

THE KANSAS UNIVERSITY SCIENCE BULLETIN.

Vol. VII, No. 6, January, 1913.

(Whole Series, Vol. XVII, No. 6.)

CONTENTS:

ANNOTATED LIST OF THE DIPLOPODA AND CHILOPODA, WITH A KEY
TO THE MYRIAPODA OF KANSAS. *Horace Gunthorp.*

PUBLISHED BY THE UNIVERSITY,
LAWRENCE, KAN.

Entered at the post-office in Lawrence as second-class matter.

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ANNOTATED LIST OF THE DIPLOPODA AND CHILOPODA,

WITH A KEY TO THE MYRIAPODA OF KANSAS.

BY HORACE GUNTHERP.

Plate XX.

(Contribution from the Zoölogical Laboratory, No. 205.)

Submitted in partial fulfillment of the requirements for the degree of Master of Arts.

FOR some time past local forms of millipedes and centipedes have been accumulating in the museum of the University of Kansas. During the past three years their number has been greatly augmented by the collections made on the summer trips of the State Biological Survey, and this in spite of the fact that the extreme dry weather during all of these summers made the finding of such forms very difficult. This condition probably accounts for the almost total absence of members of the family Craspedosomidæ. During the summer of 1910 the survey party started in Trego county, in western Kansas, and then traveled east to Lawrence. The following year the route ran south from Lawrence to the southeast corner of the state, then west seventy-five miles, and then north again to the starting point. The route taken in 1912 was southwest from Lawrence to Elk and Butler counties, returning north to Junction City, in Geary county. Besides the work of the survey, a large part of the collecting has been done by the writer in Cowley, Douglas and Jefferson counties. Also, the collection has been added to by Mr. R. D. Lindsey from Labette and Montgomery counties, by Mr. E. H. Taylor from Anderson county, and by Mr. G. D. Hanna from various points in the state.

Received for publication September 25, 1912.

As practically no records of these classes have been made from Kansas since the work of Cragin in 1885, which was of a very fragmentary character, Dr. C. E. McClung suggested to me that I work over the material on hand. The following paper is the result, and gives the list of species collected in Kansas now in the museum. Also, mention is made of all other species known to me to have been previously recorded from the state. Undoubtedly this list does not include all the species that will be found to occur in the state, and it is my intention to publish a future paper giving the results of further collecting.

I have not attempted to give a list of synonyms under each species, but simply a reference to the original description and to the latest change in name, where necessary. The grouping into orders and families follows the writings of Dr. O. F. Cook for the class Diplopoda, and of Dr. Ralph V. Chamberlain for the class Chilopoda. I wish to thank Professor McClung for the kind assistance he has given me in the classifying of this material, and in the preparation of this paper.

Class DIPLOPODA.

ORDER MEROCHETA.

FAMILY XYSTODESMIDÆ.

1. *Fontaria virginiensis* (Drury).

Julus virginiensis Drury. Ins. Exot., I, t. XLIII, fig. 8 (1770).

Fontaria virginiensis Gray. In Griffith's Animal Kingd., Ins. I, t. CXXXV, fig. 1 (1832).

A few of the specimens are white in color, with a dark slate-colored median line extending from the third or fourth segment to the penultimate. I judge these to be freshly moulted specimens, as there seem to be no specific differences otherwise.

HABITAT: Anderson Co. (E. H. Taylor); Cowley Co. (writer); Greenwood, Labette and Montgomery counties (Biol. Survey); Wyandotte Co. (G. D. Hanna). Also reported from Shawnee Co. by Cragin.

FAMILY CHELODESMIDÆ.

2. *Leptodesmus hispidipes* (Wood).

Polydesmus hispidipes Wood. Proc. Phila. Acad., 1864, p. 7.

Leptodesmus hispidipes Bollman. Entom. Americ., vol. IV, p. 2 (1888).

HABITAT: Cowley, Douglas and Jefferson counties (writer).

3. *Leptodesmus placidus* (Wood).

Polydesmus placidus Wood. Proc. Phila. Acad., 1864, p. 9.
Leptodesmus placidus Bollman. Bull. 46, U. S. Natl. Mus., p. 122 (1893).

Recorded from Jefferson county under the name *Polydesmus floridus*, by Cragin.

4. *Oxidus gracilis* (C. L. Koch).

Fontaria gracilis Koch. Syst. der Myriop., p. 142 (1847).
Oxidus gracilis Cook. Proc. U. S. Natl. Mus., vol. XL, p. 631 (1911).

Collected in greenhouses. It is probably distributed throughout the state.

HABITAT: Winfield, Cowley Co. (A. D. Shaftesbury); Lawrence, Douglas Co. (G. D. Hanna).

FAMILY POLYDESMIDÆ.

5. *Polydesmus pinetorum* (Bollman).

Polydesmus pinetorum Bollman. Entom. Americ., vol. IV, p. 3 (1888).

HABITAT: Anderson Co. (E. H. Taylor); Bourbon and Butler Cos. (Biol. Survey); Cowley Co. (writer); Douglas Co. (E. H. Taylor and writer); Franklin Co. (Biol. Survey); Jefferson Co. (writer); Pottawatomie and Shawnee Cos. (Biol. Survey); Sumner Co. (writer).

6. *Polydesmus serratus* (Say).

Polydesmus serratus Say. Jour. Phila. Acad., vol. II, p. 106 (1821).

HABITAT: Coffey Co. (Biol. Survey).

7. *Scytonotus granulatus* (Say).

Polydesmus granulatus Say. Jour. Phila. Acad., vol. II, p. 107 (1821).

Scytonotus granulatus Bollman. Bull. 46, U. S. Natl. Mus., p. 146 (1893).

This seems to be one of the rarer millipeds, as there are only three specimens in the collection.

HABITAT: Douglas Co. (writer); Shawnee Co. (G. D. Hanna).

ORDER COELOCHETA.

FAMILY CRASPEDOSOMIDÆ.

8. *Cleidogona* sp.?

Cleidogona Cook & Collins. Ann. N. Y. Acad. Sci., vol. IX, p. 41 (1896).

I find in the collection a single specimen of this genus. As it is a female, I am unable to refer it to a species, as the specific characters are very largely based on the form of the male copulatory appendages.

HABITAT: Douglas Co. (G. D. Hanna).

FAMILY LYSIOPETALIDÆ.

9. *Lysiopetalum lactarium* (Say).

Julus lactarium Say. Jour. Phila. Acad., vol. II, p. 104 (1821).

Lysiopetalum lactarium Packard. Amer. Natur., vol. XVII, p. 555 (1883).

One specimen collected was found feeding on the crushed abdomen of a freshly killed cricket.

HABITAT: Anderson Co. (E. H. Taylor); Bourbon, Chase and Cherokee Cos. (Biol. Survey); Cowley and Douglas Cos. (writer); Elk, Graham and Greenwood Cos. (Biol. Survey); Jefferson Co. (writer); Marion, Osage, Pottawatomie and Riley Cos. (Biol. Survey); Sumner Co. (W. O. Riley); Trego Co. (Biol. Survey).

ORDER ANOCHETA.

FAMILY SPIROBOLIDÆ.

10. *Arctobolus marginatus* (Say).

Julus marginatus Say. Jour. Phila. Acad., vol. II, p. 105 (1821).

Arctobolus marginatus Cook. Harr. Alaska Exped., vol. VIII, p. 65 (1904).

HABITAT: Anderson Co. (E. H. Taylor); Bourbon Co. (Biol. Survey); Butler Co. (E. C. Harrah); Cherokee and Coffey Cos. (Biol. Survey); Cowley Co. (writer); Douglas Co. (G. D. Hanna and writer); Jefferson Co. (writer); Labette and Linn Cos. (Biol. Survey); Montgomery Co. (R. D. Lindsey); Wyandotte Co. (G. D. Hanna).

11. *Tylobolus uncigerus* (Wood).

Spirobolus uncigerus Wood. Proc. Phila. Acad., 1864, p. 15.

Tylobolus uncigerus Cook. Harr. Alaska Exped., vol. VIII, p. 67 (1904).

Under the name *Spirobolus uncigerus*, this species is recorded from Shawnee county by Cragin. Other recorded localities for this species are restricted to California and Oregon, so I do not believe it occurs in Kansas.

ORDER ZYGOCHEA.

FAMILY PARAJULIDÆ.

12. *Parajulus diversifrons* (Wood).

Julus diversifrons Wood. Proc. Phila. Acad., 1867, p. 43.

Parajulus diversifrons Bollman. Bull. 46, U. S. Natl. Mus., p. 119 (1893).

Some of the specimens referred to this species are females, and doubtfully *P. diversifrons*, but each locality is represented by well-defined males.

HABITAT: Cowley Co. (writer); Douglas Co. (G. D. Hanna); Norton Co. (C. D. Bunker).

13. **Parajulus impressus** (Say).

Julus impressus Say. Jour. Phila. Acad., vol. II, p. 102 (1821).

Parajulus impressus Bollman. Bull. 46, U. S. Natl. Mus., p. 183 (1893).

HABITAT: Clay Co. (W. E. Wolking); Coffey Co. (Biol. Survey); Cowley Co. (writer); Douglas Co. (G. D. Hanna and writer); Franklin and Graham Cos. (Biol. Survey); Jefferson Co. (writer); Labette and Montgomery Cos. (Biol. Survey); Sumner Co. (writer); Trego Co. (Biol. Survey).

14. **Parajulus venustus** (Wood).

Julus venustus Wood. Proc. Phila. Acad., 1864, p. 10.

Parajulus venustus Bollman. Bull. 46, U. S. Natl. Mus., p. 183 (1893).

There is a single male specimen in the collection. It agrees well with Wood's description and figures.

HABITAT: Winfield, Cowley Co. (writer, Mar. 1911). Also recorded from "Kansas" by Bollman.

Class CHILOPODA.

ORDER SCHIZOTARSIA.

15. **Scutigera forceps** (Rafinesque).

Selista forceps Rafinesque. Ann. of Nature, vol. I, p. 7 (1820).

Scutigera forceps Meinert. Proc. Amer. Phil. Soc., vol. XXI, p. 171 (1885).

This species is undoubtedly distributed throughout the greater part of the state.

HABITAT: Cowley Co. (writer); Douglas Co. (D. H. Wenrick and writer); Montgomery Co. (Biol. Survey); Sumner Co. (writer). It is also reported by Cragin from Barber, Labette and Shawnee counties.

ORDER ANAMORPHA.

FAMILY LITHOBIIDÆ.

16. **Lithobius forficatus** (Linnæus).

Scolopendra forficata Linnæus. Syst. Nat., I, p. 638 (1758).

Lithobius forficatus Leach. Trans. Linn. Soc., vol. XI (1815).

In the adult specimens the coxal pores vary from 5, 5, 5, 4 to 6, 6, 7, 5. This number is smaller than usually assigned to this species.

HABITAT: Cowley Co. (writer); Labette Co. (R. D. Lindsey); Sumner Co. (W. O. Riley).

17. **Lithobius jowensis** Meinert.

Lithobius jowensis Meinert. Proc. Amer. Phil. Soc., vol. XXI, p. 177 (1885).

HABITAT: Anderson Co. (E. H. Taylor); Bourbon and Coffey Cos. (Biol. Survey); Cowley and Douglas Cos. (writer); Franklin and Graham Cos. (Biol. Survey); Jefferson Co. (writer); Labette, Linn and Pottawatomie Cos. (Biol. Survey); Reno Co. (G. D. Hanna); Sumner Co. (W. O. Riley); Trego Co. (Biol. Survey).

18. ***Lithobius kansensis***, n. sp.

General color light brown; posterior segments lighter. Legs and sterna yellow.

Angles of the eleventh and thirteenth dorsal plates produced, but not very sharply. Those of the eleventh are sometimes almost straight.

Head rather small, wider than long (2.7:2.4), almost round in shape, the posterior margin being less convex than the anterior margin or sides, thus making the posterior part of the head wider than the anterior. A median groove in front, from which a plainly marked furrow extends posteriorly for about a fourth of the length of the head. Slightly pilose.

Antennæ short, 2 mm. in length; composed of from 28 to 32 articles. All the articles short except the first two and the last one; rather densely pilose.

Ocelli nine to thirteen, arranged in three series; prominent.

Prosternal teeth 2 + 2, large.

Pores on the ventral surface of the coxæ of the last four pairs of legs numbering 2, 3, 3, 3, to 3, 4, 4, 4; all round, the proximal being the smallest.

Spines on the ventral surface of the first legs, 0, 0, 1 in number; of the penultimate legs, 1, 3, 3, 1, and armed at the end with two claws; of the anal legs, 1, 3, 1, 0, with two claws at the end.

Claw of the female genitalia wide, distinctly tripartite, the middle lobe the longest; basal spines (two on each side) short, stout, the inner the shorter.

Length, 8-10 mm.

HABITAT: Cowley and Douglas Cos. (writer). The type specimens were collected by the writer at Lawrence, Douglas county, during April, 1912. Most of the specimens were found under the bark of old logs in damp weather.

This species is closely related to *L. cantabrigensis* Meinert, but differs in respect to the number of articles in the antennæ, the number of coxal pores, and the number of eyes.

19. ***Lithobius transmarinus*** (L. Koch).

Lithobius transmarinus Koch. Die. Myriap. Lith., p. 33 (1862).

This is by far the most common species of *Lithobius* in the state. It is found under almost anything that will give shelter. It is an especially good dry-weather form.

HABITAT: Anderson Co. (E. H. Taylor); Bourbon, Chase and Cherokee Cos. (Biol. Survey); Cowley and Douglas Cos. (writer); Graham and Greenwood Cos. (Biol. Survey); Jefferson Co. (E. S. Tucker); Labette, Marion and Montgomery Cos. (Biol. Survey); Norton Co. (C. D. Bunker); Osage Co. (Biol. Survey); Reno Co. (G. D. Hanna); Riley, Rooks and

Shawnee Cos. (Biol. Survey); Sumner Co. (writer); Trego Co. (Biol. Survey). It is also reported from Barber county by Cragin, under the name *Neolithobius mordax* (a synonym), and Bollman states that *L. mordax* occurs in Kansas.

20. **Poabius bilabiatus** (Wood).

Lithobius bilabiatus Wood. Proc. Phila. Acad., 1867, p. 130.

Poabius bilabiatus Chamberlin. Ann. Entom. Soc. Amer., vol. V, p. 153 (1912).

All of the specimens in the collection are of small size, varying from 7 mm. to 12 mm. in length. While this species is scarce, it seems to have a wide distribution in the state.

HABITAT: Cowley and Douglas Cos. (writer); Graham Co. (Biol. Survey); Sumner Co. (W. O. Riley); Trego Co. (Biol. Survey).

ORDER EPIMORPHA.

FAMILY CRYPTOPIDÆ.

21. **Otocryptops sexspinosus** (Say).

Cryptops sexspinosus Say. Jour. Phila. Acad., vol. II, p. 112 (1821).

Otocryptops sexspinosus Pocock. Ann. and Mag. Nat. Hist., ser. 6, vol. XV, p. 351 (1895).

Color, adult, deep orange; young, yellow. The largest specimens in the collection measure 57 mm. in length. This form is common under stones and boards, especially around old buildings. One specimen collected by the writer was carrying a mass of eggs suspended under the middle of her body, and held there by the legs. This mass measures 10 mm. long by 6 mm. wide. The eggs are yellow in color and measure 1.3 mm. in diameter.

Wood shows the anterior margin of the labium in this species to be nearly straight; in all of the forms studied, a median notch is well marked.

HABITAT: Anderson Co. (E. H. Taylor); Bourbon Co. (Biol. Survey); Butler Co. (E. C. Harrah and Biol. Survey); Cherokee Co. (Biol. Survey); Cowley Co. (writer); Crawford Co. (Biol. Survey); Douglas Co. (G. D. Hanna, Biol. Survey, and writer); Franklin, Graham and Greenwood Cos. (Biol. Survey); Jefferson Co. (writer); Labette Co. (R. D. Lindsey and Biol. Survey); Linn Co. (Biol. Survey); Montgomery Co. (R. D. Lindsey and Biol. Survey); Osage, Osborne, Pottawatomie, Riley, Rooks and Shawnee Cos. (Biol. Survey); Sumner Co. (writer); Trego Co. (Biol. Survey). It was previously reported from Jefferson Co. by Cragin.

FAMILY SCOLOPENDRIDÆ.

22. **Scolopendra heros** (Girard).

Scolopendra heros Girard. In Marcy's Exp. Red River, App. F, p. 262 (1853).

The largest specimen in the collection measures 114 mm. in length. So far found only in the southern part of the state.

Through the kindness of Prof. C. H. Edmondson, of Washburn College, I have examined two individuals of this species collected by Cragin in Barber county. The larger one measures 140 mm. These two specimens are all that remain of Prof. Cragin's Myriapoda collection, as the remainder were destroyed by fire.

HABITAT: Cowley Co. (writer); Elk Co. (Biol. Survey); Labette Co. (R. D. Lindsey and Biol. Survey); Montgomery Co. (Biol. Survey). This is also reported from Barber county by Cragin, as above mentioned.

23. *Scolopendra morsitans* (Linnaeus).

Scolopendra morsitans Linnæus. Syst. Nat., X, p. 638 (1758).

Under the name *Scolopendra morsitans* var. *cærulescens*, Cragin reports a single specimen of this species from Barber county. It is a very doubtful record for the state.

24. *Scolopendra polymorpha* (Wood).

Scolopendra polymorpha Wood. Proc. Phila. Acad., 1861, p. 11.

Probably found throughout the state, but more common in the southern and western portions.

HABITAT: Butler and Chase Cos. (Biol. Survey); Cowley and Douglas Cos. (writer); Ellsworth Co. (A. Wellington); Graham and Greenwood Cos. (Biol. Survey); Jefferson Co. (writer); Labette Co. (R. D. Lindsey and Biol. Survey); Marion Co. (Biol. Survey); Montgomery Co. (R. D. Lindsey and Biol. Survey); Norton Co. (C. D. Bunker); Riley Co. (Biol. Survey); Russell Co. (W. S. Sutton); Trego Co. (Biol. Survey). Wood reports this species from Kansas, and it is recorded by Cragin from Barber, Finney and Rice counties.

FAMILY GEOPHILIDÆ.

25. *Arenophilus bipuncticeps* (Wood).

Geophilus bipuncticeps Wood. Jour. Phila. Acad., vol. V, p. 45 (1862).

Arenophilus bipuncticeps Chamberlin. Bull. Mus. Comp. Zool. Harvard, vol. LIV, p. 417 (1912).

This is one of the most common centipedes. It lives under dung, stones, and pieces of wood, and is often found in the loose soil of gardens. It seems to be able to stand dry weather better than most species, as they seem to be as numerous after a long dry spell as when the ground is moist.

HABITAT: Anderson Co. (E. H. Taylor); Bourbon Co. (Biol. Survey); Butler Co. (E. C. Harrah); Cherokee Co. (Biol. Survey); Cowley Co. (writer); Douglas Co. (E. H. Taylor, Biol. Survey, and writer); Graham and Greenwood Cos. (Biol. Survey); Jefferson Co. (writer); Labette Co. (R. D. Lindsey and Biol. Survey); Marion, Montgomery, Osage, Osborne, Pottawatomie, Riley, Rooks and Shawnee Cos. (Biol. Survey); Sumner Co. (W. O. Riley and writer); Trego Co. (Biol. Survey). Also reported from Jefferson county by Cragin.

26. *Arenophilus osborni*, n. sp. Plate XVI, figs. 1, 2 and 3.

Body robust, round, attenuated at both anterior and posterior ends. Color, Naples yellow, with a light brown, rather large spot on nearly every segment. Head and antennæ light orange; feet and sides lighter than dorsal; ventral side slightly lighter than dorsal, without dark spots.

Cephalic plate about as broad as long (32:34). The two sides of the anterior margin slightly concave, each extending from the center at a slight angle backwards. Sides somewhat convex, having well-rounded corners at the posterior ends. Posterior margin truncate, straight. Covered with fine punctations; also larger ones scattered over the surface, in each of which a hair probably grows, as several still contain them, making the cephalic plate sparsely pilose; hairs not arranged in rows, but irregularly scattered over the surface. A group of four or five hairs on lateral margins, just back of the anteriolateral corners.

Prebasal plate slightly exposed at the center.

Mandibles large, when closed reaching to the middle of the first joint of the antennæ. Armed at the base with a single very minute tooth. Slightly pilose.

Labium longer than broad (5:4). Very slightly emarginate. On type no trace of a median canal; on male (?) specimen median canal distinct, but this is probably due to the latter specimen having been dried before preserving. Finely punctate.

Antennæ rather long, the first five or six joints covered with long hairs, the remaining with short hairs. The hairs gradually become more numerous and shorter from the proximal to the distal end.

The dorsal plates are minutely punctate (similar to the head); bisulcate, with rather broad, shallow furrows; a few scattered hairs over the surface.

The ventral plates are distinctly bisulcate, with a small, nearly round median depression, which becomes somewhat elongate posteriorly.

The spiracles are oval on the first four or five segments, the remainder being round. They gradually become smaller towards the caudal end.

The coxal pores empty into two large pores on each side of a rather broad ventral plate (a generic character).

The anal legs are sparsely pilose and armed with a single claw. Not swollen.

Number of legs; ♂ (?), 53; ♀, 59. Length, ♀, 57 mm.

HABITAT: Cowley Co. (type) (writer); Bourbon Co. (Biol. Survey).

Named in honor of Prof. Henry L. Osborn, of Hamline University, my former teacher.

There are only two specimens of this species in the collection, and the one from Bourbon county is in bad condition owing to its having been crushed and dried before it was preserved. It has lost the anal legs, and so I am not positive it is a male, but believe so from the number of legs, 53, instead of 59, as in the female type.

27. *Geophilus dolichocephalus*, n. sp. Plate XX, figs. 4, 5 and 6.

Color, light orange, with a dark orange head. Young specimens are yellow with an orange head. Legs yellow. About the same size for the first two-thirds of its length, attenuated from this point backwards.

Head large, much longer than wide (5.5:3.4 or 6.3:4), with the cephalic margin slightly truncated, about equal in width to the caudal margin, which is distinctly rounded. The mandibles are large, extending to the base of the third joint of the antennæ. They are armed with four teeth, the distal one of which is prominent and black in the adult; the other three are small. The coxæ of the mandibles are longer than broad (19:11) and have a slight indentation on the inner surface, distally. The labium is large and square (1:1), and is clearly but not prominently notched. It is not canalate.

The antennæ are short, the first eight joints being sparsely covered with rather long hairs, and the distal seven joints being densely pilose with very short hairs.

The dorsal plates are distinctly bisulcate, with the exception of the caudal four or five.

The ventral plates have a distinct median depression, which anteriorly extends from the cephalic to the caudal margin of the plates, but posteriorly it becomes shorter, occupying the middle part as a long, oval depression.

The spiracles are oval cephalad and round mesad and caudad, growing smaller towards the posterior end.

The coxæ and joints of the anal legs are rather swollen. The coxal pores are round, arrangement irregular, except that most of them are on the ventral surface near and partly concealed by the ventral plate, while a few are grouped near the edge or partly under the dorsal plate. They vary in number from 21 to 25. The anal legs in the female are pilose with rather long hairs, while in the male they are covered with fine hairs, especially distally, among which are numerous longer hairs.

Legs, pilose; in number, 63 to 69 pairs. Length, 42-45 mm.

HABITAT: Bourbon Co. (Biol. Survey); Cowley Co. (type) (writer).

ETYMOLOGY: *δολιχός*, long; *κεφαλή*, head.

This species is related to *G. strigosus* (McNeill), recorded from Indiana, but differs from the latter in the following points:

G. strigosus (McNeill).

Head, longer than wide (3.3:2.1), cephalic margin truncate, caudal margin rounded.

Antennæ short, sparsely pilose, almost bare proximal.

Mandibles armed with two very minute teeth each.

Labium obsoletely canaliculate, and scarcely emarginate.

Ventral plates with a distinct mesal depression, elongate, forming a shallow oval.

Number of pairs of legs, 55.

Length, 23.5 mm.

G. dolichocephalus, n. sp.

Head, longer than wide (5.5:3.4 or 6.3:4); shape the same.

Antennæ apparently shorter; first eight joints sparsely covered with long hairs; distal seven joints densely pilose with very short hairs.

Mandibles large, armed with four teeth, the distal one large and black in adult.

Labium not canaliculate, and distinctly emarginate, especially in adults.

Well-marked mesal depression present; cephalad, forming a distinct groove from anterior to posterior margins of plate; caudad, forming an elongated oval.

Number of pairs of legs, 63 to 69. A specimen 22 mm. long has 69 pairs.

Length, adult, 42-45 mm.

The above characters applied to *G. dolichocephalus* are as true of specimens 25 mm. long as of the full-grown specimens.

I know little of the habits of this species, except that they were collected with and placed in a bottle containing a large number of *Arenophilus bipuncticeps* (Wood); so I judge their habits are similar.

28. *Geophilus mordax* (Meinert).

Geophilus mordax Meinert. Proc. Amer. Phil. Soc., vol. XXI, p. 217 (1885).

Rare. Those from Cowley county were collected under stones along the banks of a small creek in dry weather.

HABITAT: Cowley Co. (writer); Douglas Co. (G. D. Hanna).

29. *Linotænia fulva* (Sager).

Strigamia fulva Sager. Proc. Phila. Acad., vol. VIII, p. 109 (1856).

Linotænia fulva Bollman. Proc. U. S. Natl. Mus., vol. XI, p. 341 (1888).

Not common.

HABITAT: Cowley and Douglas Cos. (writer); Franklin Co. (Biol. Survey); Norton Co. (C. D. Bunker); Riley Co. (Biol. Survey).

KEY TO THE MYRIAPODA OF KANSAS.

The following key covers all of the species of Diplopoda and Chilopoda that have so far been recorded from the state of Kansas, with the exception of *Tylobolus uncigerus*, which undoubtedly does not occur in this state. In choosing characters to be used, those have been taken which seem to the writer to be the most readily understood, and to require the least possible study for their use, thus making as serviceable a key as possible. It is of course understood that this key has been made especially for the species enumerated, and many of the characters would not hold good if other forms were added to the list. In making the key, the following references have been of special value:

Bollman, Chas. H., "Myriapoda of North America," Bull. No. 46, U. S. National Museum (1893).

Chamberlin, Ralph V., numerous papers.

Cook, O. F., "Myriapoda of Northwestern North America," Harriman Alaska Exped., vol. VIII (1904).

KEY.

* Most of the segments with two pairs of legs; antennæ with 5 to 8 segments; one pair of maxillæ (DIPLOPODA).

A. Segments 20; repugnatorial pores on 5, 7, 9, 10, 12, 13, 15-19 segments.

B. Femora of legs spined; lateral carinæ more or less bent downwards.

Fontaria virginienensis.

BB. Femora of legs not spined.

C. Dorsal plates smooth with a longitudinal sulcus; lateral carinæ small; body narrow; lives in hothouses. *Oxidus gracilis*.

CC. Dorsal plates smooth or scaly, not distinctly sulcate; lateral carinæ large; body wide.

D. Back convex, smooth; lateral carinæ not serrate.

E. Male genital appendages short, their terminal spine single, curved, densely pilose. . . . *Leptodesmus hispidipes*.

- EE. Male genital appendages elongate; terminal spine large, spiral, furnished with a long, falciform, basal spinule, and a second short, robust lateral one.
Leptodesmus placidus.
- DD. Back flat, scaly; lateral carinae serrate.
E. Repugnatorial pores surrounded by a round swelling; scales on scuta arranged in 4 transverse rows.
Scytonotus granulatus.
- EE. Repugnatorial pores surrounded by a long, oval swelling; scales arranged in 3 transverse rows.
F. Length from 15 to 18.5 mm., *Polydesmus pinetorum.*
FF. Length from 22 to 27 mm., *Polydesmus serratus.*
- AA. Segments 30; repugnatorial pores absent; anal segment produced into two slender papillae; dorsal face of each segment provided with 6 bristles; carinae reduced.
Cleidogona sp?
- AAA. Segments more than 30; repugnatorial pores present.
B. Male genital appendage formed from anterior pair of legs of 7th segment; sides and back with numerous keels; anal segment not produced into spine *Lysiopetalum lactarium.*
- BB. Male genital appendage formed from both pairs of legs of 7th segment; no carinae or keels; anal segment produced into spine.
C. None of anterior segments apodous..... *Actobolus marginatus.*
- CC. Third segment apodous; male genital appendages composed of two parts each.
D. Inner part of male appendage curving towards opposite side and crossing with opposite similar part; outer part ending in one blunt point.
E. Outer part of male appendage narrow in proportion to length (9:34) *Parajulus venustus.*
EE. Outer portion of male appendage wider (16:34)
Parajulus impressus.
- DD. Inner part of male appendage curving caudad, meeting in a mid line, but not crossing as above; outer part ending in two blunt points *Parajulus diversifrons.*
- ** Not more than one pair of feet to the segment; antennae many segmented; two pairs of maxillae (CHILOPODA).
- A. Pairs of legs, 15; young born with 7 pairs.
B. Tarsi of legs multiarticulate; dorsal plates, 8; spiracles, 6, in one series, middorsal *Scutigera forceps.*
- BB. Tarsi of legs triarticulate; dorsal plates, 15; spiracles in two series, lateral.
C. Inside of anal legs with strongly marked, irregular swellings.
Poobius bilabiatu.
- CC. Anal legs not as above.
D. Angles of 7th, 9th, 11th and 13th dorsal plates produced; prosternal teeth, 10 to 14..... *Lithobius transmarinus.*
- DD. Angles of 9th, 11th and 13th dorsal plates produced; prosternal teeth, 8 to 12..... *Lithobius forficatus.*
- DDD. Angles of the 11th and 13th (or 13th only) dorsal plates produced; prosternal teeth, 4..... *Lithobius kansensis.*
- DDDD. Angles of none of dorsal plates produced; prosternal teeth, 4 to 6..... *Lithobius jowensis.*
- AA. Pairs of legs, 21; young born with same number; ocelli, 4.
B. First dorsal plate with a deep transverse furrow back of anterior margin.
C. Cephalic plate with two fine longitudinal lines, which diverge cephalad.
Scolopendra heros.
- CC. Cephalic plate without furrows as above.... *Scolopendra polymorpha.*
- BB. First dorsal plate without a deep transverse furrow back of anterior margin.
Scolopendra morsitans.
- AAA. Pairs of legs, 23; young born with same number; ocelli absent.
Otocryptops sexspinosus.

- AAAA. Pairs of legs more than 30; young born with same number.
- B. Dorsal plates bisulcate; middle piece of labrum small.
- C. Coxal pores empty into two large pores on each side of a broad ventral plate.
- D. Cephalic plate clearly longer than broad, with a distinct line of deep punctations each side of middle on caudal half, these connected by a cross line of punctations in front.
Arenophilus bipuncticeps.
- DD. Cephalic plate almost as broad as it is long, with punctations scattered irregularly over surface.....*Arenophilus osborni.*
- CC. Coxal pores numerous, not as above.
- D. Head only slightly longer than broad (almost round); 49 to 55 pairs of legs.....*Geophilus mordax.*
- DD. Head distinctly longer than broad (oblong); 63 to 69 pairs of legs.....*Geophilus dolichocephalus.*
- BB. Dorsal plates not bisulcate; middle piece of labrum very large.
Linotania fulva.

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Since the publication of Bollman's Myriapoda of North America, in 1893, no bibliography has been printed covering the work done on this group for America. Owing to the numerous systematic articles that have been published since the above work, it was thought advisable to append the following list, which covers the systematic, the distribution, and the variation papers concerning the Myriapoda of North America, north of Mexico. To any one taking up a systematic study of this group, the works of Bollman, Chamberlin, Cook, and Wood are of especial value. The most important papers in the following list are marked with an asterisk (*).

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PLATE XX.

Drawings made with a Zeichenprisma. Magnification $\times 2.16$.

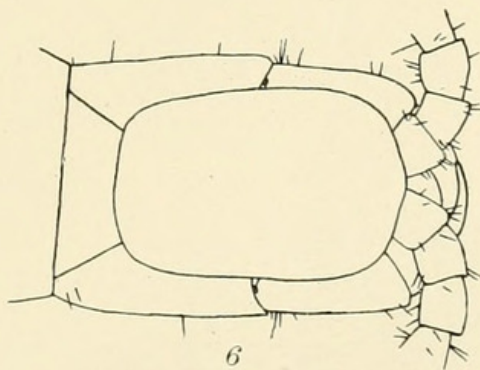
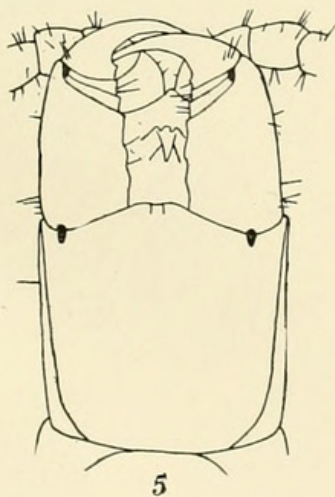
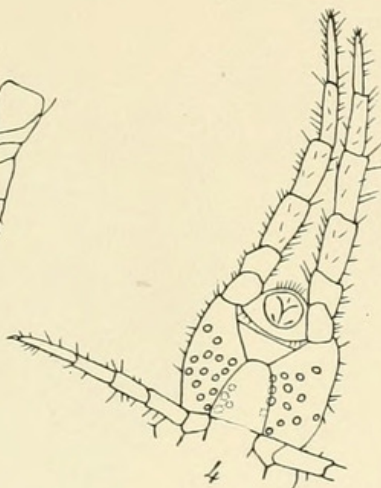
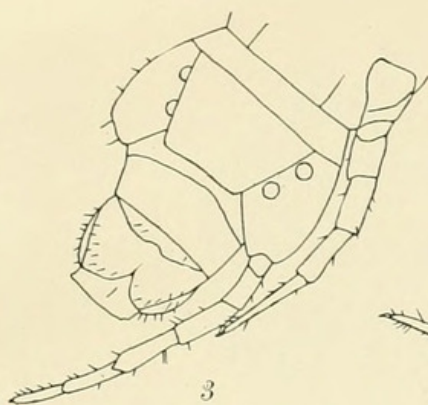
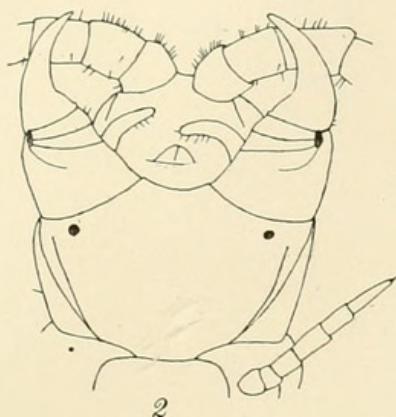
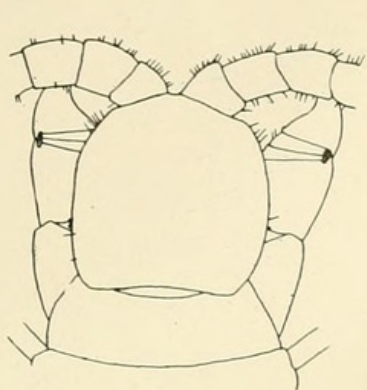
Arenophilus osborni, n. sp.

- FIG. 1.—Dorsal view of anterior portion.
- FIG. 2.—Ventral view of anterior portion.
- FIG. 3.—Ventral view of posterior portion.

Geophilus dolichocephalus, n. sp.

- FIG. 4.—Ventral view of posterior portion.
- FIG. 5.—Ventral view of anterior portion.
- FIG. 6.—Dorsal view of anterior portion.

PLATE XX.





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