XXI. NOTES ON OKLAHOMA ORTHOPTERA WITH A LIST OF SPECIES FROM THE STATE.*

T. H. Hubbell and A. I. Ortenburger.

This paper is based primarily upon two small collections of Orthoptera from southeastern and southern Oklahoma. The first of these was made by the senior author in the late fall and winter of 1918, while stationed at Fort Sill, Comanche County. The other is from various localities in southeastern Oklahoma; the material was collected by the junior author and his assistants, H. M. Hefley, Jr., and G. S. Caughron, in the course of a general faunistic survey of this part of the state. These collections are preserved in the Museums of Zoology of the University of Michigan and the University of Oklahoma.

In studying this material it was found that very little work had been done on the orthopterous fauna of the region. In Scudder's Index to North America Orthoptera, complete to the end of 1900, there are only 12 references, covering 7 species, which contain records for Oklahoma or Indian Territory. The first paper making more than incidental mention of Oklahoma Orthoptera is the list published by Caudell in 1902. Morse visited the central and southeastern portions of Indian Territory and Oklahoma in 1905, and in about two weeks of intensive collecting obtained a fair representation of the fauna; two years later a part of this collection, with material from other southern states, was reported upon in his "Further Researches on North American Acrididae". Since that time scattered records have appeared in numerous publications. It has seemed desirable to gather together all these published records to form a preliminary list of the Orthoptera of the state, which may serve as a basis for future work on the orthopterous fauna of this region, and to indicate some of the principal gaps in our knowledge concerning it. The appended bibliography contains a list of the more important papers containing Oklahoma records.

Messrs. James A. G. Rehn and Morgan Hebard have given the authors much assistance in the determination of material; and special acknowledgments are due to Mr. A. N. Caudell for allowing the authors to use unpublished records of material in the U. S.

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National Museum, and otherwise assisting in the preparation of this list. We are also indebted to Mr. H. M. Hefley, Jr., for the brief description of the Murray County habitat.

MAJOR ENVIRONMENTAL CONDITIONS OF THE STATE.[1]

Oklahoma occupies a transitional area between the low-lying, well-watered coastal plain and Mississippi valley regions on the southeast and east, and the high semi-arid Great Plains to the west. Fenneman's map of the physiographic regions of the United States shows the state occupying portions of five physiographic provinces, the limits of which are indicated in the accompanying map. (Plate II). A brief description of the topography of the state follows.

The West Gulf Coastal Plain section (III) is represented in the state by a strip 15 to 40 miles broad extending from the southeastern corner westward to about the middle of the south side, the lowest elevation being about 400 feet at the southeast corner. To the northwest this section merges with the Osage plains, but northward it is limited by the portion of the Ouachita range (IIb) which juts into the region from Arkansas.

North of the low parallel ridges of the Ouachitas lies the valley of the Arkansas river (IIa), which also merges westward with the Osage Plains. The Arkansas Valley section is bordered on the north by the elevated portion of the state which lies on the southwestern corner of the Ozark uplift (Ia&b). The southern edge of this plateau has been carved by erosion into such strong relief that it is known as the Boston "Mountains" (Ib).

The great central prairie-plains region running from north to south across the state (IV) is a part of the Osage Plains section of the Central Lowland province. This plain rises steadily toward the west, passing by a gradual transition into the plains border section (Va) of the Great Plains province. The western half of the Oklahoma "Panhandle" lies upon the High Plains (Vb) (Staked Plains in Texan phraseology), with a maximum elevation on the west of approximately 4000 feet. The High Plains are bordered to the east by a distinct escarpment.

Near the southern border of the state two isolated mountain masses rise above the plains. The Arbuckle Mountains lie about

[1]Taken largely from Fenneman, Physiographical Divisions of the United States, Ann. Amer. Soc. Geogr. 1916; Bowman, Forest Physiography 1911; Stevens and Shannon, Bull. 27, Okla. Geol. Survey, pp. 215-235.

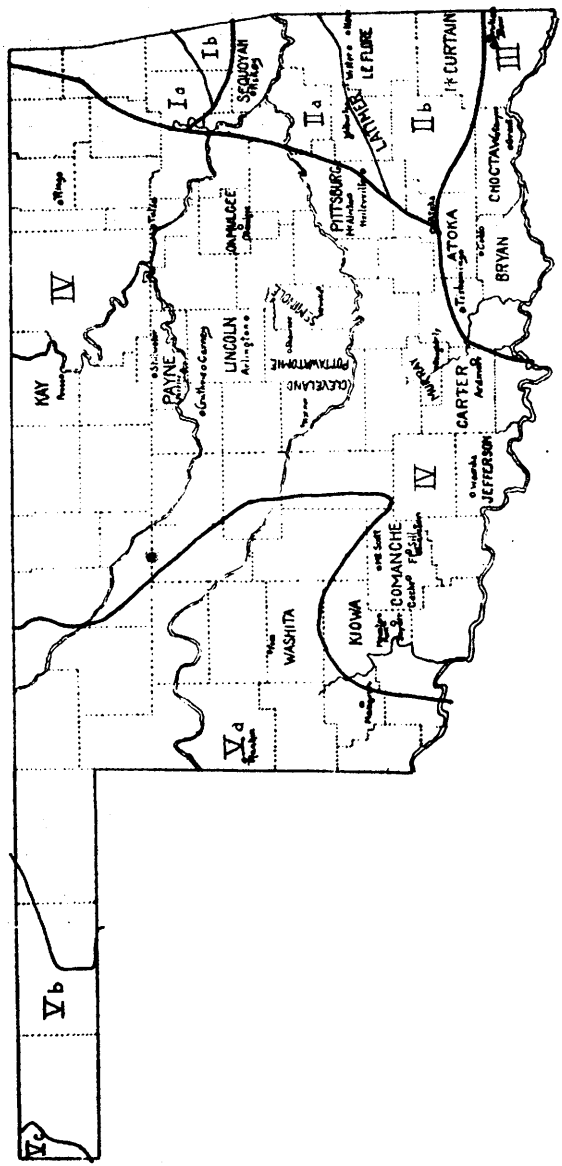
Ia
Ib
IIa
IIb
III
IV
Va
Vb
Vc
Vd
KAY
PAYNE
LINCOLN
OKLAHOMA
POTTAWATOMIE
SEMINOLE
PITTSBURG
LATIMER
LE FLORE
MCCURTAIN
CHOCTAW
ATOKA
BRYAN
CARTER
JEFFERSON
COMANCHE
KIOWA
WASHITA

PLATE II

30 miles north of the Red River opposite the middle of the southern boundary. These rounded hills extend for about 30 miles in a general east and west direction. The Wichita Mountains rise near the southwestern corner of the state, and extend southeast for about 60 miles, gradually rising in height to the eastern end, where they culminate in the peaks Mt. Scott and Mt. Sheridan. The Wichitas consist of a main mountain mass 150 square miles in extent, and a large number of neighboring sharp knobs, which rise like islands from the smooth plains about them. The whole group forms an archipelago of rugged granite mountains and peaks standing abruptly out of the sea-like plains of the region.

The rainfall is greatest in the southeastern part of Oklahoma, where it averages about 43 inches per year. Toward the west it diminishes steadily, so that most of the central portion of the state has a rather scanty rainfall, and the western part of the "Panhandle" is classed as steppe, with only 15 inches annual precipitation.

The principal vegetation regions of Oklahoma correspond rather closely with the humidity zones. The delimiting factor in most of the plant ranges seems to be the amount of rainfall. In accordance with this it is found that there is a gradual thinning out of eastern species toward the western portion of the state, the western limits of their ranges often extending as slender tongues along the valleys of the larger rivers, where the water supply is greater than in the adjacent plains. The same type of distribution will probably be found in the case of many of the eastern species of Orthoptera, especially those associated with forest conditions. As Ruthven[1] has shown, it is this interdigitation of eastern and western faunal and floral elements in the zone between the Great Plains and the central forest region which produces the characteristic features of the life of the prairie belt.

Oklahoma lies in part in the Mississippi valley forest region and in part in the Great Plains. The eastern third of the state is occupied chiefly by the timbered belt. The southern forest region, characterized by the presence of longleaf, shortleaf, loblolly and slash pines, is represented by the mixed pine, hickory and oak forests found in the southeastern corner of the state. Hardwood forests cover the elevated regions north of the Arkansas river, and a belt west of the pine section of southeastern Oklahoma.

Westward the trees disappear, except along the stream courses and in the hills. The level uplands are grass-covered, with a luxuriant

[1]Ruthven, A. G., The Faunal Affinities of the Prairie Region of central North America, Amer. Nat., xlii, 1908, 388-393.

herbaceous growth in the spring that largely disappears as the season progresses. In the stream valleys groves of cottonwood, elm, hackberry, walnut, willow and other trees are found. The slopes of the Arbuckle and Wichita Mountains are clothed with forests in which scrub oak, red cedar and redbud are the most common trees. The high plains of the extreme western part of the state are almost entirely treeless, even along the streams.

The number of species of Orthoptera occurring in Oklahoma should be large, on account of the diverse environmental conditions comprized within its boundaries. As will be noted from the accompanying map, no Orthoptera have ever been collected in the northwestern third of the state. The present list of species and varieties will probably be increased one-half or two-thirds when intensive collecting has been done in all parts of the state. This is supported by what is known of the local distribution of the plant species; only 5% are found throughout Oklahoma, while 95% reach the limit of their distribution within its boundaries. Of the entire flora, 70% is the westward extension of Mississippi valley species, with another 7% probably derived from that source; 21% is derived from the Great Plains or more westerly regions; and 2% is thought to be of local origin. A larger proportion of the Orthoptera may be expected to be of Great Plains affinities, since the family Acrididae, which forms so large a section of the order, seems to be especially rich in species in the semi-arid regions of the west.

NOTES ON COLLECTING LOCALITIES.

In 1905 Morse visited the prairie plains of southwestern Oklahoma at Mountain Park, Kiowa County, and Cache, Comanche County, and also collected in the Wichita Mountains on Mt. Sheridan, Comanche County. His excellent description of conditions in these vicinities (Morse 07:20-22) might be applied almost word for word to the two principal localities, briefly described below, where the senior author collected in 1918. Reference should be made to Morse's paper for descriptions and photographs of environmental conditions and orthopteran habitats of these and the other Oklahoma and Indian Territory localities where he collected.

Fort Sill Military Reservation, Comanche County. Fort Sill is located beside Medicine Bluff Creek near its junction with Cache Creek, a few miles north of Lawton and about 13 miles east of Cache. Most of the surrounding country is a nearly level plain, cut to the east, north and northwest by the arroyos and flats of the two

creeks. In the late fall, at the time the collections were made, the plains were covered principally by a low dry mat of grama grasses, with occasional clumps of mesquite, Artemisia, dead bunch grasses, etc. The only woodland in the immediate vicinity was that which occupied the slopes and alluvial flats of the streams. Northwest of Fort Sill Medicine Bluff Creek flows at the base of a series of high, nearly vertical precipices which give it its name. These precipitous rock faces form the north sides of a group of rounded hills called the Carlton Mountains, outliers of the Wichitas. The surface of these hills and other similar ones in the neighborhood is composed of loose, reddish fragments of decomposing rock—a barren soil covered only by a scanty growth of bunch grasses and a few other small plants. The principal orthopteran habitats of the reservation are the sand and mud bars along the creeks; the thickets of vines and shrubbery along portions of the stream borders; the open forests of cottonwood, elm, oak, willow, hackberry and other trees growing in and near the creek valleys; the grassy prairie-plains; and the barren rocky hill slopes.

Mt. Scott, Comanche County. West of Fort Sill the jagged skyline of the Wichita Mountains stands out prominently, with Mt. Scott at the northeast end dominating the lesser peaks and ridges. The eastern front of the main range is about 10 miles distant from the military post, and although three trips were made to the mountains, including two ascents of Mt. Scott, the twenty mile walk out and back to the fort consumed most of the collector's time and energy, so that few specimens were secured. Additional habitats were represented, but no species were taken which were not found on the reservation.

Mt. Scott and Mt. Sheridan, the two highest peaks of this portion of the group, rise well over 2,500 feet above sea-level, though they stand only 1200-1300 feet above the plains which they front to the north and east. Morse's description of Mt. Sheridan applies almost equally well to the other mountain. The slopes of Mt. Scott are strewn with talus fragments of all sizes, some of them enormous rock masses leaning against each other, or balanced in apparently precarious positions on the upper slopes. Portions of the lower slopes are covered with grass and low shrubs, but most of the mountain is clothed with forest, in places open and sunny, elsewhere dense and matted with vines and brush; oaks predominate, mingled with numerous cedars toward the summit. The grassy lower slopes, the open forests, and rock ledges near the summit were examined.

The more important localities where material was obtained in the summers of 1924 and 1925 by the junior author and his assistants are described below.

Dougherty, Murray County. Most of the Orthoptera collected at Dougherty were taken from one habitat. This habitat could hardly be classed as a typical short grass association, owing to the fact that there were ledge outcrops of shale, and shaly limestone at frequent intervals. The characteristic grasses were the Boutelouas. The habitat was situated on a hillside facing the southwest. There were patches of scrub-oak here and there, evidentally migrants from the adjacent oak associations. At the bottom of the hill, the prairie shaded out into a level, second river bottom, which owing to heavy grazing had become heavily infested with weeds. At the time during which collecting was done, the dominant form in the lower portion of the habitat was "nigger head", *Rudbeckia hirta* L., with the mint, *Monarda* sp. as the subdominant. This aspect persisted during the month of June.

Sawyer, Choctaw County, July 12, 1925. About one-half mile west of Sawyer the Kiamichi river meanders on its flood-plain between high, steep banks. At this time of low water parts of the flood-plain near the river were covered with a tangled mass of vines and shrubbery, in which some collecting was done. Back of the river bluffs, on the west side of the river, are cultivated fields, and grassy pastures shaded by scattered oaks, where additional material was obtained.

Broken Bow, McCurtain County, June 19-July 8, 1925. Broken Bow lies in hilly and rolling country, which was originally covered with forests of mixed pine and oak. When these forests were lumbered over, only the smallest trees were left, and the present forests are composed of these remnants and of second growth which has since sprung up. Much of the collecting at this locality was done along the rocky bed of Yanubbe creek, which is bordered by sycamore, elm, pine and oak. Orthoptera were also collected in the open, grassy groves of young oaks and pines on the low hills, and in open fields and cultivated land.

Red River, 1 mile west of the Arkansas line, McCurtain County, July 1-2, 1925. The Red River is typical of the larger streams of the prairie region. During the dry season it flows in a narrow channel, meandering from side to side in a broad, sandy flood-plain which may be as much as one to three miles in breadth. This flood-plain lies 10 to 20 feet below the level of the surrounding country, and is bounded in part by high precipitous banks. In flood time

the water fills the broad river plain from bank to bank. This locality was visited during the season of low water; Orthoptera were collected on the sandy flats bordering the stream, in the belt of cottonwoods at the margin of the sand flats, and in the edges of the open hardwood forest on the uplands back of the river bluffs.

Two miles north of Wister, Le Flore County, July 15-16, 1925. Camp was made near the edge of a shallow prairie pond on the uplands. Most of the collecting was done by sweeping vegetation; this consisted of grasses and typical prairie flora, gradually giving place to a growth of sedges near the margin of the lake.

Eighteen miles southwest of Wister, Le Flore County, July 15-16, 1925. This locality was just to the south of Holston Creek and camp was made on the top of a hill in a typical grassy open oak woods. The soil was not plentiful but present as a thin layer over the rock composing the hill. The ground was covered with great numbers of rocks of all sizes and most of the soil present supported a good growth of grass.

Seven miles west of De Queen, Sevier County, Arkansas, July 17, 1925. This locality is in reality a short distance over the Oklahoma line, in Arkansas. Collecting was done in a low, moist area covered with a forest of scrub oak, which had suffered repeatedly from fire. This had destroyed all logs and decaying wood. It was rather barren situation, witth little of the fauna usually associated with forest conditions.

LIST OF LOCALITIES WHERE COLLECTIONS HAVE BEEN MADE.

The following list is intended to include all localities where Orthoptera have been collected in Oklahoma, no matter how small the amount of work which was done there. County and elevation are not repeated in the list of species, nor is the date unless collecting was done over a considerable interval of time. The authors are under obligation to Mr. A. N. Caudell for aid in placing some of the localities which have appeared in the literature. With few exceptions, all of them appear on the accompanying map.

Ardmore, Carter County, June 1 (C. R. Jones).

Arlington, Carter County.

Broken Bow and vicinity, McCurtain County, June 19 to July 8, 1925 (A. I. Ortenburger).

Cache, Comanche County, Aug. 23, 25, 1905 (A. P. Morse), 1,275 ft.

Caddo, Bryan County, Aug. 8, 1905 (A. P. Morse), 700 ft.; Davis).

Caddo Hill, near Caddo, Bryan County, Aug. 9, 1905, (A. P. Morse), 800 ft.

Carney, Lincoln County, April 16, 1895 (B. F. Perkins).

Cherokee Nation, Indian Territory, 1894 to 1901 (A. N. Caudell). This comprised what are now the counties of Nowata, Craig, Rogers, Mayes, Delaware, Wagoner, Cherokee, Adair, Sequoyah, Tulsa and Washington.

Creek Nation, Indian Territory, 1901 (A. N. Caudell). Creek Nation comprised the counties lying between the Arkansas and Canadian Rivers west to and including Creek, Okfuskee, the north half of Hughes, and the south half of Tulsa Counties.

Dougherty, Murray County, summer 1924 (H. M. Hefley, Jr.).

Fort Sill Military Reservation, Comanche County, Oct. to Dec., 1918, (T. H. Hubbell).

Foss, Washita County, between July 17 and Aug. 8, (Davis).

Grant, Choctaw County, July 12, 1925 (A. I. Ortenburger).

Guthrie, Logan County, Oct. 17, 1922, (A. N. Caudell).

Haileyville, Pittsburg County, Aug. 6, 1905, (A. P. Morse), 650 ft.

Howe, Le Flore County, Aug. 4-5, 1905, (A. P. Morse), 500 ft.

Lawton, Comanche County, July 29, 1915, (R. Painter).

McKey (Mackay), Sequoyah County, (S. E. Meeks).

Mangum, Greer County, July 26, 1915, (R. Painter).

Mt. Marcy, Wichita Mts., Comanche County.

Mt. Scott, Wichita Mts., Comanche County, fall of 1918, (T. H. Hubbell).

Mt. Sheridan, Wichita Mts., Comanche Co., Aug. 24, 1905, (A. P. Morse); base (est.) 1,600 ft; summit, 2,500 ft.

Mountain Park, Kiowa County (not Tillman, as given by Rehn), Aug. 22-23, 1905 (A. P. Morse), 1,360-1,690 ft.

Norman, Cleveland County (University of Oklahoma).

Okmulgee, Okmulgee County, Apr. 1920, (A. Thompson).

Perkins, Payne County, 1901, (A. N. Caudell).

Ponca City, Kay County, Sept. 21, 1906, (A. C. Burrill), 1,000 ft.

Rankin, Cheyenne County, June 1919, (R. B. Jones).

Red River, 1 mile west of the Arkansas-Oklahoma boundary line, McCurtain County, June 30 to July 8, 1925, (A. I. Ortenburger).

Ringo, Cherokee Nation, Indian Territory (now in Nowata County), 1896, (A. N. Caudell); (the immediate collecting locality

was in a great bend of the Caney or Little Verdegris River—Caudell).

Shawnee, Pottawatomie County, Aug. 26, 1905, (A. P. Morse), 1,000 ft.

South McAlester, Pittsburg County, Aug 7, 1905, (A. P. Morse), 700-850 ft.

Snyder, Kiowa County, Aug. 23, 1905, (A. P. Morse), 1,350 ft.

Stillwater, Payne County, 1892-1897, (A. N. Caudell), 870 ft.

Tishomingo, Johnston County, April 15, 1916.

Tulsa, Tulsa County, 1920, (W. E. Espy).

Waurika, Jefferson County, 850 ft.

Wewoka, Seminole County, Aug. 27, 1905, (A. P. Morse), 800 ft.

Wilburton, Latimer County, Aug. 27, 1905, (A. P. Morse), 650 ft.

Wister, 18 miles southwest, Le Flore County, July 15-16, 1925. (A. I. Ortenburger).

LIST OF SPECIES

In the following list an attempt has been made to include all species definitely recorded from Oklahoma. The list is probably incomplete, due to the authors' inability to examine all of the literature; nevertheless it is believed that but few omissions have been made. Some of the published records undoubtedly are erroneous; a few such cases have been noted and corrected. No mention is made in the list of records from "Okla." or "Ind. Terr." if a more definite locality has been given for the species by any author. Specimens determined by Rehn in 1919 are indicated by a star. All of the material mentioned as being in the United States National Museum has been determined by Caudell.[1]

DERMAPTERA

Labia minor (Linnaeus)

Stillwater, April 23, 1893 (Caudell 02:83).

An introduced species. Two or three native species of earwigs should also be found in the state.

[1]Since the preparation of this paper, an important study—"The Orthoptera of South Dakota"—has been published by Mr. Morgan Hebard (Proc. Acad. Nat. Sci. Phil., lxxvii, 1925, pp. 33-35). In this paper Mr. Hebard gives full data on the distribution of the majority of the species here listed, as well as much information on habitat relations, and new synonymy.

ORTHOPTERA

BLATTIDAE

Blattella germanica (Linnaeus)

Stillwater (Caudell 02:83—Blatta).

Ischnoptera deropeltiformis (Brunner)

Two miles north of Broken Bow, June 28, 1925. 1 female.

This species occurs throughout the eastern United States south of New Jersey and Indiana; the westernmost records are Ottawa, Kansas, and Victoria, Texas.

Parcoblatta bolliana (Saussure & Zehntner)

Stillwater, Perkins (Hebard 17:81).

Parcoblatta pensylvanica (DeGeer)

Creek Nation (juv.)—May 31, 1901; Stillwater (Caudell 02:83—Ischnoptera); Stillwater, Howe—Aug. 4, 1905, Atoka—July 29, 1905 (Hebard 17:149).

Parcoblatta divisa (Saussure & Zehntner)?

Sawyer—July 12, 1925, 1 female; Red River, McCurtain Co.—July 2, 1925, 1 female, 1 large nymph.

Females of this species are very difficult to separate from those of *P. pensylvanica* in many cases. The coloration of both of the adults is recessive. In one the interocular distance is slightly less than the interantennal, in the other subequal; the pronotum of the larger individual measures 4.2x5.8 mm. Mr. Morgan Hebard has kindly examined this pair, and writes that in his opinion they probably represent *divisa*, but males would be necessary to verify the determination.

Blatta orientalis Linnaeus

Stillwater (Caudell 02:83—Stylopyga).

MANTIDAE

Litaneutria minor (Scudder)

Fort Sill, Nov. 15, 1918, 1 female.*

Taken on the open, dry prairie, running actively about on bare, trampled soil.

Stagmomantis carolina (Johannson)

Perkins—Oct. 7, 1901 (Caudell 02:83).

2 miles north of Wister, July 15-16, 1925, 1 small nymph. Sweeping.

PHASMIDAE

Diapheromera veliei Walsh

Stillwater (Caudell 02:83-84).

The Oklahoma females mentioned by Caudell (13:876) as having the spines of the posterior femora aborted are the Perkins specimens which form the basis of his later record of the next species.

Manomera blatchleyi (Caudell)

Oklahoma (Caudell 18:259; Blatchley 20:141).

Perkins, Aug. 13, 1901, (Nellie Caudell), (U. S. Nat. Mus.)

Two miles north of Broken Bow, June 22, 1925, 1 nearly adult female nymph.

The head of the nymph is crushed, but the total absence of spines on the posterior femora seems to show it to be a *Manomera*, rather than *Diapheromera veliei* or *mesillana*, which closely resemble *M. blatchleyi* in the female sex.

Parabacillus coloradus palmeri Caudell

Oklahoma (Caudell 13:613).

The antennae of *P. coloradus* are shorter than the anterior femora, which easily distinguishes it from all other walking-sticks found in the United States.

Anisomorpha ferruginea (Beauvois)

Sawyer, July 12, 1925, 1 large female nymph. Sweeping vines and shrubbery on the flood plain of the Kiamichi river.

ACRIDIDAE

Acrydiinae (Tetriginae)

Nomotettix cristatus arcuatus Hancock

Caddo (juv.), Haileyville, S. McAlester, (juv.), (Morse 06:119; 07:25—*N. c. denticulatus*); Oklahoma (Blatchley 20:159—*N. c. floridanus*.)

Rehn & Hebard (16:132) have shown that Morse's *denticulatus* is merely the westward development of the southern race *arcuatus*, showing a distinct tendency toward *N. c. compressus* of the east central states.

Acrydium ornatum Say

Payne County (Caudell 02:84—Tettix).

Acrydium arenosum arenosum (Burmeister)

Howe, S. McAlester (Morse 07:25—Tettix).

Neotettix femoratus (Scudder)

Caddo, Haileyville, Howe, S. McAlester, Wilburton (Morse 07:25).

Paratettix cucullatus (Burmeister), intermediate between subsp. *cucullatus* and *texanus* Hancock.

Haileyville, Howe, S. McAlester, Wewoka, Cache, Mountain Park, Shawnee, base of Mt. Sheridan (Morse 07:26).

Fort Sill, Oct. 25, 1918, 2 males, 6 females*, Red River, McCurtain Co., July 2, 1925 4 females.

Material from Fort Sill which was sent to Rehn was stated by him to be virtually intermediate between *cucullatus* and *texanus*. The Red River specimens show the same feature. Since the area of intergradation between the two races is broad, it seems likely that most or all of Morse's material was likewise intermediate.

Paratettix aztecus (Saussure)

Base of Mt. Sheridan, Wichita Mts., Aug. 24, 1905 (Morse 07:26—Telmatettix[3]).

"A single male of this species was taken in the stony bed of a small stream at the foot of the northern talus slope of Mt. Sheridan, hidden in the woods." This constitutes the northernmost record for this Mexican species, known elsewhere in the United States only from New Mexico, Arizona, and California.

Tettigidea lateralis lateralis (Say)

Stillwater (Caudell 02:84); Caddo, Haileyville, Howe, S. McAlester, Wewoka, Wilburton (Morse 07:27).

Tettigidea armata Morse

Howe (Morse 07:27; R. & H. 16:163). Sweeping on moist bottom lands.

Acridinae (Tryxalinae)

Mermiria neomexicana (Thomas)

Perkins—Aug. 13, 1901 (Caudell 02:84); Caddo (juv. 2, 3), Cache, Mountain Park, base and summit of Mt. Sheridan (Morse 07:80); Cherokee Nation, Aug. 1896 (Caudell 02:84; Rehn 19:80).

Fort Sill, Sept. 27-Nov. 10, 1918, 2 males, 3 females*.

Common on the grassy prairie-plains of central and western Oklahoma.

Mermiria picta (Walker)

Mackay (McKey) (McNeill 97:207—M. rostrata n. sp.), Perkins—Aug. 13, 1901; (Caudell 02:84—M. rostrata; Rehn 19:87);

[3]Hebard has recently shown that *Telmatettix* is inseparable from the older *Paratettix*. (1923—Acrididae of Colombia).

Stillwater (Caudell 02:84; Rehn 19:87); Wilburton (juv. 5), Shawnee (Morse 07:27; Rehn 19:87); Waurika—Oct. 14, 1909 (Rehn 18:88).

Found among coarse grasses in the vicinity of a stream, and in prairie meadow (Morse). Uvarov has recently shown *M. alacris* Scudder to be synonymous with *picta* (Walker).

Mermiria bivittata (Serville)

Perkins—Aug. 13, 16, 1901 (Caudell 02:84; Rehn 19:101); Mountain Park, Cache, S. McAlester, Wilburton, Caddo (Morse 07:28 in part; Rehn 19:101).

Invariably confused with the next species until they were separated by Rehn in 1919. Rehn states that the occurrence of *bivittata* within its range (North Carolina and Georgia west to Texas, north to Nebraska and Iowa) is governed by the presence of rich grasslands, and it does not occur as far west or as high as the Great Plains region, being entirely a species of the humid district. Its range in part overlaps that of *m. maculipennis* in eastern Texas, Oklahoma, Kansas, Nebraska and Iowa, but, as *maculipennis* is essentially an arid land type, over most of their territories the other species does not occur.

Mermiria maculipennis maculipennis Bruner

Atypical: Mountain Park, base of Mt. Sheridan (Morse 07:28—bivittata; Rehn 19:111).

Intermediate between *m. maculipennis* and *m. macclungi* Rehn: Base of Mt. Sheridan, (Morse 07:28—bivittata; Rehn 19:111); Perkins—Aug. 13, 1901; (Caudell 02:84—M. rostrata; Rehn 19:87);

Mermiria m. maculipennis a characteristic form of the arid and semi-arid grass lands of the south-western United States. Northward it intergrades with its Great Plains and Great Basin representative, *M. m. macclungi*, Oklahoma lying in the zone of intergradation.

Syrbula admirabilis (Uhler)

Perkins, Aug. 1901, Stillwater (Caudell 02:84); Caddo, Haileyville, Howe, S. McAlester, Wilburton, Cache, Mountain Park, Shawnee, base and summit of Mt. Sheridan (More 07:28).

Fort Sill, Oct. 27-Dec. 1, 1918, 7 specimens*; Sawyer, July 12, 1925, 1 male.

Opeia obscura (Thomas)

Cache, Mountain Park (Morse 07:29).

Fort Sill, Oct. 14-Dec. 1, 1918, 3 males, 4 females*; Mt. Scott,

Nov. 10, 1918, 1 female*. Common on the dry plains and on the grassy lower slopes of Mt. Scott.

Amphitornus coloradus (Thomas)

Cache, Mountain Park (Morse 07:29—A. bicolor).

Taken chiefly among mesquite grass, in company with the last (Morse).

Blatchly and Caudell believe that this species should continue to bear its old name, *bicolor* (Thomas), in spite of the fact that it was referred to a genus in which that name was preoccupied. Upon its removal to the present genus the old name should have been reinstated, in their opinion. The authors have followed the usage of Rehn and Hebard in this case. Mr. Caudell informs us that Akentetus McNeill is certainly a synonym of Amphitornus McNeill, the type of the former, *A. unicolor* McNeill, having proven to be only a variety of *Amphitornus coloradus* lacking the supplemental longitudinal carinae of the pronotum.

Amblytropidia occidentalis (Saussure)

Caddo, Haileyville, Howe, S. McAlester (all juv.) (Morse 07:29).

Phlibostroma quadrimaculatum (Thomas)

Cache, Mountain Park (Morse 07:30). A Great Plains species not uncommon locally in mesquite grass, associated with *Opeia Agoneotettix, Encoptolophus costalis,* etc. (Morse).

Orphulella pelidna (Burmeister)

Caddo, Haileyville, S. McAlester, Wilburton (Morse 07:30).

Fort Sill, Oct. 27-Nov. 10, 1918, 1 male, 1 female*.

Abundant in grasslands throughout the south.

Orphulella speciosa (Scudder).

Perkins, Aug. 12 (Caudell 2:84—O. picturata).

Oklahoma, 1 specimen without locality (U. S. Nat. Mus.).

Caudell writes that "this species differs from *picturata* by having the prozona of the pronotum noticeably longer than the metazona, a rather slight character. I now find that the specimens from Perkins, formerly determined and recorded by me as *picturata,* are really *speciosa* by the above noted pronotal character."

Orphulella picturata Scudder

Haileyville, Howe, Cache, Mountain Park, Shawnee, Snyder (Morse 07:30).

Orphulella decora (McNeill)

Cache, Shawnee, summit of Mt. Sheridan (Morse 07:31). A local species, not uncommon in the denser growths of grass in the damper parts of fields in the territory inhabited by it (Morse).

Dichromorpha viridis (Scudder)

Howe, Shawnee (Morse 07:31); central Oklahoma (Blatchley 20:231).

Fort Sill, Oct. 27, 1918, 1 female*; Red River, McCurtain County, July 2, 1925, last stage male and female nymphs; 2 miles north of Broken Bow, July 8, 1925, 1 female.

The specimen from Fort Sill was taken in herbage growing on a mud bar beside Medicine Bluff creek. This species ranges from New England and southern Michigan to Florida and Texas. It prefers moist situations, and is limited in distribution to the west by the arid plains. Like many other species of the humid district, it follows the stream valleys far out into the prairie plains, though unable to exist on the drier upland.

Boopedon auriventris McNeill

Caddo, Haileyville (Morse 07:32). A sylvan species peculiar to the southern half of the forested region between the Mississippi River and the Great Plains (Morse).

Boopedon nubilum (Say), var. *maculatum* Caudell.

Dougherty, June 19, 1924, 1 male. Taken in alfalfa field. A species of the prairie and plains regions, extending from Texas to Kansas and Colorado.

Ageneotettix deorum (Scudder)

Stillwater (Caudell 02:85—A. scudderi); Caddo (Morse 07:32).

Fort Sill, Oct. 16-Dec. 1, 1918, 12 specimens*; Mt. Scott, Oct. 27-Nov. 10, 1918, 4 specimens.

Common on the grassy plains of the military reservation, and on the lower slopes of Mt. Scott, in the grassy openings among the trees. A widely distributed species ranging from Saskatchewan and Manitoba east to southern Michigan, south and west to Texas and Utah.

Aulocara elliotti (Thomas)

Cache, Snyder (Morse 07:32). A campestrian species ranging from British Columbia, Alberta and North Dakota to Mexico and California.

Oedipodinae

Arphia xanthoptera (Germar)

Stillwater, Perkins—Aug. 13, 1901 (Caudell 02:85—in part as *A. carinata*); Caddo (juv. 5), Haileyville, Howe (juv. 5), Wilburton, Cache, Shawnee (Morse 07:33).

Fort Sill, Oct. 27-Dec. 1, 1918, 1 male, 1 female*.

A common species in dry fields and openings in woodlands throughout a large part of the eastern half of the country, maturing in the autumn (Morse).

Arphia conspersa Scudder

Stillwater (Caudell 02:85). Recorded from Minnesota and Kansas to Mexico.

Arphia simplex Scudder

Caddo, Howe (Morse 07:33—A. luteola).

Fort Sill, Oct. 27-Nov. 10, 1918, 1 male, 1 female (det. by Rehn as *luteola*); Daugherty, June 26, 1924, 1 female (det. Hebard 1926).

The Fort Sill specimens were taken on the grassy plains; the female from Dougherty among weeds at the side of a road. Mr. Morgan Hebard informs us that *Arphia luteola* Scudder is merely a synonym of *A. simplex*. Morse recorded *simplex* from Caddo Hill (07:33), and the species is mentioned in literature from Nebraska, Texas, Utah and Mexico; many of these records probably refer to other species of the genus. As *luteola* it has been recorded from Kansas, Texas, Utah and Colorado.

Arphia sulphurea (Fabricius)

Stillwater, Perkins (Caudell 02:85); Caddo, Haileyville, Howe, S. McAlester (Morse 07:33).

Dougherty, June 24, 1924, 1 female; Sawyer, July 12, 1925, 1 male; Broken Bow, June 19-22, 1925, 4 males, 4 females (in part determined by Morgan Hebard 1926); 18 miles southwest of Wister, June 15-16, 1926, 2 males, 4 females.

This species has much the same range as *A. xanthoptera*, and occurs in similar situations; it matures, however, in the spring and early summer, while *xanthoptera* is a fall species. One male and two females from Broken Bow are remarkable for having orange-colored wings instead of the usual yellow ones.

Chortophaga viridifasciata (DeGeer)

Stillwater, Perkins (Caudell 02:85); Caddo, Haileyville, Howe (juv. 5), S. McAlester, Wilburton (juv. 5), Cache, Mountain Park (juv. 5), Shawnee (juv. 5) (Morse 07:33-34).

Dougherty, June 26, 1924, 1 female (prairie); Grant, July 12, 1925, 1 male; Broken Bow, July 6-8, 1925, 2 females; 10 miles southeast of Broken Bow, June 27, 1925, (juv. 5).

One of the most ubiquitous locusts of the eastern half of the continent, inhabiting a great variety of environments, chiefly campestral and on soil containing a moderate amount of moisture (Morse). Nymphs of this species may be found throughout the winter.

Encoptolophus costalis (Scudder)

Caddo, Snyder (Morse 07:34—*parvus*). A locally common species frequenting the dark, chocolate-colored humus of the exposed shores of dried-up ponds and ditches, and not infrequently found in cultivated fields (Morse).

Pardalophora apiculata (Harris)

Cherokee Nation, Indian Territory (Caudell 02:85—Hippiscus tuberculatus).

Pardalophora phoenicoptera (Burmeister)

Stillwater, Perkins—Aug. 1901 (Caudell 02:85—Hippiscus). Caddo, Haileyville, Howe (Morse 07:35—Hippiscus).

Broken Bow, June 19-22, 1925, 1 male, 4 females; 18 miles southwest of Wister, June 15-16, 1925, 4 males, 1 female.

A very common species in the grasslands and cultivated fields of the southeastern United States.

Pardalophora saussurei (Scudder)

Mangum, July 26, 1915, (R. Painter), 1 male; Lawton, July 29, 1915, (R. Painter), 1 female (U. S. National Museum—determined as *Hippiscus saussurei* by Caudell).

According to Mr. Caudell this species may be confused with *X. corallipes* (which he places in Hippiscus), the two differing chiefly in the coloration of the lower and inner sides of the hind femora, these areas being blue in *saussurei* and coral red in *corallipes*. In the case of specimens preserved in alcohol these colors in both species turn yellow. This genus or group of genera is badly in need of revision.

Hippiscus rugosus (Scudder)

Stillwater (Caudell 02:85—H. variegatus); Caddo (juv. 5), Haileyville, (juv. 5), Howe, (juv. 3, 4, 5), S. McAlester (juv. 5). Wilburton, Cache, Mountain Park, Shawnee, base and summit of Mt. Sheridan (Morse 07:35).

Fort Sill, Oct. 16-Dec. 1, 1918, 2 males, 1 female*; Mt. Scott, Oct. 27, 1 male*.

A common species which ranges from New England and Indiana to Colorado, south to northern Florida and central Texas.

Xanthippus corallipes (Haldeman)

Cache, Mountain Park, Snyder (Morse 07:34—Hippiscus).

Dougherty, June 4, 1924, 1 female (taken on grassy prairie).

Not uncommon locally among mesquite grass and along roadsides (Morse). Said to range from Dakota and Wyoming to Kansas, Texas, Arizona and Utah.[3]

Leprus elephas Saussure

Fort Sill, Nov. 2, 1918, 1 female*. Apparently the northernmost record for the species, which has been reported from Texas, Arizona and Mexico.

Dissosteira carolina (Linnaeus)

Perkins (Caudell 02:85); Caddo, Haileyville, Howe, S. McAlester, Cache, Mountain Park, Shawnee, Snyder (Morse 07:36).

Fort Sill, Oct. 14-Nov. 10, 1918, 2 males, 4 females; Dougherty, June 16-26, 1924, 3 males, 4 females; Broken Bow, June 22-July 6, 1925, 1 male, 1 female; 10 miles southeast of Broken Bow, June 25, 1925, 1 male; 18 miles southwest of Wister, July 16, 1925, 1 male; 7 miles west of DeQueen, Sevier Co., Arkansas, July 17, 1925, 1 male.

The common Carolina locust; occurs throughout temperate North America along roadsides, in waste fields, and on bare ground.

Dissosteira longipennis (Thomas)

Perkins, Aug. 16, 1901 (Caudell 02:86); Mountain Park (Morse 07:36).

Fort Sill, Oct. 27, 1918, 1 male*. No other specimens were seen in this vicinity. This male was very wary and difficult to capture; it was followed for over a quarter of a mile across the grassy prairie before it was finally taken. The species ranges from Idaho and Montana through Colorado, Wyoming, Nebraska, Kansas, and Oklahoma to Texas and New Mexico. It occasionally appears in numbers large enough to cause severe damage to crops.

[3]Hebard has recently stated (Proc. Acad. Nat. Sci. Phil., lxxvii, 78-79, 1925) that *Xanthippus corallipes* (Haldeman) is divisible into several geographic races, *X. c. albulus* Scudder being that which should occur in the western half of Oklahoma. Some of the records of *X. corallipes* may apply to the very similar *X. montanus* (Thomas), which has a wide but discontinuous distribution in sandy areas from Arizona and New Mexico north to Colorado and Nebraska.

Spharagemon bolli Scudder

Caddo, Haileyville, Howe, base and summit of Mt. Sheridan (Morse 07:37).

Fort Sill, Oct. 27, 1918, 1 female*; Sawyer, July 12, 1925, 1 male, 1 female; Red River, McCurtain Co., July 1, 1925, 1 female; Broken Bow, June 19-29, 1925, 1 male, 1 female.

This species is one of the few sylvan geophilous locusts, its distribution coinciding with that of dry woodlands, in which it is usually associated (in this region) with *Melanoplus keeleri keeleri* and *M. ponderosus ponderosus*—(Morse). All of the specimens here recorded were taken in dry, open forests, mostly bordering streams.

Spharagemon equale (Say)

Cache, Mountain Park, base of Mt. Sheridan (Morse 07:36—*aequale*).

Fort Sill, Oct. 15-Dec. 1, 1918, 3 males, 3 females*; Mt. Scott, Nov. 10, 1918, 1 male, 1 female*; 18 miles southwest of Wister, June 16, 1925, 1 female.

Minnesota to British Columbia, south to Texas and Utah. Very common on bare soil on the arid plains, and along roadsides in company with species of *Trimerotropis, Hadrotettix*, and *Dissosteira*.

Spharagemon cristatum Scudder

Perkins, Aug. 16, 1901 (Caudell 02:86); Cache, Mountain Park, Shawnee (Morse 07:37).

Fort Sill, Oct. 13-Dec. 1, 1918, 6 males, 4 females*; Mt. Scott, Nov. 10, 1918, 3 males, 1 female*.

Common in barren areas on the dry plains, and on the stony, barren slopes of the Carlton mountains; also common on the rocky grass-covered slopes of Mt. Scott. These observations do not agree with Morse's statement that its distribution is concident with that of areas of loose sand or very light soil, though it is probably most abundant in such areas. *S. cristatum* has been recorded from Kansas and Nebraska south to New Mexico, Texas, and Mexico. It is possibly no more than a race of *S. collare* (Scudder).

Mestobregma kiowa (Thomas)

Mountain Park (Morse 07:38—Trachyrhachis).

Mestobregma fuscifrons (Stal)

Cache, Mountain Park, Shawnee (Morse 07:38—Trachyrhachis).
Fort Sill, Oct. 29, 1918, 1 male. (Dry grassy prairie).

Mestobregma obliterata (Bruner)

Mountain Park (Morse 07:38—Trachyrhachis).

Mestobregma thomasi Caudell

Caddo, Haileyville, Howe, base of Mt. Sheridan (Morse 07:37—Trachyrhachis) 18 miles southwest of Wister, June 16, 1925, 1 female.

In 1907 Morse presented evidence to show that the four so-called species listed above are merely forms of a single plastic species, *Mestobregma kiowa*. They differ from each other only in the coloration of the wing, and in large collections from various localities perfectly graded series can be made connecting one form to another. *M. thomasi* has wings with a broad, complete transverse fuscous band and a lemon-yellow disk; *fuscifrons* has a narrower, usually broken band and yellow disk; in *obliterata* the wing band is reduced to faint cloudings in the radial and posterior parts of its course or is frequently lacking, and the disk is usually yellow; in *kiowa* the wing band is absent and the disk hyaline. The exact relationship of these forms to each other is not yet fully understood; it is, however, evident that there is a definite correlation between the humidity of the environment and the degree of wing coloration. *Mestobregma thomasi*, the most brilliantly colored, occupies the humid region from Georgia to eastern Oklahoma; *fuscifrons* and *obliterata*, intermediate in coloration, overlap in range to a considerable extent, but occur in the semi-arid parts of Oklahoma and Texas; and *kiowa* is the characteristic form of the arid Staked Plains.

That this relation between humidity and wing coloration is not a simple and direct one is suggested by the fact that in North Dakota, which has a much greater humidity on the east than on the west side, the typical form of *kiowa* occurs throughout the state, and none of the others are present, except in so far as a very small number of individuals show a slight tendency toward *obliterata*. Morse regards these four types as geographical varieties or races, though he apparently attributes their characteristic features to the direct effect of the environment on an unusually plastic species. Blatchley (20:290) treats *M. thomasi* as a distinct species, in spite of the strong evidence against this view. If it can be shown be rearing under diverse experimental conditions that this variation in wing color is actually caused by the direct effect of the environment upon the somatic tissues, these forms can scarcely be regarded as geographic races in the ordinary sense of the term. If, on the other hand, the characters are inherited unchanged by variations in environment, it would indicate that the observed differences actually show at least incipient racial differentiation within the species

Mestobregma kiowa. There is great need for controlled breeding experiments to determine the true status of these forms. Numerous cases of this sort occur in the order Orthoptera, where the final decision regarding the validity of a species or race must await evidence based on breeding experiments.

Mestobregma plattei plattei (Thomas)

Oklahoma, no locality (U. S. National Museum—determined by Caudell as *Trachyrhachis plattei*). This is a form of the Great Plains region, south to southern Colorado; in New Mexico and in Arizona it is replaced by other races (Rehn).

Trimerotropis cincta (Thomas)

Stillwater (Caudell 02:86). Ranges from North Dakota to Texas and New Mexico.

Trimerotropis citrina Scudder

Stillwater, Perkins—Aug., 1901 (Caudell 02:86); Haileyville. Howe, Cache, Mountain Park, Shawnee, Snyder, (Morse 07:39).

Fort Sill Oct. 13-Dec. 1, 1918, 11 males, 9 females*; Dougherty, June 26-27, 1924, 2 females; Red River, McCurtain Co., July 2. 1925, 2 males, 6 females; 4 miles west of Broken Bow, July 8, 1925, 1 female; 7 miles west of DeQueen, Sevier Co., Arkansas July 17. 1925, 1 female.

Common throughout the southern states on bare ground, roadsides, cultivated land, etc.

Trimerotropis latifasciata Scudder

Cache, Mountain Park (Morse 07:39). Plentiful in northwestern Texas and Oklahoma, where it is found in abundance, associated with *Spharagemon equale*, etc., on roadsides and bare spots (Morse).

Trimerotropis pallidipennis (Burmeister)

Fort Sill, Oct. 27-Dec. 1, 1918, 5 males, 4 females*; Mt. Scott. Oct. 27, 1918, 1 male, 1 female*.

Common on the stony slopes of Mt. Scott. The prevailing color of the weathered rock fragments which compose the soil of the Carlton Mountains is a dull brownish red; the series from that locality reproduces this color almost perfectly. The tegmina of these Oklahoma specimens are suffused and the bands indistinct; the series has an entirely different aspect from other material of this species taken in the desert mountains of western Texas and Arizona, which is light-colored, with very contrastingly marked

tegminal bands and much narrower wing bands. Hebard has recently stated that *T. vinculata* Scudder, under which name this species has long been known, is synonymous with ***pallidipennis*** (Burm.).

Trimerotropis saxatilis McNeill

Haileyville, Mountain Park, summit of Mt. Sheridan (Morse 07:39-40).

These records define the southwestern limits of distribution of this rock-dwelling locust, which occurs elsewhere in southern Illinois, Tennessee, North Carolina, Georgia, and Arkansas.

Hadrotettix trifasciatus (Say)

Stillwater (Caudell 02:86); Caddo Hill, S. McAlester, Mountain Park, base of Mt. Sheridan (Morse 07:41).

Fort Sill, Oct. 27-Dec. 1, 1918, 1 male, 3 females*; Dougherty, June 26, 1924, 1 female; 18 miles southwest of Wister, June 16, 1925, 3 males, 6 females.

Common on the open grassy plains and along roadsides. Ranges from Alberta and Saskatchewan to Texas, New Mexico, Arizona, and Mexico.

Brachystola magna (Girard)

Stillwater (Caudell 02:86); Cache (Morse 07:41). A phytophilous species of the arid west, found usually on tall weeds such as sunflowers. Found throughout the Great Plains region from Wyoming and South Dakota to Texas, New Mexico, and Mexico.

Cyrtacanthacrinae (Acridinae, Locustinae)

Schistocerca americana (Drury)

Valley of Cimarron river near Perkins; Cherokee Nation, Jan. 18, 1895; common throughout the state (Caudell 02:86); Caddo, Wilburton, Cache, Shawnee, (Morse 07:43).

Ten miles southeast of Broken Bow, June 24, 1925, 1 male.

Schistocerca alutacea form *alutacea* (Harris)

Perkins, Aug. 18, 1901 (Caudell 02:86).

Guthrie, Oct. 17, 1922 (A. N. Caudell) (U. S. Nat. Mus.)

Fort Sill, Nov. 16, 1918, 1 male. From thicket of shrubbery and vines beside Medicine Bluff Creek, at the foot of the Medicine Bluffs.

Schistocerca alutacea form *rubiginosa* (Scudder)

Caddo, Shawnee (Morse 07:42).

Schistocerca lineata Scudder

Cache, base of Mt. Sheridan (Morse 07:43). Locally plentiful; usually found among the sunflowers and other coarse weeds along gullies, roadsides, and fences (Morse). Ranges from Colorado and South Dakota to Texas and Mexico.

Schistocerca obscura (Fabricius)

Caddo (Morse 07:43).

Schistocerca damnifica damnifica (Saussure)

Perkins, May, 1901 (Caudell 02:86). This is apparently the westernmost record.

Hypochlora alba (Dodge)

Caddo, Cache, Shawnee, base of Mt. Sheridan (Morse 07:44).

Fort Sill, Oct. 27-Dec. 1, 1918, 12 specimens; Mt. Scott, Oct. 27-Nov. 11, 1918, 3 specimens. Common on white sage (*Artemisia cana* Pursh) on the plains and on the lower slopes of Mt. Scott, and scarcely ever taken elsewhere than on this plant.

Campylacantha olivacea olivacea (Scudder)

Haileyville, Howe, S. McAlester, Wilburton, Cache, Mountain Park, Shawnee, base of Mt. Sheridan (Morse 07:44); Mt. Marcy (Blatchley 20:326).

Fort Sill, Oct. 18-Dec. 1, 1918, 3 males, 3 females*. Sweeping dry grasses and herbage on the open prairie (near Fort Sill), and tall dead grasses and weeds along the margin of the creeks.

Stillwater, Sept. 26, 1916, (R. Painter), both typical form and form *acutipennis* (U. S. Nat. Mus.)

Hesperotettix viridis (Thomas)

Fort Sill, Oct. 27, 1918, 2 females*; Dougherty, June 18-24, 2 males, 1 large male nymph. Sweeping grasses and weeds along the creeks at Fort Sill; the Dougherty specimens were found in an alfalfa field, a grassy pasture, and in roadside vegetation. This species ranges from South Dakota and Minnesota to Texas, and west to Arizona and southern California.

Hesperotettix brevipennis pratensis Scudder

Caddo, S. McAlester, Wilburton (Morse 07:45).

18 miles southwest of Wister, June 15, 1925, 1 male. Sweeping prairie vegetation near pond margin.

Hesperotettix speciosus (Scudder)

Caddo, Cache, Mountain Park (Morse 07:45); Caddo, Foss (Blatchley 20:335).

Fort Sill, Oct. 16, 1918,1 female*. Sweeping dry grass on the plains.

Paratylotropidia brunneri Scudder

Caddo Hill (Morse 07:46). A rare species, found among shrubby undergrowth of dry, stony woodlands (Morse). Recorded also from Dakota, Arkansas, and Texas.

Phoetaliotes nebrascensis (Thomas)

Caddo, Wilburton, Cache, base of Mt. Sheridan (Morse 07:53).

Fort Sill, Oct. 27-Dec. 1, 1918, 11 specimens*; Mt. Scott, Nov 10, 1918, 1 specimen. Sweeping dry grasses and other herbage of the prairie and lower mountain slopes.

Melanoplus bispinosus Scudder

Perkins, Aug. 16, 1901 (Caudell 02:87); Caddo Hill, S. McAlester, Wilburton, Cache, Shawnee, base and summit of Mt. Sheridan (Morse 07:46).

Fort Sill, Oct. 16-Dec. 1, 1918, 5 males, 6 females; Daugherty, June 16-26, 1924, 1 male, 1 female. Common on the prairies in the vicinity of Fort Sill.

Melanoplus bivittatus (Say)

Stillwater (Caudell 02:87); Caddo, Wilburton, Cache, base of Mt. Sheridan, Snyder (Morse 07:47).

Perkins, Oct. 19, 1922 (Mrs. Mary Cundiff) (U. S. Nat. Mus.); Fort Sill, Oct. 27-Nov. 10, 1918, 4 females; Dougherty, June 16-24, 1924, 5 females. At Fort Sill this species was common in the creeks valleys and in cultivated fields; the Dougherty specimens were taken on openly wooded hills, in alfalfa fields, and on prairie vegetation.

Melanoplus confusus Scudder

Perkins, May 28, 1901 (Caudell 02:88-M. minor).

Melanoplus differentialis (Thomas)

Common throughout the state (Caudell 02:87); Caddo, Howe, Cache Mountain Park, Shawnee, base of Mt. Sheridan (Morse 07:47).

Fort Sill, Nov. 2-10, 1918, 2 males, 5 females*; Dougherty, June 16-20, 1924, 25 large nymphs. Common along the stream courses in the tall grass and dead weeds at Fort Sill; at Dougherty nymphs were taken on the prairies, in open grassy woods, in roadside vegetation and alfalfa fields.

Melanoplus femur-rubrum femur-rubrum (DeGeer)

Haileyville, Howe, S. McAlester, Wilburton, Shawnee (Morse 07:47).

Fort Sill, Oct. 27, 1918, 1 male*.

Melanoplus flavidus Scudder, atypical.

Fort Sill, No. 2-10, 1918, 1 male, 2 females; Red River, McCurtain Co., July 2, 1925, 1 female. These specimens were kindly determined by Mr. Morgan Hebard. They are intermediate between *f. flavidus* and *f. elongatus* Scudder, the Texan and New Mexican race.

Melanoplus glaucipes Scudder

Mountain Park (Morse 07:48; R. & H. 09:164).

Fort Sill, Dec. 1, 1918, 1 female*. Sweeping on the stony slopes of the Carlton Mountains. The species is known from Kansas, Texas, New Mexico, and Mexico.

Melanoplus impiger Scudder

Shawnee (Morse 07:48).

Fort Sill, Oct. 27-Dec. 1, 1918, 3 males, 3 females; Mt. Scott, Nov. 10, 1918, 1 female.* Found on the open prairies, and in the open grassy forests on the upper slopes of Mt. Scott.

Melanoplus impudicus Scudder

Caddo, Howe, (Morse 07:49). Frequents the grasses of dry, open woodlands, and also sometimes found in fields of sandy or stony soil (Morse).

Melanoplus inconspicuus Caudell

Creek Nation, near Arlington, May 31, (Caudell 02:87-88-type locality).

Rehn and Hebard state (16:231) that this species is probably a member of the Fasciatus group, which includes *fasciatus, querneus, franciscanus, nigrescens* and *walshii*. It is not related to *juvencus* (= *viridipes)* as stated by Caudell.

The species is apparently known only from the single male type.

Melanoplus keeleri keeleri (Thomas)

Caddo Hill, Haileyville, Howe, S. McAlester, Wewoka, Wilburton, Cache, Mountain Park, base of Mt. Sheridan (Morse 07:49).

Fort Sill, Oct. 27-Dec. 1, 1918, 4 males, 1 female.* Taken in the margins of a grassy oak and elm grove on the flats of Medicine Bluff Creek.

Melanoplus keeleri luridus (Dodge)

Oklahoma (Fox 14:513).

Melanoplus latens Morse

Caddo Hill, Howe (Morse 06:120, 07:49). Caddo Hill is the type locality of this short-winged, red-legged species.

Melanoplus mexicanus atlanis (Riley)

Stillwater (Caudell 02:87—M. atlanis); Caddo, Caddo Hill, Howe, Cache, Mountain Park, Shawnee (Morse 07:46—M. atlanis).

Fort Sill, Oct. 13-Dec. 1, 1918, 16 males, 15 females*; Dougherty, June 6-26, 1924, 2 males, 3 females; Red River, McCurtain Co., July 2, 1925, 1 female; Broken Bow, June 19, 1925, 2 males; Sawyer, July 12, 1925, 1 female.

A common species throughout at least the eastern half of the state; occasionally injurious.

Melanoplus obovatipennis Blachley

Howe, S. McAlester (Morse 07:50; Blatchley 20:375). Xerophytic upland forests (Morse).

Melanoplus packardii Scudder

Perkins, Aug. 16, 1901 (Caudell 02:88); Shawnee (as foedus), Wilburton, Cache, Mountain Park, base and summit of Mt. Sheridan (Morse 07:48, 50).

Fort Sill, Oct. 27-Dec. 1, 1918, 12 specimens*. Taken on the open prairie, and also among the brushy tangles along the margins of Medicine Bluff creek.

Melanoplus palmeri Scudder

Mountain Park (Morse 07:50). Recorded from Texas, New Mexico, Arizona, and Mexico.

Melanoplus plebejus (Stal)

Caddo, Wilburton (Morse 07:51). A common Texan species. Occurs among the denser growth of grasses and other herbage in moist prairie meadows(Morse).

Melanoplus ponderosus ponderosus (Scudder)

Caddo Hill, Haileyville, Howe, S. McAlester, Cache, base and summit of Mt. Sheridan (Morse 07:51—M. robustus).

Fort Sill, Oct. 16-Dec. 1, 1918, 10 males, 7 females (Det. by Rehn as *robustus*); Daugherty, June 18, 1924, 10 large nymphs; 18 miles southwest of Wister, June 15, 1925, 1 male.

At Fort Sill this species was common in an open grassy grove

of oaks on the flats of Medicine Bluff creek.

On November 19 a female was found ovipositing in a crevice in the rough bark at the base of a large oak.

Eastward this species intergrades with *M. ponderosus viola.* Arkansas lies in this area of intergradation, and material from eastern Oklahoma will probably also be found to be intermediate or atypical. The male from Wister is so badly crushed that it cannot be determined whether or not it is typical of the western race.

Melanoplus punctulatus arboreus Scudder

Fort Sill, Oct. 27, 1918, 1 male*. This specimen was found resting on the bark of an oak in the grove mentioned under the last species.

Melanoplus scudderi scudderi (Uhler)

Caddo, Howe, S. McAlester, Wilburton, Cache, Shawnee, base and summit of Mt. Sheridan (Morse 07:52).

Fort Sill, Oct. 27-Dec. 1, 1918, 6 males, 6 females; Mt. Scott, Nov. 10, 1918, 2 males, 1 female. Common in the margins of the groves along the creek valleys, on the lower slopes of Mt. Scott, and a few specimens taken in the open prairie.

Melanoplus spretus (Thomas)

Indian Territory (Riley 91:10; Bruner 93:27); Indian Territory, Oklahoma (Caudell 02:88).

Dactylotum pictum (Thomas)

Indian Territory (Uhler 77:795—D. bicolor); Mountain Park (Morse 07:54). Occurs in the mesquite grass of the dry pariries (Morse).

TETTIGONIIDAE

Phaneropterinae

Phaneroptera texensis (Saussure & Pictet)

Cache, base of Mt. Sheridan (Rehn & Hebard 14:297—Scudderia).

Phaneroptera curvicauda (DeGeer), intermediate between *c. curvicauda* and *c. laticauda* (Brunner)

Stillwater, Ringo (Caudell 02:88—Scudderia curvicauda); Howe, Haileyville, S. McAlester (Rehn & Hebard 14a:284—Scudderia).

The area of intergradation between the northern and southern races is broad, and probably includes all of Oklahoma.

Phaneroptera furcata furcata (Brunner)

Haileyville, Wilburton, S. McAlester, Wewoka, base and summit of Mt. Sheridan, Cache, Caddo (Rehn & Hebard 14a:303—Scudderia).

Amblycorypha oblongifola (DeGeer)

S. McAlester, Wister (Rehn & Hebard 14b:322).

Dougherty, June 27, 1924, 1 male; Sawyer, July 12, 1925, 1 female.

Amblycorypha huasteca (Saussure)

Cache (Rehn & Hebard 14b:327). Ranges from Kansas to Texas and Mexico.

Amblycorypha uhleri Stal

S. McAlester, Howe, Caddo, (Rehn & Hebard 14b:335); eastern Oklahoma (Blatchley 20:483).

Amblycorypha rotundifolia parvipennis Stal

Ardmore (Rehn & Hebard 14b:340).

Broken Bow, June 29, 1925, 1 male. Known only from Texas, Oklahoma and Arkansas. Intergrades with *rotundifolia rotundifolia* eastward, and probably with *r. brachyptera* Ball to the north.

Microcentrum rhombifolium (Saussure)

Perkins (Caudell 02:88—M. laurifolium).

Microcentrum retinerve (Burmeister)

Stillwater (Caudell 02:88).

Pseudophyllinae

Pterophylla furcata (Caudell)

4 miles west of Broken Bow, July 8, 1925, 1 male. Described by Caudell from Nebraska in 1906. No other records have come to our attention. No data were preserved with the specimen.

Copiphorinae

Neoconocephalus robustus crepitans (Scudder)

Perkins, Aug. 1901, (Caudell 02:85—Conocephalus crepitans); Wilburton, Shawnee, Caddo, summit of Mt. Sheridan, Cache (Rehn & Hebard 15c:395).

Neoconocephalus triops (Linnaeus)

Stillwater, Perkins (Caudell 02:88—Conocephalus); Stillwater (Blatchley 20:530).

Conocephalinae

Orchelimum vulgare Harris

Wilburton, Ardmore, Caddo (Rehn & Hebard 15a:44).

Orchelimum nigripes Scudder

Stillwater, Ringo (Caudell 02:89).

Orchelimum calcaratum Rehn & Hebard

S. McAlester, Shawnee, Waurika (Rehn & Hebard 15a:49).

Fort Sill, Oct. 20-Nov. 16, 1918, 7 specimens*. Taken in shrubbery and tall weeds along the valley of Medicine Bluff creek.

Conocephalus fasciatus fasciatus (DeGeer)

Howe, Wilburton, Haileyville, Okmulgee, Shawnee (Rehn & Hebard 15b:176).

Conocephalus strictus (Scudder)

Ringo, Perkins (Caudell 02:89—Xiphidium); Howe, Wilburton, S. McAlester, Caddo, Shawnee, base of Mt. Sheridan, Cache, Mountain Park (Rehn & Hebard 15b:196).

Conocephalus saltans (Scudder)

Waurika, summit of Mt. Sheridan (Rehn & Hebard 15b:220).

Decticinae

Pediodectes haldemanii (Girard)

Dougherty, June 26, 1924, 1 female. Taken on grassy hills north of the town.

Pediodectes stevensoni (Thomas)

Fort Sill, Oct. 27, 1918, 1 male, 1 female*. This pair was taken on a barren, rocky slope of the Carlton mountains, walking about among the rocks and grass tufts.

Pediodectes nigromarginata (Caudell)

Perkins, Aug. 13, 1901 (Caudell 02: 89—Orchesticus; 07:346—Stipator; 08:16).

Pediodectes grandis (Rehn)

Recorded from Oklahoma by Caudell (07:348), on the authority of A. P. Morse.

Rhaphidophorinae

Daihinia brevipes Haldeman

Rankin, June 1919, (R. B. Jones) (U. S. Nat. Mus.). Re-

corded from South Dakota, Colorado, and Wyoming south to Louisiana.

Udeopsylla robusta Haldeman

Indian Territory (Bruner 91:39—U. gigantea; Scudder 94:108—9—Daihinia gigantea); Stillwater (Caudell 03:90—U. gigantea.)

Ceuthophilus divergens Scudder

Fort Sill, Oct. 27-Nov. 10, 1918, 1 male, 1 female*.

Taken under the same circumstances as *Pediodectes stevensoni*, crawling around on stony ground in late afternoon. Determined as *bruneri* Scudder by Rehn; this species recently synonymized by Hebard.

Ceuthophilus variegatus Scudder

Perkins (Caudell 04:115).

Fort Sill, Oct. 27-Dec. 11, 1918, 2 males, 1 female* (compared with types by Rehn).

Ceuthophilus pinguis Scudder

Stillwater, Perkins—Aug. 1901 (Caudell 02:89).

Arlington, May 28, 1901 (Nellie Caudell), 1 male (juv. ?) (U. S. Nat. Museum).

Ceuthophilus caecus Scudder

Perkins, Aug. 13-16, 1901, 1 male, 1 female (U. S. Nat. Museum).

GRYLLIDAE

Gryllotalpinae

Gryllotalpa major Saussure

Stillwater (Caudell 02:90—as G. borealis; Blatchley 20:647).

Carney, Apr. 16, 1895 (B. F. Perkins); Tishomingo, Apr. 15, 1916; Okmulgee, Apr. 1920 (A. Thompson); Tulsa, 1920 (all in U. S. Nat. Museum). Mr. Caudell informs us that he knows of no accurate records of *Gryllotalpa hexadactyla* for the state.

Myrmecophilinae

Myrmecophila nebrascensis Bruner

Gryllinae

Miogryllus verticalis (Serville)

Perkins, May 16, 1901 (Caudell 02:90—M. oklahomae n. sp.; Hebard 15:120; Blatchley 20:695.)

Gryllus assimilis Fabricius

Stillwater, Perkins—Aug. 6, 1901 (as G. abbreviatus), Perkins—Apr. to Aug., 1901, Creek Nation—May 31, 1901 (as luctuosus) (Caudell 02:91).

Fort Sill, Oct. 27-Dec. 1, 1918, 4 males, 5 females*; Dougherty June 25, 1924, 1 small juv.; Red River, McCurtain Co. July 2, 1925, 1 female.

Gryllus domesticus Linnaeus

Perkins (Caudell 02:91).

Nemobiinae

Nemobius fasciatus socius Scudder

Oklahoma (Hebard 13:424; Blatchley 20:677).

Probably intergrades with the northern *f. fasciatus* in the state.

Oecanthinae

Oecanthus nigricornis nigricornis F. Walker

Stillwater (Caudell 02:91).

Oecanthus nigricornis quadripunctatus Beutenmuller

Fort Sill, Oct. 27-Nov. 10, 1918, 5 males, 2 females* (Hubbell 22:56); Dougherty, June 24, 1924, 1 male (on flowers).

Eneopterinae

Hapithus agitator quadratus Scudder

Fort Sill, Oct. 18, 1918, 1 female. Sweeping vines and shrubbery along Medicine Bluff creek.

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PLATE II. EXPLANATION OF MAP

Ia. Ozark plateau.

Ib. Boston Mountains.

IIa. Arkansas Valley.

IIb. Ouachita valley.
III. West Gulf Section of Coastal Plain Province.
IV. Osage Plains section of Central Lowland Province.
Va. Plains border section of Great Plains Province.
Vb. High Plains section of Great Plains Province.
Vc. Semi-desert section of Great Plains Province.