter. Upper spur of middle tibia shorter and broad at apex. Coarse thoracic punctures much less dense and not ascending nearly so far onto the disc.

Female.— Anterior tibial spur somewhat more slender and longer. Upper spur of middle tibia longer and coming gradually to a point at apex. Coarse thoracic punctures denser and absent only from a narrow median space.

Specimens examined; 26, from Payne County, Oklahoma, and various parts of Kansas, taken during April, May, and June. The species probably occurs throughout both states. It is never found in the droppings of animals as are most of our species of the genus. It is sometimes seen on the wing but is most commonly collected at electric lights.

13170. Anobium consuetanum LeConte.

1850. LeConte: Agassiz Lake Superior, Boston, p. 255.

Moderately elongate, parallel, convex; yellowish testaceous, the thorax and suture slightly darker. Head sparsely punctate, the middle of the front almost deprived of them; intervals finely alutaceous; front not tuberculate; clypeus hemihexagonal, very feebly emarginate, broadly rounded each side; gnaea slightly prominent, obtuse; margin not finchiate. Thorax moderately convex, slightly narrowed in front; entire surface sparsely punctate, the intervals finely alutaceous; base with a fine marginal line. Elytra with disc rather deeply striate, the striae finely and crenately punctured; intervals convex, alutaceous, sparsely and finely punctulate. Body beneath sparsely punctulate. Mesosternum not carinate between the coxae. Posterior femora very sparsely punctate. First segment of posterior tarsus not as long as the three following. Length 4.5 - 5 mm.

Male.— Anterior tibial spur shorter, stouter, and strongly curved. Thorax less distinctly punctate.

Female.— Anterior tibial spur longer, less stout, and not strongly curved. Thorax more distinctly punctate.

No specimens of the species are at hand or were observed in any of the collections of Oklahoma and Kansas species studied. The above description is modified from that of Horn who writes that the species "occurs from Canada to Missouri, Kansas, and New Mexico, but not common." The species is recorded in the Kansas lists solely on

the authority of the above statement.

13174. Aphodius knausi Fall (pl. 3, fig. 4).

1905. Fall: "Two New Species of Aphodius," Ent. News, XVI, p. 130.

Oblong, moderately elongate, convex. Pale yellowish testaceous; disc of head and thorax irregularly infuscate; elytra each with sutural interval, an oblique broad band, and sometimes a sub-humeral and a subapical spot fuscous. Head almost invisibly punctate; front without trace of tubercles; clypeus very broadly and shallowly emarginate, broadly rounded on each side; genae slightly prominent, obtuse. Thorax convex; very slightly or not at all narrowed in front; side margins fimbriate anteriorly with rather long hairs; surface coarsely covered with intermixed punctures; basal marginal line strong. Elytra slightly wider posteriorly; rather deeply striate, the striae very faintly punctulate; intervals convex, alutaceous, sparsely and feebly punctulate. Mesosternum not carinate between the coxae. Anterior tibia tridentate externally, the upper tooth small. First segment of posterior tarsus subequal in length to the three following. Length 3 - 3.6 mm.; width 1.6 - 1.8 mm.

No sexual characters have been observed.

Specimens examined; 12, from Englewood and Medora, Kansas. The type material came from Englewood and was collected there on June 26, about twenty years ago. According to Mr. Knaus, the collector, the species was abundant. On the night of July 14, 1924, Mr. Knaus again found the species, this time at Medora where it came to his light. The above are the only records of its being collected.

The dark markings of the elytra are variable in extent and in some examples are even subobsolete.

13180. Aphodius bicolor Say (pl. 3, fig. 5).

1823. Say: Jour. Ac. N. S. Phila., III, p. 212. LeConte ed., II, p. 136.

Oblong, moderately elongate, convex; black, shining, body beneath and legs yellowish; estaceous. Head with moderately coarse and close punctures which are finer and sparser at middle; fimbriate at sides; front without tubercles; clypeus broadly and rather deeply emarginate, the angles on each side obtuse but distinct; genae rather prominent, obtuse. Thorax convex; slightly narrowed in front; surface moderately coarsely punctate, the punctures intermixed and at the sides denser; basal marginal line strong. Elytra subparallel; rather deeply striate, the striae crenately punctured; intervals feebly convex, sparsely and finely punctate. Mesosternum not carinate between the coxae. Metasternum finely punctate, the punctures very sparse at middle, close at the sides. Abdomen with moderately close and coarse punctures. First segment of posterior tarsus equal in length to the three following. Length 5.7 - 6.8 mm; width 2.8 - 3 mm.

Male.-- Anterior tibial opposite the upper tooth. Thorax slightly less densely punctured. Middle and posterior femora conspicuously fimbriate posteriorly.

Female.-- Anterior tibial spur opposite the middle tooth. Thorax slightly more densely punctured. Middle and posterior femora not conspicuously fimbriate.

Specimens examined; 178, from Payne County, Oklahoma, and Douglas county, Kansas, taken during October, November, and January.

The species occurs abundantly in human feces as well as in the droppings of animals. Those taken in January were flying to human feces. It is probably that bicolor flies and feeds on warm days throughout winter. It should also be found during the spring months.

According to Horn, occasional specimens have the alternate intervals beginning with the third with small, round, reddish yellow spots, and sometimes the base and scutellar region is pale. He also states that in the female the legs are not fimbriate, but in the specimens examined the femora were sparsely fimbriate in the female, and the posterior tibiae of the female were fimbriate like those of the male. A. bicolor is readily distinguished from other Oklahoma and Kansas species by the dark dorsum and pale undersurface.

The position of the anterior tibial spur of the male is also characteristic of the species.

13182. Aphodius seryal Say.

1835. Say! Boston Jour. Nat. Hist., I, p. 177. LeConte ed., II, p. 651.

Oblong, moderately elongate, convex. Head, thorax, and body beneath black; abdomen and legs paler; elytra yellow maculate with black; surface shining. Head pale at sides; roughly punctate-rugose in front; rather coarsely and closely punctate posteriorly; front subobsoletely trituberculate; clypeus moderately emarginate, the angles on each side distinct and reflexed; genae moderately prominent, obtuse. Thorax pale at the front angles; slightly narrowed in front; surface punctate, the punctures somewhat unequal, sparse medially, close and coarse at the sides; basal marginal line distinct. Elytra slightly wider posteriorly; rather deeply striate, the striae not closely punctured; intervals flat, sparsely and rather finely punctate. Mesosternum not carinate between the coxae. Metasternum and abdomen punctate, the latter alutaceous. Posterior femora sparsely punctulate. First segment of posterior tarsus nearly as long as the three following. Length 3.8 - 4.4 mm.; width 2.8 - 3.1 mm.

Male.-- Anterior tibial spur somewhat longer.

Female.-- Anterior tibial spur a little shorter.

Specimens examined; 178, from Payne County, Oklahoma, and Douglas and Gove Counties, Kansas, taken from September 6 to March 12. Unlike most of our species of Aphodius, seryal does not occur in manure. It is found beneath fallen leaves and other decaying rubbish in wooded areas where it winters and apparently feeds. It may be found on the wing during warm days throughout the winter months.

The black markings of the elytra are in the form of transverse bands of quadrate spots. The black extends longitudinally on the sides, and the elytra are reddish yellow at their apex. The black

markings are variable in size and extent.

13184. Anthodius distinctus Mueller.

1776. Mueller: Zoologiae Danicae prodromus, Hafniae,
p. 53.

Oblong, oval, convex. Black, shining; the elytra yellow maculate with black; legs paler. Head punctate variably in the sexes; surface roughened anteriorly; front trituberculate; clypeus broadly and rather feebly emarginate, very broadly rounded on each side; genae prominent, obtuse. Thorax convex, slightly narrowed in front; basal marginal line fine; anterior angles sometimes yellowish. Elytra slightly wider posteriorly; stiate, the striae rather fine and crenately punctured; intervals nearly flat, very finely glutaceous, finely and very sparsely punctured near the striae. Mesosternum carinate between the coxae. Metasternum punctate and pubescent. Posterior femora sparsely punctate. First segment of posterior tarsus nearly as long as the three following. Length 4 - 6 mm.; width 2 - 3.7 mm.

Male.-- Head sparsely punctate; median tubercle somewhat more prominent. Thorax wider; very finely and sparsely punctate at middle, the punctures becoming larger at the sides where there are a few coarse punctures. Anterior tibial spur stout.

Female.-- Head rather closely punctate; median tubercle less prominent. Thorax narrower; surface almost evenly punctate, the punctures intermixed, coarser, and closer. Anterior tibial spur slender.

Specimens examined; 268, from Payne and Pawnee Counties, Oklahoma, and Douglas County, Kansas. The species is one of our most abundant scavenger beetles. It occurs in the adult state almost throughout the year. The winter is passed in the adult state in old manure and beneath other cover, and the beetles are frequently found on the wing in mid-winter.

The yellow spot at the front angle of the thorax which is used by Horn as a key character is usually absent in Oklahoma and Kansas specimens. The black elytral markings are in the form of spots and

longitudinal vittae which are variable in extent and often fused.

The species was introduced into this country from Europe. It is the species known for so long as immarginatus Herbst.

13189. Aphodius terminalis Say.

1823. Say: Jour. Ac. N. S. Phila., III, P. 213.
LeConte ed., II, p. 137.

Oblong, oval, convex; black, shining, glaucous above and beneath, apex of elytra usually reddish brown. Head evenly, rather coarsely and closely punctate; front simple or feebly trituberculate; clypeus broadly and shallowly emarginate, broadly rounded each side; genae rather prominent, very obtuse. Thorax convex; slightly narrowed in front; surface rather closely punctate, the punctures somewhat unequal and sparser and finer medially; basal marginal line distinct. Elytra somewhat wider posteriorly; striate, the striae moderately closely punctate; intervals very flat, finely and very sparsely punctate. Mesosternum not carinate between the coxae. Metasternum and abdomen rather coarsely punctate. First segment of posterior tarsus nearly as long as the three following. Length 4 - 4.8 mm.; width 2 - 2.3 mm.

Male.-- Anterior tibial spur longer, stouter, and more curved.

Female.-- Anterior tibial spur shorter, less stout, and less curved.

Specimens examined; 83, from Payne County, Oklahoma, and Douglas County, Kansas, taken during October, November, December, February, and March. The species sometimes occurs beneath carrion and dead leaves, but are by far the most common in fresh manure. The adults pass the winter where they happen to be feeding when cold weather comes and fly to fresh manure on warm days until January.

Aphodius subtruncatus LeConte is said by Horn to occur in Colorado and Nebraska. It may therefore be found in our territory.

13300. Aphodius walshii Horn (Pl. 3, fig. 6).

1870. Horn: "Description of the Species of Aphodius and Dialytes of the United States," Trans. Am. Ent. Soc., III, p 132.

Moderately elongate, oval, convex, shining. Head and thorax black, the latter with the margins broadly pale; elytra fuscous, less shining, the side margins paler; underside brownish; legs brownish yellow. Head finely and sparsely punctate; front with no trace of tubercles; clypeus broadly and feebly emarginate, broadly rounded each side, the margin slightly reflexed; genae very feebly prominent, very obtuse. Thorax convex; slightly narrowed in front; side margins fimbriate with rather long hairs; surface sparsely punctate, the punctures intermixed except medially where fine only are present, puncturation less sparse at the sides; base with fine marginal line. Elytra subparallel; rather deeply striate, the striae with very fine and rather close punctures; intervals alutaceous, convex, finely and very sparsely punctate, the outer intervals with the punctures closer; elytral margin fimbriate with rather long hairs. Mesosternum not carinate between the coxae. Metasternum and hind femora alutaceous and with a few punctures. Abdomen alutaceous, punctate, and pubescent. First segment of hind tarsus equal in length to the three following. Length 5 - 5.3mm.; width 2.6 - 2.8 mm.

Male.— Anterior tibia sinuate on the inner side, a distinct emargination opposite the second tooth; upper tooth obsolete; spur rather stout, suddenly curved at tip. Metasternum broadly sulcate. Posterior femur with a dentiform process on hind margin near base.

Female.— Anterior tibia of the usual form; upper tooth distinct; spur slender, acute at apex. Metasternum narrowly grooved. Posterior femur without teeth.

Specimens examined; 5, from Payne County, Oklahoma, and Douglas County and Madras, Kansas, taken in April, May, and June. The elytral pubescence is very evanescent and is most distinct on the sides. The species resembles the following closely but may be distinguished by the fimbriate margin, finely punctured elytral intervals, and the secondary sexual characters. It frequents regions where the soil is sandy.

13301. Aphodius femoralis Say (pl. 2, fig. 1).

1833. Say: Jour. Ac. N. S. Phila., III, p. 215. LeConte ed., II, p. 139.

Moderately elongate, oval, convex, shining. Head and thorax black, the latter sometimes paler at sides; elytra fuscous, less shining, the sides margins somewhat paler; underside blackish; legs paler. Head variably punctate in the sexes; front without tubercles; clypeus subtruncate, very broadly rounded on each side; genae prominent, subacute. Thorax variable in the sexes; finely margined at base. Elytra subparallel; striate, the striae finely punctured; intervals convex, alutaceous, punctate variably in the sexes. Mesosternum not carinate between the coxae. Metasternum, hind femora, and bedomen sparsely and finely punctate, the latter alutaceous. First segment of posterior tarsus equal in length to the three following. Length 4.2 - 5.3 mm.; width 2 - 2.7 mm.

Male.-- Head very finely and sparsely punctate, almost smooth at middle. Thorax somewhat wider; the sides more arcuate; surface sparsely, very finely punctate on the disc, the punctures closer and coarser at the sides. Elytra paler, less alutaceous; intervals less coarsely punctured, the punctures not contiguous with the striae. Spur of anterior tibia stouter. Metasternum broadly and shallowly sulcate.

Female.-- Head rather coarsely, almost evenly, not densely punctate. Thorax somewhat narrower; the sides less arcuate; surface more evenly, more coarsely, and more closely punctate. Elytra darker; more alutaceous; intervals rather coarsely punctate near or less contiguous with the adjacent stria. Spur of anterior tibia slender. Metasternum not sulcate.

Specimens examined; 57, from Payne County, Oklahoma, and Douglas County, Kansas, taken during April and May. The elytra pubescence is rarely lost, even in very old cabinet specimens. The species is very abundant during the two months that it is present. It seems to be more common where the soil is sandy.

13303. Aphodius tenuistriatus Horn (pl. 2, fig. 3; pl. 3, fig. 1).

1887. Horn: "A Monograph of the Aphodiini Inhabiting the United States." Trans. Am. Ent. Soc., XIV, p. 60.

Rather elongate and slender, convex; rufotestaceous, shining. Head very finely alutaceous; finely and sparsely punctulate; front without tubercles; clypeus feebly emarginate in front, broadly

rounded each side of the emargination, the sides very oblique; gaeae not prominent. Thorax convex; very distinctly narrowed in front; margin fimbriate; surface very finely alutaceous and with intermixed punctures which are very sparse and fine at middle, coarser and closer on the sides; basal marginal line fine. Elytra nearly parallel; very feebly and finely striate, the striae without punctures; intervals flat, each with two rows of rather coarse hair bearing punctures; elytral margins fimbriate. Mesosternum not carinate between the coxae. Metasternum and abdomen with a very few fine punctures. Anterior tibiae punctate on their anterior faces. First segment of posterior tarsus not as long as the three following. Length 3.5 - 4.3 mm.; width 1.8 - 2.1 mm.

No sexual characters have been observed.

Specimens examined; 44, from Payne County, Oklahoma, and Hamilton and Douglas Counties and Hedera, Kansas, taken during May and June. The species occurs beneath manure on sand or very sandy soil. The elytral pubescence is very conspicuous and is seldom if ever lost in cabinet specimens.

The relationships of this species were entirely mistaken by Horn. The only character which tends to place it in group I is its strongly pubescent elytra. This character is outweighed by the punctate fore tibia and the short first segment of the anterior tarsus together with other characters. A. tenuistriatus should be placed with those species of group I that have punctate fore tibiae. It should follow pubescens in our lists. The general form of the two species is very similar. Besides the characters mentioned above, both species have broad hind tibiae, short basal hind tarsal segments, and the thorax margined at base.

13204. Anhodina oblonga Say.

1823. Say: Jour. Ac. N. S. Phila., III, p. 215. LeConte ed., II, p. 133.

Moderately elongate, convex; black, shining. Head punctate, the punctures sparse and fine at middle, coarser and closer near the sides, the surface somewhat rugose anteriorly; fronta not tuberculate; clypeus broadly emarginate at middle, a small, reflexed, acute tooth on each side of the emargination; genae prominent but obtuse. Thorax convex; distinctly narrowed posteriorly; surface sparsely, coarsely, and almost evenly punctate, a few very fine punctures intermixed; basal marginal line strong. Elytra wider posteriorly; finely striate, the striae crenately punctured; intervals almost flat and with a very few fine punctures. Mesosternum obtusely carinate between the coxae. Abdomen, metasternum, and hind femora sparsely punctate. First segment of posterior tarsus distinctly longer than the three following. Length 8 mm.; width 3.8 mm.

Male.-- Anterior tibial spur widened and emarginate at apex. Upper spur of middle tibia short, slightly curved. Thorax less punctate.

Female.-- Anterior tibial spur acute at apex. Thoracic punctures more numerous.

Specimens examined; 1, in the T. B. Ashton Collection of Purdue University, labeled "Ken." The above description was drawn from Illinois specimens. The species seems to be quite rare. It apparently does not feed on the droppings of domestic animals. Nothing is known of its habits.

VIII. ATAEINIUS Harold.

1867. Harold: *Col. Hefte*, II, p. 100.
 1871. Hour: "Synopsis of Aphodiini of the United States,"
Trans. Am. Ent. Soc., III, pp. 284-297.
 1887. Horn: "A Monograph of the Aphodiini Inhabiting the
 United States," *Trans. Am. Ent. Soc.*, XIV,
 pp. 1-110.
 1910. Blatchley: *Coleoptera of Indiana*, pp 924 - 927.
 1922. Dawson: "A Synopsis of the Scarabaeidae of Nebraska,"
University (of Nebr.) Studies, XIII, pp. 163-
 244.

Head convex, never verrucose or tuberculate; mandibles concealed, the molar tooth distinct, the laminae membranous; eyes usually concealed. Thorax not transversely grooved, never wider than the elytra, the margin fimbriate. Mesosternum carinate between the coxae. Ventral segments united, the terminal separated from the preceding by a deeper groove. First segment of hind tarsus elongate; first anterior tarsal segment longer than the second; posterior tibia without transverse carina, straight, the outer apical angle prolonged and often spiniferous.

About twenty five species of *Ataeinius* are known to occur in North America. Eight of these have been taken in our territory, and two others may occur there.

The "accessory spinale" referred to in the following table and descriptions is a prolongation of the apical margin of each posterior and middle tibia on the underside adjacent to the spurs. It is not or but little longer than the apical fimbriae, but differs from the latter in being much thicker.

The species of the present genus are quite similar to those of *Aphidius* in general appearance and in habits. In *Ataeinius* the first segment of the anterior tarsus is always longer than the second. This character is found only in three of the Oklahoma and Kansas species of *Aphidius*, namely *tuberculatus*, *stercorator*, and *semistratus*. The hind tibiae lack transverse ridges in the

present genus. In *Aphodius* these ridges are present except in a very few species. The species of *Atasnius* are usually more parallel. The outer apical angle of the hind tibia is always more prolonged than in *Aphodius*.

Key to the Species.

- A. Clypeus with a small denticle or distinct angulation on each side of the emargination (pl. 4, fig. 4).
 B. First segment of posterior tarsus as long as the long spur. ——— abditus.
 BB. First segment of posterior tarsus shorter than the long spur and thicker near the apex. ——— inens.
 AA. Clypeus broadly rounded on each side of the emargination.
 B. Opaque species; thorax without basal marginal line.
 C. Elytral intervals flat. ——— imbricatus.
 CC. Alternate elytral intervals distinctly more elevated. ——— alternatus.
 BB. Species more or less shining; thorax with a basal marginal line.
 C. Color pale reddish brown. ——— socialis.
 CC. Color piecous or black.
 D. Posterior tibia without accessory spinule.
 E. Head not rugose at the sides. ——— gracilis.
 EE. Head rugose at the sides. ——— flavator.
 BB. Posterior tibia with accessory spinule.
 E. Intervals of elytra very flat and densely punctured. ——— robustus.
 EE. Intervals of elytra convex, finely and sparsely punctured or smooth.
 F. Clypeus finely punctured, not rugose. ——— viridatus.
 FF. Clypeus coarsely punctured and usually rugose at the sides. ——— cornutus.

13216. *Atasnius abditus* Haldeman (pl. 4, fig. 4).

1848. Haldeman: "Description of North American Coleoptera," Jour. Ac. N. S. Phila. (2), p. 106.

Elongate, slender, parallel, subdepressed; dark brown or piecous, shining, legs reddish brown. Vertex rather densely, not finely punctate; front without punctures; clypeus rather sparsely

granulate, broadly and not deeply emarginate, a distinct angulation or small denticle on each side of the emargination; genae moderately prominent, very obtuse. Thorax slightly narrowed posteriorly; surface densely and coarsely punctate, the punctures finer along the front margin and denser near the front angles; basal marginal line very strong. Elytra parallel; humeri dentate; surface striate, the striae broad, deep, and coarsely, crenately punctured; intervals convex, each with one or two rows of fine punctures. Mesosternum opaque in front; strigose punctate; carinate between the coxae, the carina smooth and shining. Metasternum coarsely, sparsely punctate at middle; opaque and finely roughened on the sides. Abdomen rather coarsely punctate, sparsely so at middle, densely on the sides; each segment crenate in front. Posterior femur without accessory spinule. Length 3.4 - 4 mm.; width 1.5 - 1.8 mm.

Specimens examined; 68, from Payne County, Oklahoma, and Douglas and Franklin Counties, Kansas, taken from April 17 to August 8. The Kansas specimens were taken at electric light; those from Payne County were found beneath fresh manure and decaying logs on very sandy soil.

Atanius inops Horn is known to occur in Arizona, Texas, and Indiana. It may therefore be found in Oklahoma and Kansas.

13230. Atanius imbricatus Melsheimer.

1844. Melsheimer: Proc. Ac. N. S. Phila., II, p. 136.

Oblong, oval, moderately convex and robust; piceous, opaque, surface usually covered with a brownish gray coating. Head rather coarsely and closely punctured, the punctures of the vertex closer and those of the sides somewhat longitudinally strigose; clypeus impunctate along anterior margin and rather broadly and moderately deeply emarginate, very broadly rounded each side of the emargination; front with short, yellowish, scale-like hairs; genae feebly prominent, very obtuse. Thorax slightly narrowed posteriorly; surface rather sparsely clothed with short, yellowish scale-like hairs, and closely, rather coarsely punctate; sculpture more or less obscured by the coating; base without marginal line. Elytra broadly and deeply striate, the striae coarsely and very indistinctly punctate; intervals flat, the third, fifth, and seventh slightly elevated near the apex, each interval with a row of short yellowish

scale-like hairs; humeri acutely dentate. Mesosternum opaque, coarsely punctate, carinate between the coxae. Metasternum coarsely, not densely punctate, opaque at the sides. Abdomen coarsely punctate and somewhat rugose, the segments crenate in front. Posterior tibia without accessory spinule. Length 4 - 4.5 mm.; width 1.9 - 2.1 mm.

Specimens examined; 14, from Douglas and Franklin Counties, Kansas, collected at light. The species is said by Blatchley to occur "beneath rubbish." It undoubtedly occurs in Oklahoma.

Atanius alternatus Malshemer occurs from Pennsylvania to Texas according to Horn. It is said to be rare, and it will probably be found in both Oklahoma and Kansas.

13322. Atanius socialis Horn (pl. 4, figs. 1, 2, and 3).
1871. Horn: "Synopsis of Aphodiini of the United States," Trans. Am. Ent. Soc., III, p. 287.

Moderately elongate, rather feebly convex; ferruginous or pale castaneous, shining. Clypeus feebly emarginate in front, very broadly rounded each side; genae very prominent, obtuse. Thorax with basal marginal line; hind angles not defined. Elytra moderately striate, the striae feebly crenately punctured; intervals slightly convex, sometimes with a very few fine punctures; humeri obtuse. Mesosternum very densely punctate; intercoxal carina very feebly indicated, almost invisible. Metasternum with a few punctures at middle. Abdomen almost impunctate, the segments crenate in front. Middle and hind tibiae each with a distinct accessory spinule. Length 4 - 4.5 mm.; width 2 - 2.2 mm.

Male.— Head slightly more transverse; almost evenly, rather finely, sparsely punctate; punctures a little coarser on the vertex; a small median area less punctate; clypeus in front broadly truncate, very feebly emarginate. Prothorax fine-seventh as long as wide; surface sparsely punctate, the punctures all rather fine but unequal in size; side margins more arcuate. Anterior tibia slender, usually bidentate, the upper tooth when present very small; spur extending to apex of second tarsal segment, not

tapering but suddenly becoming acute and inwardly curved at apex; first anterior tarsal segment not much longer than the second. Middle tibia without trace of transverse ridges. Posterior femur without marginal line.

Female.— Head slightly less transverse; vertex and front punctate, the punctures coarser and closer than in the male; clypeus rugose, feebly emarginate, the emargination deeper than in the male. Prothorax five-sevenths as long as wide; surface with large and small punctures intermixed, the punctures close at middle and dense at the sides; side margins less arcuate. Anterior tibia of the usual form; strongly tridentate externally; spur slender tapering to the apex which is very acute and extending to the apex of the first tarsal segment which is about twice as long as the second. Middle tibia with two very feeble transverse ridges. Posterior femur with a long, rather feeble marginal line.

Specimens examined: 112. Most of the specimens were taken at Ottawa, Kansas, during July, 1923. The males were fairly abundant at electric lights throughout the month. All the females were collected beneath fresh cow manure, on sandy, bare, hard soil. A single male found with the females was the only specimens of its sex not taken at light. It has a number of structural peculiarities and is described below. Other specimens at hand were taken at Lawrence and Onaga, Kansas. The Lawrence specimens are all males and were taken at light in July. The Onaga specimens are from the Crevescœur Collection of Ottawa University. There are also at hand four specimens labeled "Kan." from the T. B. Ashton Collection of Purdue University.

The above description disagrees with that of Horn in several of its statements. A number of new characters are also recorded. The most important exception taken by the above description concerns the accessory spinule. Horn states that the species is

without the spinule. In all the specimens examined, the accessory spinule is very distinct.

The relationships of this peculiar species have been much discussed. It is enough to say here that it is not a true *Atanius*.

The male mentioned above as being found beneath manure with females was collected July 15. It differs from the other males in the following characters: apex of anterior tibia much more obliquely truncate, making the apical tooth (which is broad and subacutely rounded at apex) long; a broad, blunt, tooth-like protuberance externally at base of apical tooth; spur attached opposite the protuberance, much longer and broader than in the other males, widest and curved inwardly just before the middle and then gradually tapering to the apex which is very acute; minor spur of middle tibia strongly curved at apex; color darker.

13226. *Atanius gracilis* Melsheimer.

1844. Melsheimer: Proc. Ac. N. S. Phila., II, p. 137.

Slender, elongate, parallel, subdepressed; piceous, moderately shining. Head convex; surface closely punctate, the median portion and clypeus near margin smoother; clypeus broadly, moderately deeply emarginate, broadly rounded on each side; genae prominent, obtuse. Thorax slightly narrowed posteriorly; surface densely and coarsely punctate, the punctures finer in front; median line feebly impressed on basal half; basal marginal line strong. Elytra de eply and broadly striate, the striae punctate; intervals subcarinaform, apparently with rows of punctures; humeri feebly dentate. Mesosternum opaque in front; densely punctured; intercoxal carina strongly developed, the carina smooth and shining. Metasternum and abdomen coarsely, not closely punctate; the abdominal segments crenate in front. Middle and posterior femora sparsely punctate, the posterior marginal line of the latter entire. Posterior tibia without accessory spinule. Length 3 - 3.2 mm; width 1.1 - 1.3 mm.

Specimens examined; 38, from Douglas and Franklin Counties, Kansas, taken during June and July at electric light. The species will also be found in Oklahoma.

13237. Ateneius obscurator Harold

1874. Harold; Col. Hefte, XII, p. 24.

Slender, elongate, parallel, subdepressed; piceous, legs rufotestaceous, surface strongly shining. Head with coarse, sparse punctures along posterior margin; vertex finely punctate; front and clypeus rugose, the latter convex and broadly, rather shallowly emarginate in front, broadly rounded each side of the emargination; genae prominent, obtuse. Thorax not narrowed posteriorly; surface with coarse, irregularly spaced, sparse punctures, the punctures closer at the front angles and almost absent from the region of the hind angles; base with marginal line. Elytra rather finely striate, the striae rather closely and crenately punctured; intervals flat, smooth; humeri feebly dentate. Mesosternum epaques and densely punctured in front; carinate between the coxae. Abdomen impunctate, the segments crenate in front. Posterior femora not margined. Posterior tibia without accessory spines. Length 3 - 4.2 mm.; width 1.8 mm.

Specimens examined; 2, from Wallace and Reno Counties, Kansas. The specimen from Reno County was collected October 12, 1922. The species is recorded from Hamilton County in the Kansas lists. It will undoubtedly be found in Oklahoma, but probably does not occur in the eastern parts of either state.

13238. Ateneius robustus Horn.

1871. Horn; "Synopsis of Aphedini of the United States," Trans. Am. Ent. Soc., III, p. 286.

Oblong, oval, moderately convex, very robust; black, subopaque. Head moderately convex; coarsely and densely punctate; clypeus punctate-rugose, broadly and rather feebly emarginate in front, very broadly rounded each side of the emargination; genae prominent, subrectangular. Thorax slightly narrowed posteriorly; entire surface

except median line for a short distance at middle coarsely and densely punctate; base with marginal line. Elytra rather deeply striate, the striae indistinctly punctured; intervals flat, broad densely punctured, the punctures nearly as coarse as those of the thorax; humeri strongly dentate. Mesosternum opaque in front; very densely punctured; intercoxal carina feeble, impunctate, and shining. Metasternum and abdomen rather coarsely, sparsely punctate, the latter with the segments crenate in front. Posterior femur punctate, the marginal line not entire. Posterior tibia with accessory spinule. Length 4.7 mm.; width 2.5 mm.

Specimens examined; 1, from Douglas County, Kansas, taken May 10, 1923. The species seems to be quite rare.

A. robustus differs from all other species of *Ataenius* by its robust form and peculiar punctuation. The species has the general appearance of an *Aphodius* belonging to Horn's group H.

13231. *Ataenius stricatus* Say.

1823. Say: "Desc.....Exp. to Rocky Mts.," Jour. Ac. N. S. Phila., III, p. 213. LeConte Ed., II, p. 137.

Oblong, parallel, moderately elongate and convex; piceous black, shining. Head moderately convex; extremely finely sparsely punctured, without trace of rugae; occipital region with coarser punctures; clypeus broadly and feebly emarginate, broadly rounded each side; gena moderately prominent, subacute. Thorax slightly narrowed posteriorly; surface with coarse punctures sparsely placed in a narrow region along the base, never close at sides, the punctures of the anterior and middle regions very fine and sparse, almost entirely absent in front; basal marginal line distinct. Elytra deeply striate, the striae finely punctured; intervals feebly convex, crenate on both sides, smooth above; humeri dentate. Mesosternum opaque, densely punctured in front; not carinate between the coxae. Metasternum smooth at middle, slightly rugose at the sides. Abdomen coarsely punctate at sides, more finely so at middle, the last two segments smooth at middle; the segments crenate in front. Posterior femur smooth; marginal line extending two-thirds the distance from apex to base. Hind tibia with accessory spinule. Length 4.5 - 5 mm.

No specimens of the species are at hand. The above is a modification of Horn's description. The species is recorded from Onaga in the Kansas lists.

13335. Ataenius cornutus LeConte.

1858. LeConte: "Descriptions of new species of Coleoptera collected by the Boundary Commission," Proc. Ac. N. S. Phila. (2). IV, p. 65.

Oblong, moderately elongate and convex, parallel; black shining, legs reddish brown. Head moderately convex; posterior margin with coarse, not close punctures; front sparsely and finely punctate; clypeus rugose, broadly but not deeply emarginate in front, very broadly rounded each side; genae prominent, rectangular. Prothorax with coarse, sparse punctures intermixed with fine, rather indistinct punctures, the coarse punctures less sparse on the sides; base with marginal line. Elytra striate, the striae crenately punctured; intervals flat, sparsely and finely punctate; humeri dentate. Mesosternum opaque, densely punctate, indistinctly carinate between the coxae. Metasternum almost impunctate. Abdomen coarsely punctate at the sides, almost smooth at middle, the segments crenate in front. Posterior femur with a very few fine punctures; the marginal line short. Hind tibia with accessory spicule. Length 4.5 - 5.3 mm.; width 2 - 2.4 mm.

Specimens examined: 238, from Payne and Pawnee Counties, Oklahoma, and Douglas and Franklin Counties, Kansas. This species is one of our commonest scavenger beetles. It is found throughout the year, in fresh manure during the warm months and in old dung and beneath other cover during the winter. It occurs abundantly at electric lights.

A. stereoxator Fabricius which is recorded in the Kansas lists is known only from Florida and South America. There can be no doubt that the specimens from which the record was taken were cornutus.

PSEMPHIBIUS Heer.

1841. Heer: Fauna Coleopterum helvetica, Turici, p. 531.
 1871. Horn: "Synopsis of Aphodiini of the United States,"
 Trans. Am. Ent. Soc., III, pp. 284 - 297.
 1887. Horn: "A Monograph of the Aphodiini Inhabiting the
 United States," Trans. Am. Ent. Soc., XIV, pp
 1 - 110.
 1910. Blatchley: Coleoptera of Indiana, p. 922.

Head deflexed; eyes concealed; front verrucose; maxillae corneous and terminated by stout, curved spines, internal lobe coriaceous; base and tooth of mandible corneous, remainder membranous. Thorax usually transversely grooved; margin fimbriate. Hind tibiae generally triseriately denticulate, sometimes with distinct oblique ridges; tarsi short, the segments triangular, the claws minute.

None of the species of *Psemphibius* have been taken in either Oklahoma or Kansas. It is probable that *Psemphibius intermixtus* Say occurs in both states. It may be briefly characterized as follows: oblong; brownish, elytra pale, subopacus; clypeus obtusely angulate each side of the emargination; occiput without oblique grooves; elytral intervals each with a series of indistinct flattened tubercles.

IX. NYSSEMUS Mulsant.

1842. Mulsant: Hist. nat. d. Col. de France, Lyon, II, Lamelli-
 cornes, p. 214.
 1871. Horn: "Synopsis of Aphodiini of the United States," Trans.
 Am. Ent. Soc., III, pp. 284 - 297.
 1887. Horn: "A Monograph of the Aphodiini Inhabiting the United
 States," Trans. Am. Ent. Soc., XIV, pp. 1 - 110
 1922. Dawson: "A Synopsis of the Scarabaeidae of Nebraska," Univ-
 ersity (of Nebr.) Studies, XLII, pp. 173 - 244.

Head reflexed; eyes concealed in repose; vertex without trans-
 verse elevated line. Molar teeth of mandibles corneous; maxillae

membranous, inner lobe corneous. Elytral tubercles without scale-like hairs. Anterior tibiae tridentate; middle and posterior tibiae with feeble trace of transverse ridges; tarsi slender, the first joint of the posterior elongate.

Two of the three North American species occur in our territory.

The following table and descriptions have been modified from Horn.

Key to the Species.

- A. Clypeus rounded each side of the emargination; elytral interval each with a row of small tubercles on the inner side, a continuous, finely elevated line on the outer. ----- scaber.
- AA. Clypeus angulate each side of the emargination; elytral intervals each with a double row of nearly equal tubercles ----- rossii.

13251. Hyasoma scaber Haldeman.

1843. Haldeman: "Descriptions of North American Coleoptera," Jour. Ac. N. S. Phila., (3), p. 107

Oblong, moderately convex, piceous opaque, legs brownish. Head moderately convex, granulate, the granules coarser at middle and in front, denser, finer, and more opaque posteriorly. Clypeus moderately emarginate at middle, the angles rounded; clypeus very obtuse. Thorax one-fourth wider than long, slightly narrowed in front, anterior angles obtuse, lateral margins not distinctly crenulate, hind angles broadly rounded, base arcuate with distinct marginal line, disc convex, densely granulate, with four equal equidistant transverse rows of larger tubercles, the anterior two entire, the posterior two interrupted. Elytra as wide as the thorax, humeri slightly oblique on the inner side, a more elevated cariniform line on the outer side which is entire anteriorly, interrupted posteriorly. Mesosternum opaque, densely punctured, finely carinate between the coxae. Metasternum smooth. Abdomen nearly smooth, the segments crenate in front, each with a transverse row of serrate punctures at middle. Posterior femora smooth, the marginal line fine and entire; first segment of hind tarsus nearly as long as the three following. Length 3.5 - 4 mm.

No specimens of this species are at hand. Mr. W. Knapp records it from Madras, Kansas, where he has collected it in June. Horn states that it "occurs at the margin of streams from the middle states to Texas.

13253. Hivassicus sonatus LeConte.

1831. LeConte: "Descriptions of New North American Coleoptera," Trans. Ent. Ac. of S., VII, p. 77.

Oblong, moderately convex, piceous black, opaque, elytra sometimes brownish, body beneath and legs reddish brown. Head densely, nearly equally granulate. Clypeus emarginate, the angles each side well defined, rather acute; genae very obtuse. Thorax one-fourth wider than long, not narrowed in front, anterior angles obtuse, the margin distinctly crenate, hind angles broadly rounded, basal marginal line feeble, surface closely granulate, with four very indistinct, transverse, discal ridges composed of granules very slightly larger, the first ridge alone entire. Elytra finely and indistinctly striate, the intervals with two nearly equal rows of slightly elongate tubercles. Mesosternum opaque, densely punctate, finely crenate between the coxae. Metasternum slightly scabrous at sides. Abdomen nearly smooth, the transverse row of punctures scarcely visible on the segments, each segment crenate in front. Posterior femora smooth, the marginal line deep and entire; first segment of the hind tarsus nearly as long as the three following. Length 3 - 3.5 mm.

No specimens of this species are at hand, but it has been recorded from Clark County, Kansas.

PLEUROPHORUS Mulsant.

1842. Mulsant: Hist. nat. d. col. de France, Lyon, II, Lamelli-cornes, p. 312.
 1871. Horn: "Synopsis of Aphodiini of the United States," Trans. Am. Ent. Soc., III, pp. 284 - 297.
 1887. Horn: "A Monograph of the Aphodiini Inhabiting the United States," Trans. Am. Ent. Soc., XIV, pp. 1 - 110.
 1910. Blatchley: Coleoptera of Indiana, p. 923.

Head convex, verrucose or punctate; eyes concealed; mouth parts as in Pezomachus. Thorax with transverse grooves at sides; margins without scale-like hairs. Middle and posterior tibiae slender and not thickened at apex, the spurs slender; posterior tarsi slender, not compressed, the joints not triangular and the claws normal in size.

None of the species of this genus have been collected either in Oklahoma or Kansas, but Eleuroboza naxialis Chevrolat probably occurs in both states. It may be known from the other North American species of the genus by its coarsely rugulose head and punctate mesosternum.

Subfamily III. OCHODAEINAE

Oval, convex species; color brown; covered above with short, erect hair. Mandibles and labrum corneous, not covered by the clypeus which is not dilated; antennae 10-segmented, club 3-segmented. Epimera of metathorax covered. Ventral segments six, free. Anterior coxae prominent; middle coxae oblique, contiguous; tarsi with a small setigerous onychium.

The subfamily contains one North American genus, Ochodaeus, in which the eyes are not emarginate.

X. OCHODAEUS Serville.

1825. Serville: Entomological part of Encyclopedie Methodique, X, p. 360.
1863. LeConte: "New Coleoptera Collected on the Survey for the Extension of the Union Pacific Railway, E. D. from Kansas to Fort Craig, New Mexico," Trans. Am. Ent. Soc., III, pp. 49-59.
1876. Horn: "Revision of the United States Species of Ochodaeus and other genera of Scarabaeidae," Trans. Am. Ent. Soc., V, pp. 177-197.
1909. Fall: "A Short Synopsis of the Species of Ochodaeus Inhabiting the United States," Jour. N. Y. Ent. Soc., XVII, pp. 30-33.
1922. Dawson: "A Synopsis of the Scarabaeidae of Nebraska," University (of Nebr.) Studies, XXII, pp. 173-244.

Three of the nineteen North American species are known from Kansas, and it is possible that three others occur in our territory. The species are seldom seen except at electric lights, and nothing is known of their habits. Our species all have the elytra punctate pubescent, and striate and the mentum flat or concave. The measurements given in the following descriptions were taken from the apex of the thorax to the tip of the elytral suture.

Key to the Species

- A. Front or clypeus not tuberculate.
- B. Suturel angle of elytra not dentiform.
- C. Vertex not carinate; mentum deeply longitudinally impressed; posterior femur of male without apical tooth.-----simplex.
- CC. Vertex with a more or less distinct short transverse carina; mentum rather deeply longitudinally impressed in front, more broadly so posteriorly; posterior femur of male with apical tooth.-----musculus.
- BB. Suturel angle of elytra dentiform.
- C. Vertex of male with a transverse carina which is feebler or sometimes wanting in the female; frontal margin of male not tuberculate on each side.-----missans.
- CC. Vertex not carinate in either sex; frontal margin of male acutely tuberculate on each side.-----biarmatus.
- AA. Front with a distinct tubercle.
- B. Mentum rather deeply emarginate at apex, the lateral angles acute; frontal tubercle strongly developed, forming a short, stout horn.-----mandibularis.
- BB. Mentum with a small, indistinct emargination at apex, the lateral angles rounded; frontal tubercle small.-----sparsus.

13263. Ochodaeus musculus Say.

1835. Say: "Descriptions of New North American Coleoptera," Boston Jour. Nat. Hist., I, p. 178. LeConte ed., II, p. 51.

1910. Blatchley: Coleoptera of Indiana, p. 935.

Ferruginous brown, becoming paler. Head coarsely punctured, clypeus with double margin, the upper forming an arcuate carina, a feeble transverse carina on the vertex. Thorax sparsely punctured in male, more densely in the female, median line extremely indistinct even at base. Elytra striate, striae punctured moderately closely, intervals moderately convex, irregularly tri- or externally biserially punctured, the punctures denser in the female; suturel angle rectangular. Body beneath sparsely punctured and hairy. Length 5 - 5.5 mm.

The above description is that of Horn. The species is recorded from "western Kansas" in the Kansas lists. It undoubtedly occurs in the eastern part of the state also, but it seems to be rare. It will probably be found in Oklahoma.

13266. Ochodaeus kanasus Fall.

1909. Fall: "A Short Synopsis of the Species of Ochodaeus Inhabiting the United States," Jour. N. Y. Ent. Soc., XVII, p. 34.

Oblong oval, moderately robust, testaceous, with short semi-erect pale hairs. Labrum moderately emarginate. Mentum longitudinally impressed from apex to base, the channel broader and less deep posteriorly. Frontal lobe with strong cariniform upper margin, vertex with a smooth transverse carina which is longer and well developed in the male, shorter and less developed or subobsolete in the female, head scarcely granulose, the punctures not dense and nearly simple, at least in the male. Prothorax not quite twice as wide as long, surface moderately densely granulose, median line feebly impressed in posterior half. Elytra about one-eighth longer than wide, twice as long as, and not or but very slightly wider than the prothorax; striae moderately impressed, the intervals irregularly, subtriseriately punctate, the punctures nearly as coarse as those of the striae; sutural angle dentiform. Upper tooth of front tibiae strong, remote from the base, and rather nearer the middle tooth than the latter is to the apical one. Femora and tibiae simple in both sexes. Basal joint of hind tarsus subequal in length to the three following. Length 4-5mm.; width 2.2 - 2.3 mm.

The above is the original description. The types were from Hamilton County and McPherson, Kansas, and Las Vegas, New Mexico. The species is said not to be uncommon in western Kansas. It will undoubtedly be found in Oklahoma.

13267. Ochodaeus biarmatus LeConte.

1868. LeConte: "New Coleoptera collected on the Survey for the extension of the Union Pacific Railway, E. D. from Kansas to Fort Craig, New Mexico," Trans. Am. Ent. Soc., II, p. 51.

Ferruginous or brownish testaceous. Head sparsely punctured, clypeal margin arcuate, double, the upper ridge elevated at each end into a small tubercle (male) or flat (female). Thorax moderately densely punctate-granulate, median line distinctly impressed at basal third. Elytra rather deeply striate, striae closely punctate, intervals convex, moderately densely punctulate. Body beneath sparsely punctate. Length 3.5 - 5 mm.

The above is Horn's description. The species is known from western Kansas, Texas, and New Mexico, and will be found in Oklahoma. It is the only North American species having the frontal margin of the male terminating in an acute tubercle on each side.

Qahodanus simplex Leconte is known from Texas, Colorado, New Mexico, and Nevada; Q. mandibularis Linell occurs in Arizona, New Mexico, and Nebraska; and Q. snaryus Leconte is recorded from New Mexico and Colorado. It is possible that these species occur in our region.

Subfamily IV. GEOTRIPIDAE

Rounded, convex species. Head or thorax of males sometimes armed; mandibles and labrum corneous, prominent; antennae 11-segmented, club 3-segmented. Elytra usually strongly striate. Spinera of metathorax visible. Ventral segments six, free pygidium covered. Anterior coxae prominent; middle coxae more or less oblique, usually contiguous; tarsus with a bisetose unguitum.

All of the five North American genera occur in Oklahoma and Kansas.

Key to Genera

- A. Club of antenna lenticular (pl. 1 fig. 1); color ferruginous or ferruginous and black.
 B. Middle coxae distinctly separated. ----- Bolboceras.
 BB. Middle coxae contiguous or nearly so.
 C. Eyes entirely divided.
 D. Process between the intermediate coxae without a tooth-like elevation. ----- Odontopus.
 DD. Process between the intermediate coxae with a vertical, tooth-like elevation. ----- Bolboceros.
 DDE.
 CC. Eyes partially divided. ----- Basanites.
 AA. Club of antenna lamellate (pl. 1, fig. 2); color variable, never any part ferruginous. ----- Geotrigena.

XI BOLBOCERAS Kirby.

1818. Kirby: "A Century of Insects," Trans. Linn. Soc. Lond., XII.
 1870. Horn: "Notes on some Genera of Coprophagous Scarabaeidae of the United States," Trans. Am. Ent. Soc. III, pp. 42-51.
 1906. Schaeffer: "On Bradycinetus and Bolboceras of North America, with Notes on other Scarabaeidae," Trans. Am. Ent. Soc., XXXII., pp. 249-260.

Club of antenna large, lenticular; eyes only partially divided; male without slender clypeal horn. Middle coxae distinctly separated, the process between them without a tooth-like elevation.

Two of the six North American species of Bolboceras occur in our territory. B. ferrugineus Beauvois, which is recorded from

Hooker County in the Kansas lists, is an eastern species known from North Carolina and Florida. The Kansas record is undoubtedly due to a misdetermination, and the Hooker County specimen was probably B. fossatus Haldeman.

Key to the Species

- A. Apex of each middle and hind tibia deeply emarginate on the outer side (pl. 4, fig. 5).-----fossatus.
 AA. Apex of each middle and hind tibia truncate on the outer side (pl. 4, fig. 6).-----serratus.

13381. Bolboceras fossatus Haldeman (pl. 1, fig. 1; pl. 4, fig. 5).
 1853. Haldeman: "Descriptions of Some New Species of Insects," Proc. Ac. N. S. Phila., VI, p. 362.

Broadly oval, very robust, strongly convex; ferruginous, rather feebly shining. Head very densely and coarsely punctate; genae variable in form. Thorax strongly declivous in front; coarsely and densely punctate except at base where the punctures are fine and sparse; median line densely and coarsely punctured; lateral margins serrate. Mytra rather feebly striate, the striae with sparse moderate punctures; intervals impunctate. Underside and legs with moderately long brownish hairs; intermediate intercoxal process slightly contracted between the coxae. Middle and hind tibiae deeply emarginate on the outer sides of their apices. Length 15.6 - 19mm.; width 10 - 12.6 mm.

Male.-- Frontal suture trituberculate, the median tubercle broader and all very prominent in well developed individuals, the tubercles equal and more or less truncate in less developed males; front not tuberculate. Thorax with sides of anterior declivity sharply produced outwardly, the declivity limited on each side by a deep broad groove which is limited externally by an obtuse tooth-like elevation; side margins of thorax sinuate near apex.

Female (allotype).-- Frontal suture hemihexagonal, the outer angles subacutely produced; front with a broad, short, blunt, median tubercle. Thorax less strongly declivous in front, the two projections and the groove faintly indicated on each side; side margins not sinuate.

Specimens examined; 9, from Payne County, Oklahoma, and Kiowa and Seward Counties and Modera, Kansas, taken in June, July, and August. The species is also known from Sylvia, Kansas.

Some of the *Medora* specimens were taken from their burrows which descended vertically in the sand for twelve or fourteen inches. The others from *Medora* were collected at light. In Payne County the species burrows in hard, red clay which contains only a small amount of sand.

The male secondary sexual characters vary a great deal. Some males closely approach the females in the form of the thorax, but the sexes may be distinguished in all cases by the presence or absence of the frontal tubercle which is found only in the female.

According to Horn the present species may be distinguished from the next by the sinuation of the lateral thoracic margins near the apex. This character appears to have no value whatsoever. In *fossatus* only well developed males have the side margins of the thorax sinuate near the front angles. There is no indication of this character in the females. In *serratus* there is more or less sinuation in all of the specimens examined.

Although the male has been known for many years, the female has remained unknown. The allotype described above was taken in Seward County, Kansas, August 17, 1921. Three females from Payne County, Oklahoma, are also at hand.

13283. *Dolbassus serratus* LeConte (pl. 4, fig. 6).

1864. LeConte: "Notice of some Coleoptera from the Mexican Boundary," Proc. Ac. N. S. Phila., VII, p. 80.

Broadly oval, very robust, strongly convex; ferruginous, shining. Head coarsely and very closely punctate in front, becoming smooth behind; frontal suture elevated into a tubercle at middle; genae rectangularly angulate, coarsely and closely punctate or apparently impunctate, two or three groups of coarse punctures on each side; median line with coarse, not dense punctures; form of the thorax differing little or none in the sexes, the anterior declivity only slightly produced each side of the median line and limited on each side by a broad groove which is limited in turn by a broad tooth-like elevation. Elytra very feebly striate, the striae with fine, not closely placed punctures; intervals impunctate. Underside and legs with moderately long brownish hairs; intermediate intercoxal process rather strongly narrowed between the coxae. Middle and hind tibiae truncate on the outer sides of their apices. Length 12.6 - 16.6 mm.; width 8 - 10.6 mm.

Male.-- Front not tuberculate.

Female.-- Front with a grooved median tubercle.

Specimens examined; 6, from Ness and Push Counties, Kansas.

The two specimens with date labels were taken in July. The species undoubtedly occurs in western Oklahoma. Besides by the characters given in the key the species may be known from leaving by the puncturation of the head and thorax and the feebler elytral striae. It is B. ferrugineus is more shining, also, and has little or no difference in the form of the thorax of the sexes.

XII. QUINTANUS Klug.

1843. Klug: "Die Col. Gatt. Anthrenus und Belboecras,"
Abhandl. d. K. Akad. d. Wiss. z. Berlin, p
37.
1870. Horn: "Notes on Some Genera of Coprophagous Scarabaeidae of the United States," Trans. Am. Ent. Soc., III, pp. 42 - 51.
1910. Blatchley: Coleoptera of Indiana, p. 938.

Eyes completely divided. Male with a slender clypeal horn. Middle coxae contiguous.

Because of the rarity of most of them the species of this genus are not well understood. One of the three North American species occurs in Oklahoma and Kansas.

133.86. Odonotus filicornis Say.

1823. Say: "Desc....Exp. to Rocky Mts.," Jour. Ac. N. S. Phila., III, p. XII, LeConte ed., II, p. 136.

Broadly oval, very robust, strongly convex; pale chestnut brown or brownish yellow, shining. Clypeus semicircular; roughly punctate, the median line more or less cariniform; front more or less punctate, the punctures becoming sparser posteriorly. Thorax differing in the sexes. Elytra shallowly striate, the striae with coarse punctures; intervals impunctate. Underside with moderately long brownish yellow hairs. Length 6.5 - 9 mm.; width 4.4 - 5.7 mm.

Male.-- Front with a slender, movable horn which is slightly longer than the greatest width of the head. Median line of thorax deeply impressed except at base and near apex, terminating abruptly apically where it is somewhat elevated, the groove bounded on each side by a rather shallow depression which is as broad as long, the outer margin of the depression bounded externally by a sharp longitudinal ridge; thorax with coarse punctures in the median groove and lateral depressions and near the front and side margins.

Female.-- Front without horn. Median line of thorax less wide and deep, not elevated apically; lateral depressions obsolete; longitudinal ridge absent; one-third from apex a smooth transverse elevation which is slightly tuberculate at or near its extremities; thorax with coarse punctures except at base and along each side of median line.

Specimens examined, 2 females, from Payne County, Oklahoma. The Kansas lists record the species from the eastern part of the state. The above description of the male characters was drawn from North Carolina specimens. One of the Payne County specimens was taken October 11, 1923, from its burrow in a moist woods. The

burrow was vertical and four inches deep and was made in loose, moist, black soil.

XIII. BOLBOCEROSOMA Schaeffer.

1906. Schaeffer: "On *Bradyrinetus* and *Bolboceras* of North America, with Notes on Other Scarabaeidae;" *Trans. Am. Ent. Soc.*, XXXII, pp. 249-260.
1924. Dawson and McCulloch: "New Species of *Bolbocerosoma*," *Can. Ent.*, LVI, pp. 9-15.
1932. Dawson: "A Synopsis of the Scarabaeidae of Nebraska," *University (of Nebr.) Studies*, XXII, pp. 163-244.

Club of antennae large, lenticular; eyes completely divided. Male without slender clypeal horn. Intermediate coxae very narrowly separated, nearly contiguous, the process between them with a tooth-like elevation.

Three of the five North American species occur in our territory.

Key to the Species

- A. Second elytral stria obsolete or very incomplete, never deep and strongly punctured like the others.
- B. Size small, length 6-9 mm.; striae punctures of elytra bearing fine, rather long, erect, yellow hairs; second stria obliterated, or at most indicated by two or three feeble punctures. ——— *pusillum*.
- BB. Size larger, length 10-13 mm.; striae punctures without hairs; second stria feeble and incomplete but rarely if ever obliterated. ——— *binotatus*.
- AA. Second elytral stria deep, strongly punctured like the others; black area of elytral apex confluent with the black sutural stripe. ——— *brunnei*.

-----, *Bolbocerossoma pusillum* Dawson and McCulloch.

1924. Dawson and McCulloch: "New Species of Bolbocerossoma," *Can. Ent.* LVI, p. 11.

Broadly oval, very robust, strongly convex; mahogany red, sometimes lighter to Sanford's brown marked with black, shining. Head black. Thorax with lateral concavities of declivity and posterior border between the elytral humeri black; discal area with coarse, sparse, and irregularly distributed punctures, the secondary puncturation usually very fine and inconspicuous; punctures at sides fine and very dense. Elytra with extreme base, sutural intervals, and a large subapical spot on each which varies in size and which is very generally coalescent with the sutural stripe black; second elytral stria obsolete or indicated basally by one or two punctures or a barely visible, depressed line; fifth stria feebly impressed, indicated by a line of variable punctures which are always small and feeble basally but with a tendency to become stronger distally; strong punctures of normal striae bearing fine, erect, yellow hairs. Mesosternal protuberance between the coxae very feebly developed. Length - 6 - 9 mm.; width 4 - 6.5 mm.

No specimens of this species are at hand. The above description was drawn from the original. In the type material of this species, there are specimens from Riley and Wallace Counties Kansas, and from Texas. The species will be found in Oklahoma.

-----, *Bolbocerossoma binaciatum* Dawson and McCulloch.

1924. Dawson and McCulloch: "New Species of Bolbocerossoma", *Can. Ent.*, LVI, p. 13.

Broadly oval, very robust strongly convex; Sanford's brown to mahogany red marked with black, shining. Head black. Thorax with lateral excavations of declivity and basal margin between the elytral humeri black; secondary puncturation sometimes distinct, frequently obsolete. Elytra with sutural intervals and a moderate sized, oval, median to slightly post-median spot on each black; second stria very feebly impressed, often abbreviated to about twice the length of the scutellum and with only a few weak, variable punctures; fifth stria attaining the usual length but very feebly impressed and only moderately punctured, often partially evanescent on its basal third; eight stria usually not at all impressed but represented by a line of variable punctures, very feeble basally but sometimes well marked distally. Mesosternal protuber-

ance between the coxae only moderately or scarcely at all upturned to form a tooth-like process. Length 10-13 mm.; width 7.5 - 9 mm.

The above is drawn from the original description. No specimens of the species are at hand, but several were collected in Payne County, Oklahoma, during October, 1923. They were taken from burrows made in the almost bare, sandy soil of a little used road. The burrows were about four inches deep, straight, and vertical, and closely resembled those of Ducantius lasarus, differing only in diameter.

Specimens of binotatum from Kansas are included in the type material of the species.

----- Bolbecerosoma bruneri Dawson and McCulloch,
1924. Dawson and McCulloch: "New Species of Bolbecerosema," Can. Ent., LVI, p. 14.

Broadly oval, very robust, strongly convex; mahogany red to amber brown marked with black, shining. Head largely or wholly black; surface very densely and roughly punctured. Thorax black along basal margin between the elytral humeri and with other variable black markings; surface coarsely and very roughly punctate at the sides and along the front margin, the punctures becoming well separated medially; disc with fine punctures sparsely intermixed; area just before the basal margin impunctate or nearly so; punctures of the declivity before the transverse carina fine, not close. Elytra each with subhumeral stripe, a large subapical spot, and sutural stripe black, the latter two confluent; each elytron with seven striae between suture and humeral umbone; surface deeply striate, the striae uniformly developed and coarsely, crenately punctured, the punctures coarser on the sides, all punctures without hairs; intervals convex, impunctate, strongly crenate on their outer sides. Mesosternal protuberance between the coxae rather strongly developed, concave on its anterior face. Body beneath with yellowish hairs. Length 10 - 12.5 mm.; Width 7 - 9 mm.

Specimens examined; 8, from Payne County, Oklahoma, and Johnson, Norton, and Douglas Counties, Kansas, taken during June and September. The species seems to be scarce.

Most of the specimens at hand were found flying slowly near the ground. One Payne County Example collected June 4, 1924, was taken from a burrow similar to that made by biplexiatum.

XIV. EUCALPITUS Westwood,

1852. Westwood: Trans. Linn. Soc. Lond., XII, p. 26.

Club of antennae large, lenticular; eyes partially divided; male without clypeal horn. Intermediate coxae nearly contiguous, the process between them without a tooth-like elevation.

The single North American species occurs in our territory.

13289. Eucalpitus laevius Fabricius.

1775. Fabricius: Systema Entomologiae, Flensburg and Lipsiae, p. 11.

1870.	Horn:	Trans. Am. Ent. Soc., III, p. 49
1906	Schaeffer:	Trans. Am. Ent. Soc. XXXII, p. 263.
1910.	Blatchley:	Coleoptera of Indiana, p. 937.
1910.	Boucomont:	Ann. Soc. Ent. France, LXXX, p. 336.
1922.	Dawson:	University (of Nebr.) Studies, XXII, p. 195.

Broadly oval, robust, convex; uniform castaneous, shining. Sculpture quite variable and differing in the sexes. Clypeus and vertex each with a tubercle or ridge which is often emarginate at apex; head densely punctate in the clypeal region, the punctures usually very sparse behind the clypeal protuberance. Thorax with anterior declivity, median impressed line, and two usually well defined transverse grooves on each side coarsely punctured. Elytra striate, the striae coarsely punctured; intervals smooth. Legs

and underside clothed with brownish hairs. Length 9 - 12 mm.; width 5.5 - 7 mm.

Specimens examined; 44, from Payne County, Oklahoma, and all parts of Kansas. The species is much more abundant in the western sections of our region than in the eastern parts. It is found at light from the first of May until the last of July. During October, 1924, a number of specimens were taken near Stillwater, Oklahoma, from burrows which were excavated in bare roadways to a depth of from three to four inches. The burrows were found among the holes of Bolboceroms, which they resembled very closely.

XV. GEOTRUPES Latreille.

1796. Latreille: Précis des Caracteres generiques des Insectes, Bordeaux, p. 6.
1868. Horn: "Geotrupes of Boreal America," Trans. Am. Ent. Soc., I, pp. 313 - 322.
1880. Horn: "Contributions to the Coleopterology of the United States, No. 3, " / Trans. Am. Ent. Soc. VIII, pp. 139 - 154.
1888. Blanchard: "Some Account of our Species of Geotrupes," Psyche, V. pp. 103 - 110.
1910. Blatchley: Coleoptera of Indiana, pp. 938 - 939.
1922. Dawson: "A Synopsis of the Scarabaeidae of Nebraska," University (of Nebr.) Studies, XXII, pp. 163-244.

Club of antennae lamellate; eyes completely divided. Intermediate coxae very narrowly separated, apparently contiguous, without a tooth-like elevation between them. In our species the thorax is simply convex and is not ridged or tuberculate.

Three of the eleven North American species of the genus occur in Oklahoma and Kansas. The burrows of these species are vertical and are most commonly made beside or beneath the droppings of animals.

Key to the Species.

- A. Body above shining; elytra striate.
 B. First segment of hind tarsus subequal in length to the three following taken together; middle tarsus of male normal.-----blackburnii.
 BB. First segment of hind tarsus subequal in length to the two following taken together; middle tarsus of male short and thick.-----splendens.
 AA. Body above opaque; elytra without striate but with rows of punctures.-----opacum.

13293. Geotrupes blackburnii Fabricius (pl. 1 fig. 2).

1761. Fabricius: Species Insectorum, Hamburg and Kiliani, p. 30.

Broadly oval, convex, shining. Blackish bronze above, body beneath bluish. Clypeus entire, roughly punctate; a very short, blunt tubercle just before the frontal suture; genae roughly punctate; occiput smooth. Thorax almost smooth at middle, the sides with coarse, rather close punctures and with smaller, indistinct punctures intermixed; median line feebly impressed on basal half. Elytra deeply striate, the striae rather feebly punctate; intervals smooth. Length 12 - 17.4 mm.; width 7 - 10 mm.

Male.-- Apical tooth of anterior tibia broadly produced internally. Middle tarsi normal.

Female.-- Apical tooth of anterior tibia simple.

Specimens examined; 64, from Payne and Pawnee Counties, Oklahoma, and Douglas County, Kansas, collected during the fall, winter and spring months. The species is, no doubt common throughout eastern Oklahoma and Kansas. It winters commonly in its burrows and sparingly beneath rubbish and other cover. The burrows are preferably made beneath the droppings of animals in the moist,

loose soils of woodlands. The species occasionally occurs at carrion. It is this species that is recorded in the Kansas lists of Coleoptera as Geotruncus agerai Germ.

13296. Geotruncus opacus Haldeman.

1853. Haldeman: "Descriptions of some new species of insects," Proc. Ac. N. S. Phila. VI, p. 362.

Broadly oval, convex, opaque above, shining beneath. Black above, body beneath bluish. Entire head roughly punctate; clypeus entire; a short tubercle before the frontal suture. Thorax almost smooth at middle, the sides with rather sparse, coarse punctures and with indistinct smaller punctures intermixed; median line very feebly impressed on basal half. Elytra not striate but with rows of punctures. Length 13.4 - 15 mm.; width 7.5 - 9 mm.

Male.— Apical tooth of anterior tibia broadly produced internally. Middle tarsi normal.

Female.— Apical tooth of anterior tibia simple.

Specimens examined; 23, from Payne County, Oklahoma, and Douglas County, N. Kansas, taken in all months except December, January, June, and July. It probably occurs in all parts of Oklahoma and Kansas except in the western thirds of these states. It sometimes occurs at carrion, but the burrows are usually made beneath the droppings of animals in sandy soil.

13299. Geotruncus splendidus Fabricius.

1775. Fabricius: Systema Entomologiae, Flensburg and Lipsiae, p. 18.

Broadly oval, convex, shining. Color variable; brilliant green, purple, or bronze above; bluish or blackish beneath. Clypeus entire, roughly punctate; a very short, blunt tubercle just before the frontal suture; genae roughly punctate; occiput smooth

Thorax almost smooth at middle, the sides with sparse, rather coarse punctures and with small, indistinct punctures intermixed; median line feebly impressed on basal half. Elytra deeply striate, the striae rather feebly punctate; intervals smooth. Length 14.3 -17 mm.; width 10 - 10.4 mm.

Male.-- Apical tooth of anterior tibia broadly produced internally. Middle tarsi short and thick.

Female.-- Apical tooth of anterior tibia and middle tarsi normal.

Specimens examined; 39, from Payne County, Oklahoma, and Douglas County, Kansas, taken between the dates, April 14 and November 11. The species undoubtedly occurs throughout the eastern halves of our states. It is found most commonly burrowing at the droppings of animals, but it has been found beneath carrion, feathers, fungi, and decaying vegetables.

Subfamily V. AGARHOCERINAE

Mandibles and labrum coraceous, prominent; antennae 10-segmented, club 3-segmented. Scutellum large. Front coxae conical, prominent; middle coxae transverse, contiguous; ventral segments five, not connate. Pygidium entirely covered by the elytra. Tarsi with slender claws and no onychium. Body contractile.

One of the two North American genera occurs in our territory.

XVI. CLOECTUS Germar.

1843. Germar: Zeitschrift für die Entomologie, Leipzig, IV, p. 129.

1910. Blatchley: Coleoptera of Indiana, p. 940.

The body is partially contractile, and the middle and posterior tibiae are thick.

Two species are known; both are considered below.

Key to the Species.

- A. Side margins of elytra entire; punctures of elytra close. ---
 --- apodioides.
- AA. Side margins of elytra finely denticulate on about basal half; punctures of elytra separated by a distance almost equal to their length. --- globosus.

1330. Cloeetus apodioides Illiger.

1805. Illiger: Magazin für Insektenkunde, IV, p. 137.

Oval, subglobose; purplish bronzed or blackish, shining. Head punctate, the punctures moderately close and coarse; clypeus rounded; genae very prominent. Thorax almost twice as wide as long, widest at base, margined on all sides, finely and sparsely punctured, hind angles rectangular, sides nearly straight.

Scutellum sparsely and finely punctured. Elytra almost as wide as long; side margins entire; disk with rows of long, close, deep punctures; intervals in part becoming carinate on apical third. Length 4 - 4.5 mm.; width 2.8 - 3 mm.

Specimens examined; 28, from Payne County, Oklahoma, and Douglas County, Kansas, collected from April 15 to September 12. This species occurs beneath dead bark, especially that of oak and hickory.

13321. Glossina globosus Say.

1835. Say: "Descriptions of New North American Coleoptera," Boston Jour. N. H., I, p. 179. LeConte ed., II, p. 635.

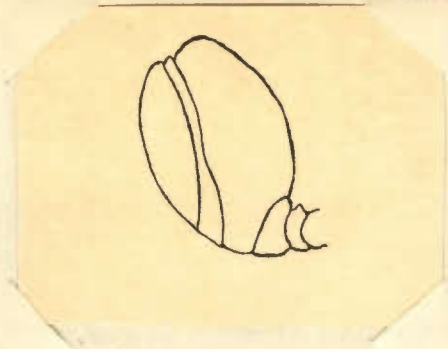
Form of the preceding; black, shining. Median portion of vertex smooth, the head on each side punctate and somewhat rugose; clypeus rugose. Thorax similar to that of the preceding species, but much more densely punctate. Scutellum finely punctate at base and apex, smooth medially. Elytra almost as wide as long; side margins of about basal half finely denticulate; the punctures of the disk long, deep, and separated by a distance almost equal to their length; intervals in part becoming carinate in about apical third.

Specimens examined; 3, labeled "Kan." This species undoubtedly occurs in Oklahoma. It is easily distinguished from the preceding species by the characters given in the key and by the sculpture of the head and thorax.

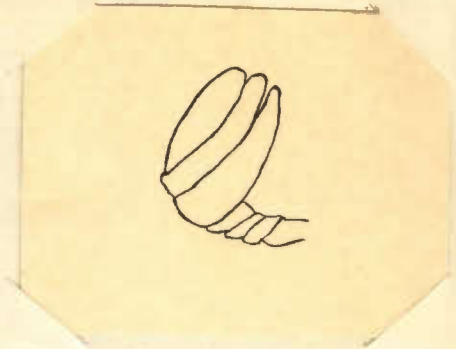
PLATE I.

1. Antenna of Bolbosceras fossatus.
2. Antenna of Geotrupes blackburnii.
3. Female thorax of Phanaeus difformis (lateral aspect).
4. Female thorax of Phanaeus carnifex (lateral aspect).
5. Head of Ganthos vicilans.
6. Head of Ganthos laevigatus.

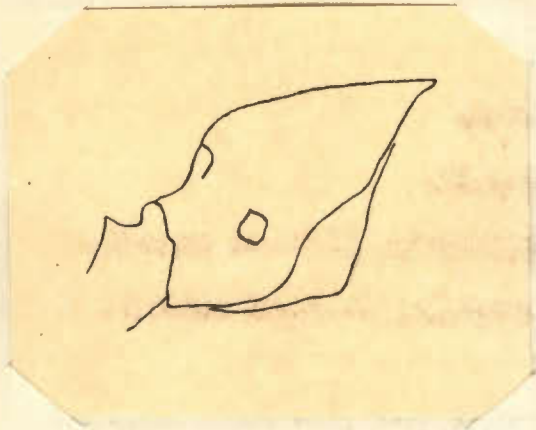
PLATE 3.



1



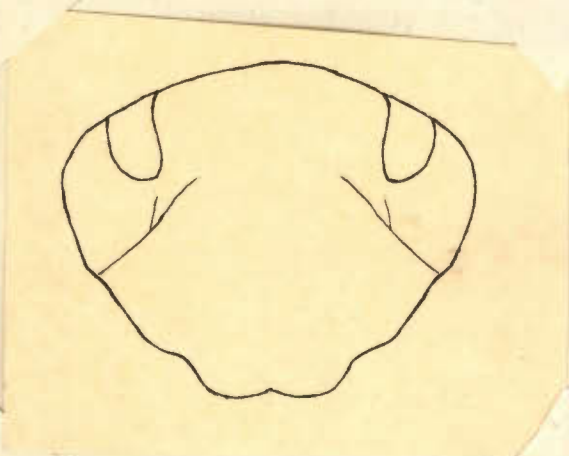
2



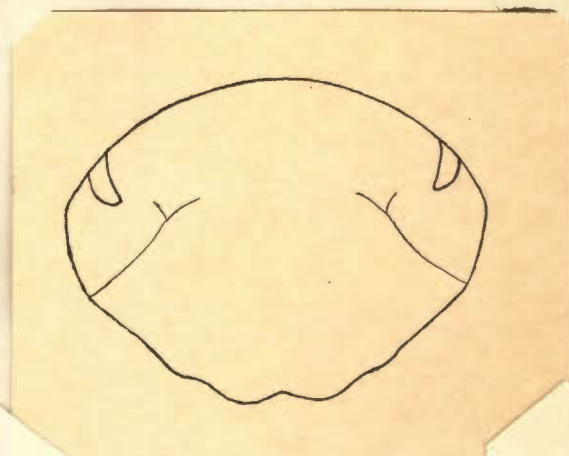
3



4



5



6

PLATE II.

1. Hind tibia of Anhodus femoralis (ventral aspect).
2. Hind tibia of Anhodus ruficola (ventral aspect).
3. Head of Anhodus isnuistriatus.
4. Head of Anhodus lutulentus.
5. Hind femur and tibia of Anhodus stercorosus (ventral aspect).
6. Hind femur and tibia of Anhodus ruficola (ventral aspect).

PLATE II.

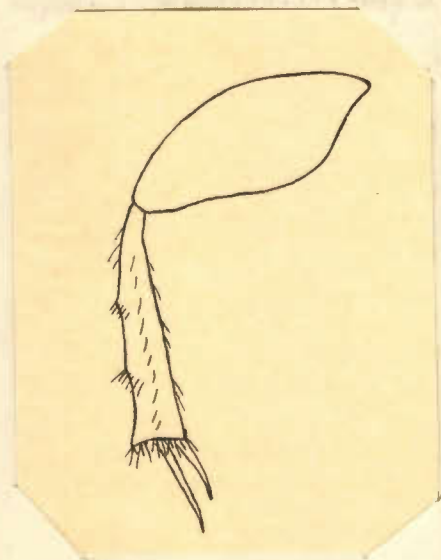
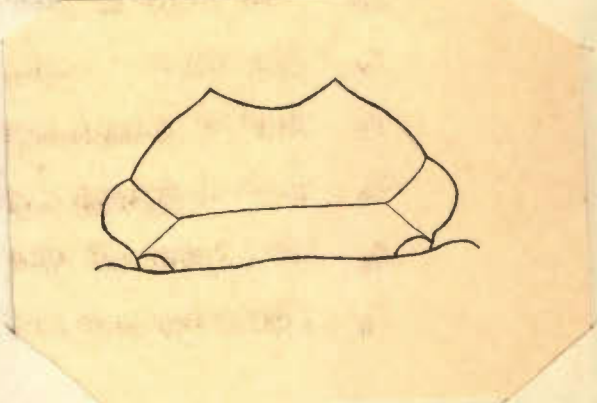
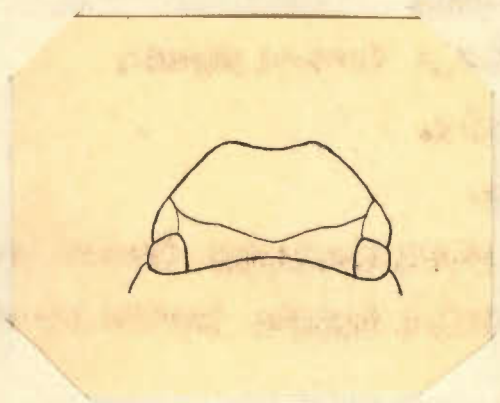


PLATE III.

1. Fore tibia of Anhodius tenuistriatus (dorsal aspect).
2. Fore tibia of Anhodius stercorosus (dorsal aspect).
3. Fore tibia of Anhodius rubeculus (dorsal aspect).
4. Fore tibia of Anhodius knusui (dorsal aspect).
5. Male fore tibia of Anhodius bicolor (dorsal aspect).
6. Male fore tibia of Anhodius walshii (dorsal aspect).

PLATE III.

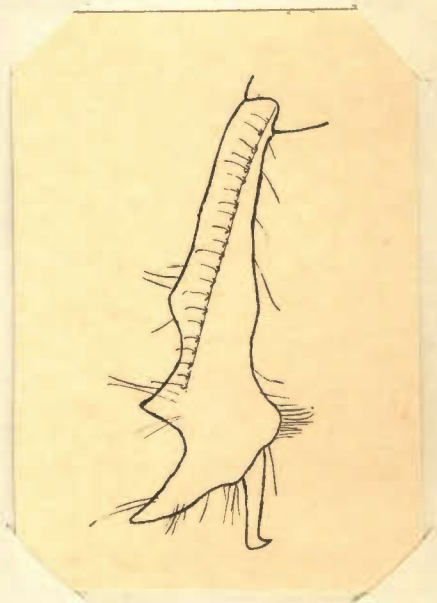
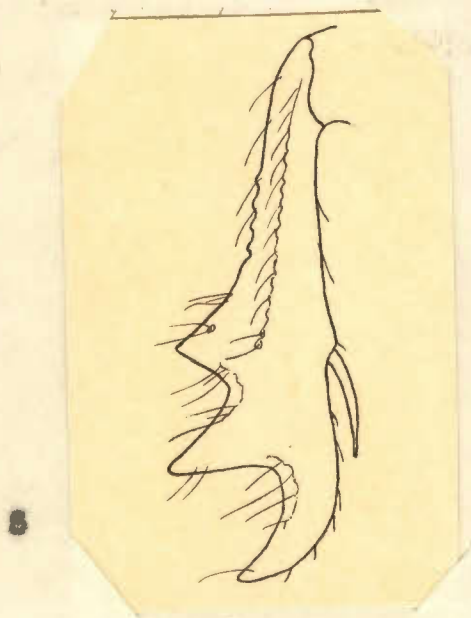
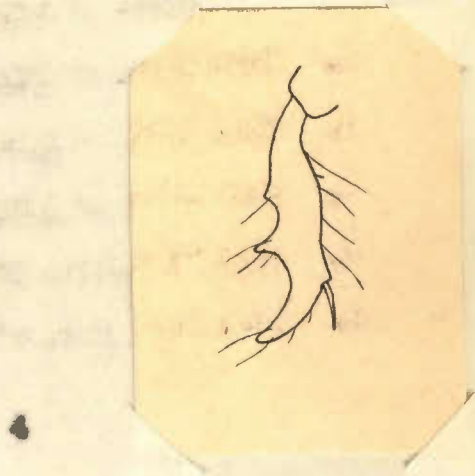
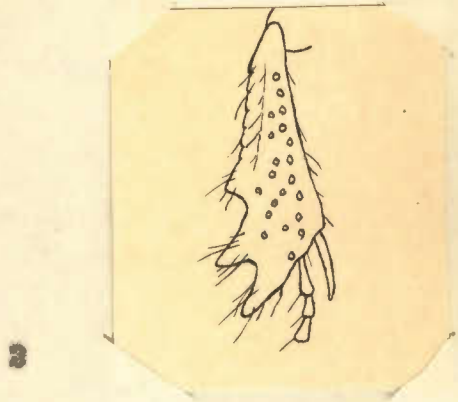


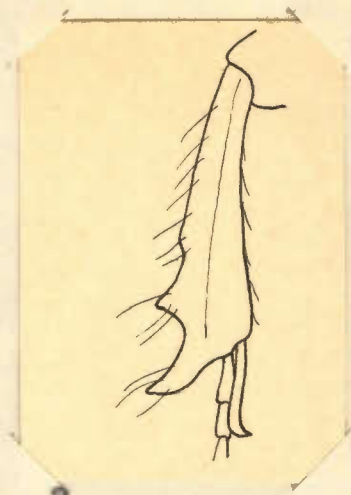
PLATE IV.

1. Female fore tibia of Atacnius socialis (dorsal aspect).
2. Male fore tibia of Atacnius socialis (dorsal aspect).
3. Male hind tibia of Atacnius socialis (ventral aspect).
4. Head of Atacnius abditus.
5. Apex of hind tibia of Bolboceras fossatus (lateral aspect).
6. Apex of hind tibia of Bolboceras serratus (lateral aspect).

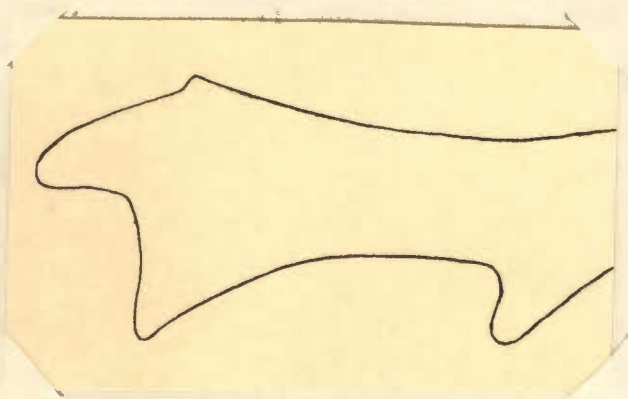
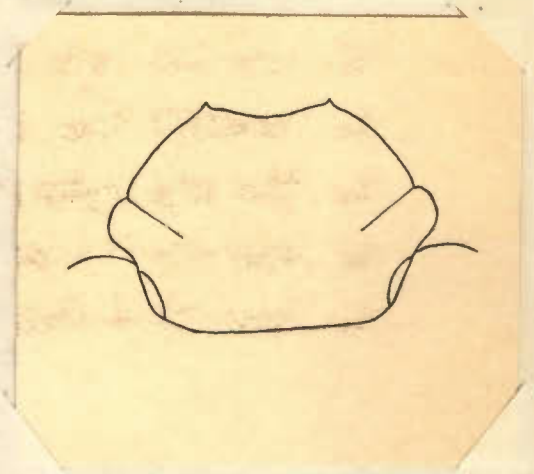
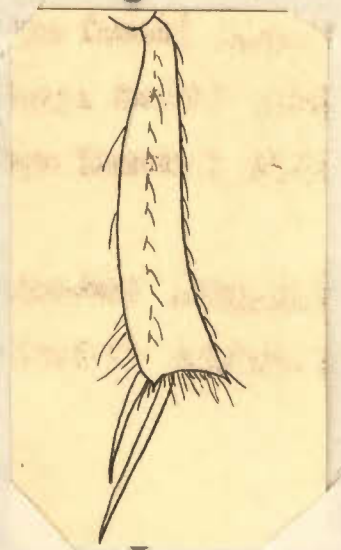
PLATE IV.



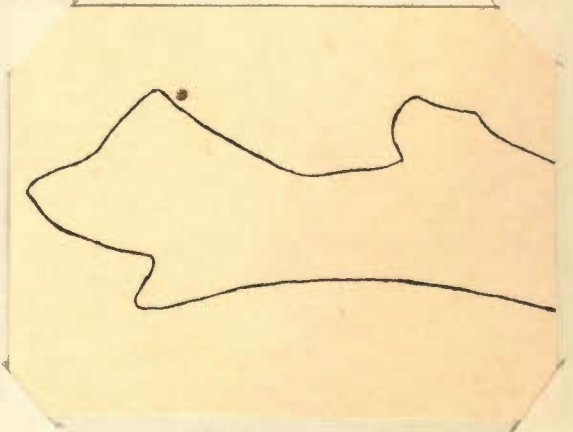
1



2



3



4

INDEX TO DESCRIPTIONS

abditus	73	cognatus	80
abusus	48	concevus	61
ACANTHOCERINAE	102	conferta	42
Aegialia	42	consentaneus	62
AEGIALIINAE	42	COPRINAE	15
alternatus (Aphodius)	44	Copris	27
alternatus (Atecnus)	75	coproides	32
aphodioides	102	cribricollis	38
APHODIINAE	43	denticulatus	47
Aphodius	43	depressipennis	18
Atecnus	72	diformis	30
biarmatus	67	distinctus	66
bicolor	53	ebanus	17
biplagiatus	95	Eucanthus	97
blackburnii	99	femoralis	69
Bolboceras	89	ferrugineus	89
Bolbocerocoma	94	figurator	78
brevifrons	40	filicornis	93
bruneri	96	finetarius	48
Canthos	15	fossatus	90
carnifex	30	Geotrupes	98
carolinus	26	GEOTRUPINAE	89
chalcites	22	globosus	103
Choeridium	24	gracilis	77
Cleoctus	102	gramarius	50

guatemalensis	35	Odontaeus	92
haldemanni	56	oklahomensis	55
hesate	34	Orthophagus	32
histeroides	25	opacus	100
imbricatus	74	orphus	36
ineps	74	parvulus	84
inquinatus	66	pennsylvanicus	38
interruptus	81	perplexus	23
iowensis	53	Phanaeus	29
janus	37	Pinotus	25
kansanus	87	Pleurophorus	83
knuxi (Aphedius)	63	praticola	18
knuxi (Orthophagus)	39	probus	20
laevis	21	Psephenobius	81
lasarus	97	psyllus	95
lesontei	19	putridus	49
lividus	52	Rhyssalus	81
lutulentus	52	robustus	78
mandibularis	88	rufoculus	59
minutus	27	ruricola	49
musculus	86	sarbanii	57
nigricornis	17	scaber	82
oblongus	70	serratus	91
OCHODAEINAE	85	serval	65
Ochodaeus	85	simplex	88

<i>socialis</i>	75
<i>sonatus</i>	83
<i>sparsus</i>	88
<i>spissipes</i>	42
<i>splendidus</i>	100
<i>stercorator</i>	80
<i>stercorosus</i>	60
<i>strigatus</i>	79
<i>subtruncatus</i>	67
<i>temistriatus</i>	69
<i>terminalis</i>	67
<i>triangularis</i>	51
<i>tullius</i>	28
<i>vigilans</i>	80
<i>viridis</i>	28
<i>vittatus</i>	52
<i>walshii</i>	68