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SOLPUGIDA IN THE
UNITED STATES

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INTRODUCTION

THE MOST RECENT COMPREHENSIVE STUDY of solpugids is that of Roewer (1934) who considered the biology and taxonomy of the order throughout the world. Although Roewer had access to most of the material in Europe, he apparently did not have an abundance of specimens and had very meager representation from North America. Solpugids deposited in museums and other institutions in the United States have not been critically examined since Banks (1900) published a synoptic review of the order. A comparatively large number of these rather uncommon arachnids has been collected since 1900 and deposited in the large museums of the country. Comparison of some of this material with the descriptions and figures given by Roewer (1934) indicated a confusion of names for several older species and the existence of many undescribed species. A thorough study of the order, especially the difficult Nearctic family Eremobatidae in the United States, seemed advisable. The present publication is the result of a four-year study of as many specimens as could be obtained.

This study was sponsored by the Department of Insects and Spiders of the American Museum of Natural History in which institution are deposited most of the types and a large portion of the study specimens. Dr. Willis J. Gertsch and other members of the department assisted with much advice and encouragement. Important lots were received from the Chicago Natural History Museum in Chicago, Illinois, the Museum of Comparative Zoology in Cambridge, Massachusetts, the Academy of Natural Sciences of Philadelphia, Pennsylvania, and the United States National Museum in Washington, D. C. Supplementary material was obtained from the California Academy of Sciences in San Francisco, the Colorado Museum of Natural History in Denver, Kansas State College at Manhattan, Oregon State College at Corvallis, Utah State Agricultural College at Logan, and the Universities of Arizona at Tucson, California at Berkeley and Davis, Colorado at Boulder, Nebraska at Lincoln, and Utah at Salt Lake City. Several individuals, including C. Victor Anderson of Rexburg, Idaho, Harriet Exline Frizzell of

Rolla, Missouri, Donald C. Lowrie of Las Vegas, New Mexico, Clyde P. Stroud of Las Vegas, New Mexico, and F. Werner of Cambridge, Massachusetts, also contributed specimens. Acknowledgments are due the latter individuals and the directors and curators of the various museums, institutions, and collections for the extended loans of material. Special acknowledgments are made to Edson Fichter for the basic outlines of the original drawings of figures 1 to 17 and for the completed drawings of figures 18 to 25, and to my wife, Katharine Elizabeth Muma, for organizing and arranging the records and illustrations and for typing and criticizing the manuscript.

BIOLOGY

Solpugids are a relatively primitive group of arachnids that are largely confined to the tropical and subtropical regions of the world. Although some species are found under humid conditions, most of the order seems to prefer a hot, arid climate. In North America the majority of species is found in Mexico and southwestern United States. One or two species range northward into the western provinces of Canada, and at least three species are found in southeastern United States.

These arachnids are burrowers, usually secretive, and principally nocturnal in habit. For these reasons solpugid material is not abundant in collections. Although an effort was made to obtain a majority of the preserved specimens in the United States, only 500 to 600 mature solpugids were examined during this study. A few solpugids are diurnal, and these, with some of the larger nocturnal species, have been the subject of several series of biological observations. These reports are fragmentary and have dealt principally with the feeding and hunting habits of these curious arachnids. Complete biological information is not available for even a single species.

In areas where solpugids are common they have been referred to by such vernacular names as wind scorpions, sun spiders, scorpion spiders, or hunting spiders. The first two names appear to be more appropriate, as

one refers to the speed and agility of certain species, the other to the fact that they are commonly found in desert country and that diurnal species frequently forage for food in the bright sunlight. Although commonly believed by lay people to be poisonous, no poison glands or ducts have been morphologically demonstrated in solpugids. Constant hunters and voracious feeders, these arachnids have been observed to kill birds and small mammals but are not known to feed on warm-blooded animals. Lizards and many different invertebrates have been listed

as solpugid food. They are also cannibalistic. Observations on egg laying and maternal habits have indicated that female solpugids do not feed upon their young but guard them rather closely through the first one or two molts. The most common observation is that of their climbing ability, several species reportedly using the adhesive organs at the tips of the palpi to climb trees in search of prey. A résumé of biological observations and notes was given by Roewer in 1934, while Turner (1916) and Fichter (1940) have made some observations on North American species.

SYSTEMATIC STUDY

ORDER SOLPUGIDA

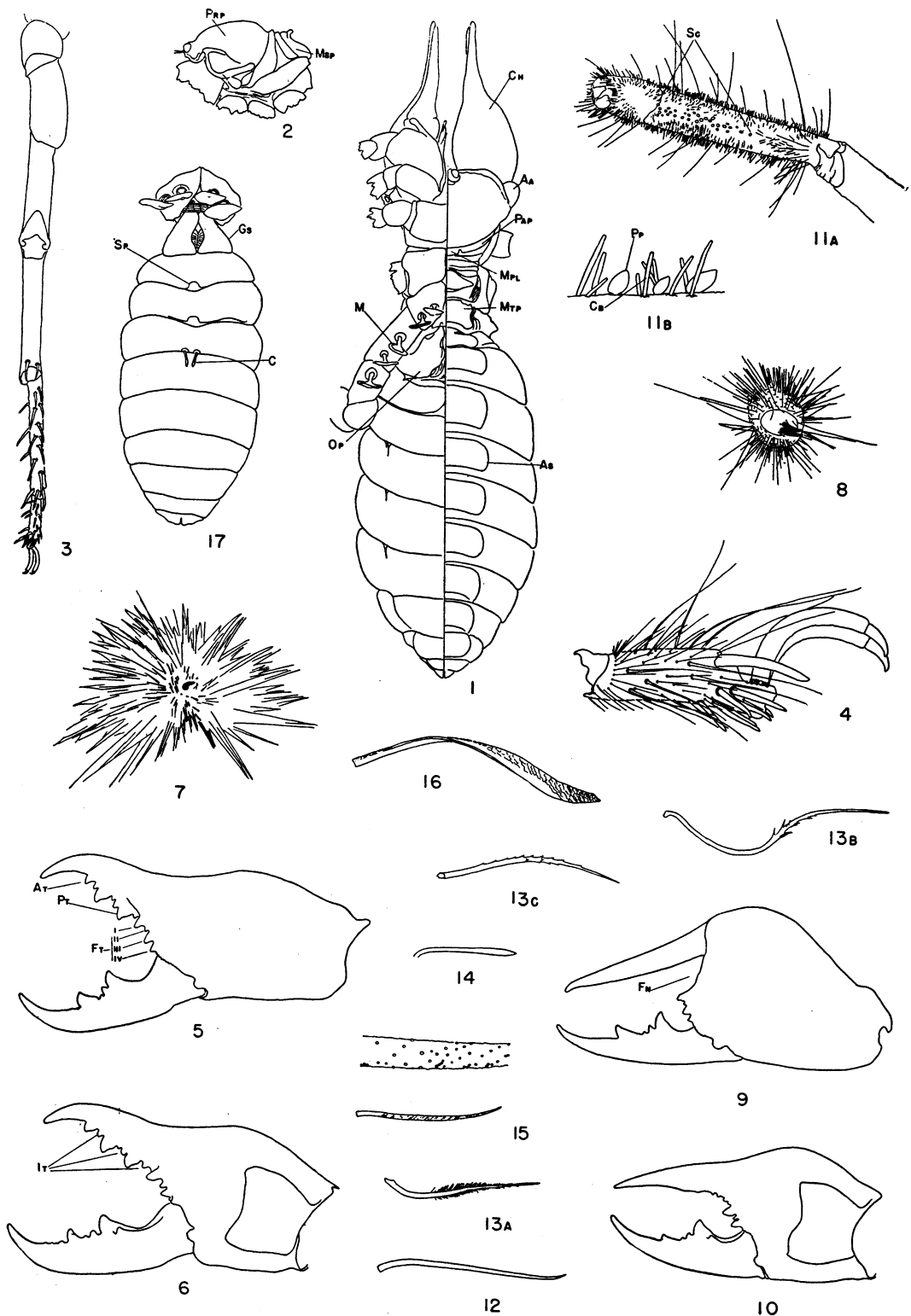
COMSTOCK IN 1940, commenting on the several ordinal names previously used for this group of arachnids, pointed out that the name Solpugides was first proposed as a family name by Leach in 1815, while the ordinal name Solifugae was not proposed by Sundevall until 1823. He further stated that the ordinal name Galeodea proposed by Kirby and Spence in 1826, because of the older status of the genus *Galeodes* Olivier, 1791, did not necessarily need to be adopted so long as the genus *Solpuga* Lichtenstein, 1796, was still retained in the order.

A study of the literature reveals the following facts. The genus *Galeodes* was erected in 1791 by Olivier for the species *Phalangium araneoides* Pallas, 1771. In 1796 the genus *Solpuga* was erected for three species, *Solpuga fatalis*, *arachnodes*, and *chelicornis*, by Lichtenstein who unfortunately did not indicate a type for the genus. Fabricius in 1798 recognized the conspecificity of *Phalangium araneoides* Pallas with *Solpuga arachnodes* Lichtenstein but overlooked the older genus *Galeodes* Olivier in naming it *Solpuga araneoides*. By law of priority Lichtenstein's genus *Solpuga* should have been listed as a synonym of *Galeodes* Olivier. This error was again overlooked by Leach in 1815 when he used *Solpuga araneoides* Fabricius, 1798, as the example of his family Solpugides. Koch added further confusion in 1842 when he recognized the genus *Solpuga* Lichtenstein and placed as the type species *Solpuga lethalis* Koch, but did not include any of the species for which the genus was erected. At the same time he, Koch, placed *fatalis* (Lichtenstein) and *araneoides* (Pallas) in the genus *Galeodes* Olivier. Simon in 1879 pointed out these early errors, synonymized *Solpuga* Lichtenstein under *Galeodes* Olivier, including the species *Galeodes araneoides* (Pallas) and *Galeodes fatalis* (Lichtenstein), and erected a new genus, *Gaetulia*, for *Gaetulia setigera* (Olivier), of which he considered *Solpuga chelicornis* Lichtenstein a synonym, and the species placed by Koch (1842) in *Solpuga* Lichtenstein. Kraepelin in 1899 resurrected the genus *Solpuga* Lichtenstein for the species

chelicornis Lichtenstein, listing it as the typical species. In 1901, however, Kraepelin placed *Solpuga lethalis* Koch as the typical species, even though he retained *chelicornis* Lichtenstein in the genus. Roewer in 1934 removed *chelicornis* Lichtenstein to a new genus, *Solpugopa*, leaving *Solpuga*, for the second time, with none of the species for which it was originally erected. At the same time all authors have maintained *Galeodes araneoides* Pallas as the type species of the type genus of the Galeodidae.

The fact that the genus *Solpuga* Lichtenstein has been stripped of all its original species plus the fact that the oldest described species, *araneoides* Pallas, has been retained as the type of the oldest genus, *Galeodes* Olivier, in the family Galeodidae Sundevall seems to justify the use of the ordinal name Galeodea. Despite the above findings, however, the long-established use of the ordinal names Solpugida and Solifugae makes it advisable that one or the other of these two names be used. As Comstock has pointed out that Solpugida has priority over Solifugae, the ordinal name Solpugida is used in the present study.

From 1823 until 1879 the two Solpugida described from the United States were placed in the genus *Galeodes* Olivier under the Class Arachnides. In 1879 E. Simon erected the genera *Datames* Simon and *Cleobis* Simon for the several North American species under the family Solifugae Sundevall. Kraepelin in 1899 made *Datames* Simon the type genus of his subfamily Dataminae under the family Solpugidae Pocock and placed *Cleobis* Simon in the subfamily Daesiinae under the same family. In his synopsis of North American Solpugida in 1900 Banks demonstrated the priority of the mollusk genus *Cleobis* Dana (1847) and the orthopteran genus *Datames* Stål (1875) over Simon's genera and renamed them *Ammotrecha* Banks and *Eremobates* Banks. Kraepelin in 1901 followed Banks' finding, changed his subfamily name from Dataminae to Eremobatinae and retained Banks' genera *Ammotrecha* and *Eremobates*. Roewer in his monograph on the Solifugae of the world in 1934 raised Krae-



FIGS. 1-17. Descriptive figures for the family Eremobatidae. (See opposite page.)

pelin's subfamily Eremobatinae to family status as the Eremobatidae and erected the family Ammotrechidae for *Ammotrecha* Banks and allied genera. These two families are readily separated by the following key.

KEY TO FAMILIES

- Propeltidium truncate, anterior margin straight. Tarsi of first legs with one or two claws. Tarsi of second and third legs with a dorsal terminal spine Eremobatidae
 Propeltidium not truncate, anterior margin recurved. Tarsi of first legs with no claw. Tarsi of second and third legs without a dorsal terminal spine Ammotrechidae

FAMILY EREMOBATIDAE ROEWER, 1934

Solpugida with exterior lobes of propeltidium partially separated from the propeltidium. Propeltidium truncate, anterior margin straight or nearly straight. Median plagula of peltidium indistinctly separated from anterior arci. Posterior arci of parapeltidium short and diverging posteriorly. Propeltidium often covered with spines or setae. Paired spiracles of abdomen not protected. First postspiracular abdominal segment of males often bearing ctenidia on its posterior margin. Genital opercula of females exhibiting specific differences. Anal segment of abdomen normal. Setal plate bristles of rostrum nearly horizontal in position and without a common dorsal keel. Lateral lobes of rostrum

extend beyond anterior edge of dorsal plate.

Cheliceral dentition exhibiting sexual dimorphism. Females: Fixed finger with three primary teeth that are separated by a variable number of intermediate teeth; on the fond a mesal and ectal row of four fondal teeth, of which the fourth or most ventral is often indistinctly separated from the serrate socket margin of the movable finger. Movable finger with two primary teeth separated by a variable number of intermediate teeth and frequently a mesal tooth just mesad of the basal primary tooth. Males: Cheliceral dentition similar to that of the female except that the fixed finger is usually style-like, possessing at most a reduced number of modified or aborted teeth, and separated from the fondal teeth by a fondal notch which may be obscure. Fixed finger with a flagellum complex of setae and usually a mesal or mesoventral groove that are of generic significance.

Palpus with an immovable tarsus; tarsus and metatarsus usually unspined and usually with cylinder bristles; metatarsus often with a ventral scopula.

Walking legs normal. Tarsi of first, second, and third legs with single segment. Fourth leg with three-segmented tarsi. First leg unspined, palp-like, and bearing one or two tiny claws on the tarsus. Tarsi of second and third legs with a dorsal terminal spine. Leg spination otherwise appears to be variable.

Much of the descriptive method employed

FIGS. 1-17 (OPPOSITE PAGE). 1. *Eremobates scaber* (Kraepelin), dorsoventral view of female body. 2. *Eremobates scaber* (Kraepelin), lateral view of anterior female peltidia. 3. *Eremorhax titania*, new species, ventral view of fourth leg of female. 4. *Eremorhax magnus* (Hancock), lateral view of tarsus of third leg of male, showing dorsal terminal spine. 5. *Eremobates pallipes* (Say), ectal view of female chelicera. 6. *Eremorhax titania*, new species, mesal view of female chelicera. 7. *Eremorhax magnus* (Hancock), terminal view of male first leg, showing claw. 8. *Therobates bilobatus*, new species, terminal view of male first leg, showing claws. 9. *Eremobates pallipes* (Say), ectal view of male chelicera. 10. *Eremorhax titania*, new species, mesal view of male chelicera. 11A. *Eremobates durangonus* Roewer, mesoventral view of palpal tarsus and metatarsus, showing position and arrangement of scopula and cylinder bristles; B, lateral view of a few palpal papillae and cylinder bristles. 12. *Eremorhax magnus* (Hancock), tubular bristle of male flagellum complex. 13A. *Eremobates scaber* (Kraepelin); B, *Therobates bilobatus*, new species; C, *Hemerotrecha texana*, new species, plumose bristles of male flagellum complex. 14. *Eremothera sculpturata*, new species, spatulate bristle of male flagellum complex. 15. *Hemerotrecha simplex*, new species, striate bristle of male flagellum complex. 16. *Hemerotrecha minima*, new species, clavate bristle of male flagellum complex. 17. *Eremobates scaber* (Kraepelin), ventral view of male abdomen, showing genital sternite and ctenidia. **Abbreviations:** Aa, anterior arci; As, abdominal sclerite; At, anterior tooth; C, ctenidia; Cb, cylinder bristles; Ch, chelicerae; Fn, fondal notch; Ft, fondal teeth; Gs, genital sternite; It, intermediate teeth; M, malleolus; Mpl, median plagula; Msp, mesopeltidium; Mtp, metapeltidium; Op, operculum; P, peltidium; Pap, parapeltidium; Pp, papilla; Prp, propeltidium; Pt, principal tooth; Sc, scopula; Sp, spiracle.

in the study of this family is based upon actual or proportional measurements. Although some specific variation occurs, the significance of such measurements is largely of subfamily, generic, or group importance. As other workers could easily become confused as to the manner by which these measurements were obtained, the following explanatory statements are believed to be important.

Total lengths were gross measurements made without the use of magnification, under 95 per cent alcohol, over a plastic millimeter rule, and adjusted to the nearest half-millimeter. Total lengths include the chelicerae.

Leg and palpal measurements were made without the use of magnification under alcohol, over a plastic millimeter rule, and adjusted to the nearest half-millimeter. All segments except the coxae were included in the measurements. The proportional length of metatarsus to tarsus of the palpus was obtained by superimposing the shortest length of the tarsus on the longest length of the metatarsus.

Chelicerel measurements were made with an ocular micrometer at $\times 22.5$ magnification, under alcohol, and adjusted to the nearest tenth-millimeter. Width measurements were made at the widest part of the basal segment of the chelicerae in lateral view. Length measurements were made along the ectal surface from the basal articulation to the tip of the fixed finger in such a manner that the line of measurement was always within the chelicera. When the fixed finger was bent or curved, stadia permitting the longest line of measurement were utilized. Comparable sizes of teeth were obtained from specimens on which the teeth were not obviously worn, unless stated otherwise. Comparative width of fondal notch was based on the width of the notch at its distal end. The proportion of length to width of the chelicerae was a pure proportion based on measurements.

Propeltidium measurements were made with an ocular micrometer at $\times 22.5$ magnification, under alcohol, and adjusted to the nearest tenth-millimeter. Width measurements included the exterior lobes. Length measurements, which were made after rotating the specimen caudally until the greatest

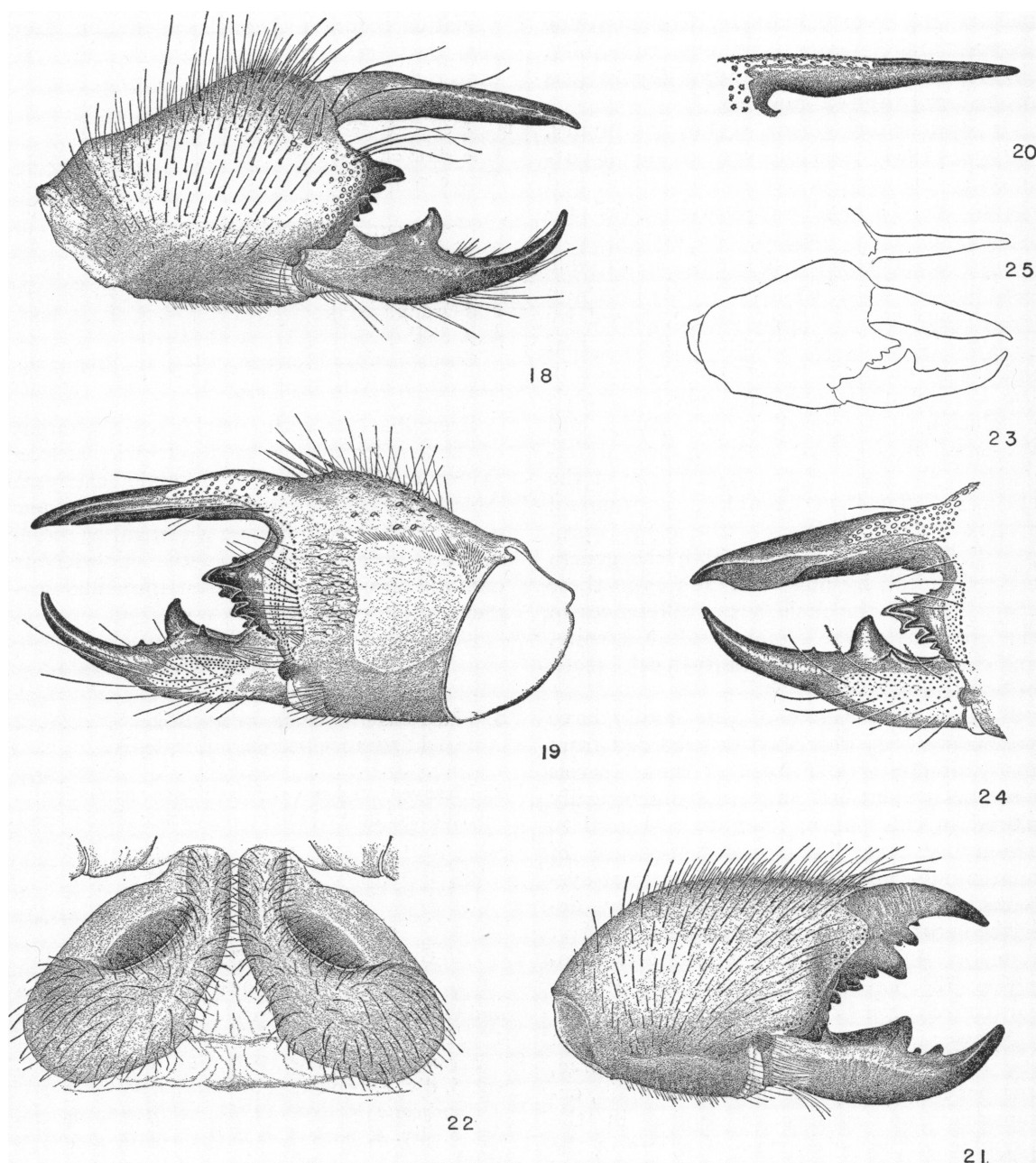
length was obtained, included the eye tubercle but excluded the median plagula. Separation of the eyes was based on the diameter of one eye viewed from a 45-degree retrolateral aspect. The proportion of length to width of the propeltidium was a pure proportion based on measurements.

In his diagnosis of the family Eremobatidae, Roewer considered the most important characteristics for the erection of the family to be the possession of a dorsal terminal spine on the tarsi of the second and third legs and the possession by the males of an immovable finger with no principal, anterior, or intermediate teeth. The present study indicates that it is necessary to modify the latter characteristic to include males that possess an immovable finger with aborted or modified teeth.

Roewer divided the family Eremobatidae into two subfamilies, the Eremorhaxinae and the Eremobatinae, on the basis of segmentation of the tarsus of the fourth leg and the number of claws on the tarsus of the first leg. In the Eremorhaxinae he placed the species *Eremorhax magnus* (Hancock), stating that the tarsus of the fourth leg was always undivided and that the tarsus of the first leg bore no claws. The remainder of the species, which he believed to possess three-segmented fourth tarsi and two-clawed first tarsi, he then placed in the Eremobatinae.

An examination of the first tarsus of *Eremorhax magnus* (Hancock) from a distal view under high magnification reveals a tiny, spine-like claw. Further, an examination of the tarsus of the fourth leg after clearing it in beechwood creosote demonstrates the presence of three segments. For these reasons, the subfamily Eremorhaxinae Roewer is relegated to synonymy under Eremobatinae Roewer. The genus *Eremorhax* Roewer may, however, be maintained with a modification of the distinguishing characteristics.

A close examination of a large number of species of Eremobatidae from the United States discloses a variation in the number of claws present on the tarsus of the first leg. Several species, like *Eremorhax magnus* (Hancock), possess only one small claw, others possess two. On this basis and with supporting evidence which is given under the separate diagnoses two subfamilies of Eremo-



FIGS. 18-25. 18. *Eremorhax magnus* (Hancock), ectal view of right male chelicera. 19. *Eremorhax magnus* (Hancock), mesal view of right male chelicera. 20. *Eremorhax magnus* (Hancock), dorsal view of fixed finger of right male chelicera. 21. *Eremorhax magnus* (Hancock), ectal view of right female chelicera. 22. *Eremorhax magnus* (Hancock), ventral view of female genital opercula. 23. *Eremorhax latus*, new species, ectal view of right male chelicera. 24. *Eremorhax latus*, new species, mesal view of right male chelicera. 25. *Eremorhax latus*, new species, dorsal view of fixed finger of right male chelicera.

and females distinct. First post-spiracular abdominal sternite of males usually without ctenidia on its posterior margin. Genital opercula of females adjacent at anterior end and widely divergent at posterior end.

GENOTYPE: *Eremorhax magnus* (Hancock).

KEY TO GROUPS

MALES

Fixed finger weakly creased or hollowed mesoventrally *magnus* group
Fixed finger distinctly grooved mesoventrally *striatus* group

Magnus GROUP

Males of this group are characterized by indistinct mesoventral grooving of the fixed finger and very tiny anterior and intermediate teeth of the movable finger. Females have a deep oval pit on each genital operculum. Fixed finger of female chelicerae with only one intermediate tooth between the principal and medial teeth, one in front of the medial tooth, and no anterior tooth. Both sexes have a distinct mesal tooth of the movable finger that is visible over the posterior margin of the principal tooth from a lateral view. Both rows of fondal teeth graded in size I, III, II, IV.

TYPICAL SPECIES: *Eremorhax magnus* (Hancock).

KEY TO MALES

Fixed finger gradually tapered from base to tip, mesoventral groove an indistinct crease *Eremorhax magnus* (Hancock)
Fixed finger broad and flattened at tip, mesoventral groove an indistinct, shallow depression *Eremorhax latus*, new species

*Eremorhax magnus*¹ (Hancock)

Figures 18-22

Datames magna HANCOCK, 1888, Proc. Amer. Phil. Soc., vol. 25, p. 107, figs. A, B, a-h (male).

Eremobates magnus KRAEPELIN, 1901, Das Tierreich, no. 12, p. 127 (male).

Eremorhax magnus ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 553, figs. 319, 324a (male and female).

?*Eremopus mexicanus* ROEWER, 1934, in Bronn,

¹ Latin, *magnus*, large.

op. cit., vol. 5, div. 4, book 4, p. 563, figs. 323f, 324h (female).

MALES: Total length, 27.0 to 38.0 mm.

	LENGTH	WIDTH
Chelicerae	7.1-10.6 mm.	3.3-5.0 mm.
Propeltidium	3.8- 5.2	6.0-8.0
Palpi	21.0-30.0	—
1st legs	16.0-25.0	—
4th legs	26.0-35.0	—

Coloration in alcohol yellow to rusty yellow, with dusky markings as follows: eye tubercle dark, anterior margin of propeltidium excluding exterior lobes often dusky, abdominal tergites faintly dusky; tarsus, metatarsus, and apical end of ventral surface of tibia of palpus dark; distal end of femur and proximal end of tibia of fourth leg dusky. Malleoli white.

Dentition of chelicerae variable but maintaining general pattern shown in figures 18 to 20. Movable finger with principal tooth large, intermediate and anterior teeth very small or missing, and mesal tooth visible behind principal tooth. Some specimens have a low ridge replacing the anterior and intermediate teeth of the movable finger. Fixed finger straight or at most slightly curved downward. Fondal teeth occurring in two rows of four each, which are graded in size I, III, II, IV. First fondal tooth of ectal row large, frequently with an accessory tooth on its dorsal margin. Fourth fondal tooth of both mesal and ectal rows minute and barely distinguishable from dentate socket margin of movable finger. Fondal notch U-shaped, about as wide as base of fixed finger and usually bearing one or more denticles.

Mesal groove of fixed finger an indefinite crease near ventral margin of finger. Flagellum complex composed principally of simple tubular setae with a few fine, weakly plumose setae along the ventral edge. Mesal setae of movable finger simple except for a few dorsad plumose setae near the base of the finger.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by slightly more than one diameter. Propeltidium wider than long by a ratio of 1 to 1.5.

Coxae of first, second, and third legs provided with tubular bristles on anterior mar-

gin. On some specimens these bristles are not distinct. Metatarsus, tarsus, and tibia of palpus provided with numerous cylinder bristles but no scopula on metatarsus. Metatarsus of palpus two and one-half times as long as tarsus.

First post-spiracular abdominal sternite not normally provided with ctenidia on its posterior margin.

FEMALES: Total length, 31.0 to 42.0 mm.

	LENGTH	WIDTH
Chelicerae	8.3-10.6 mm.	4.6-5.4 mm.
Propeltidium	3.6-5.0	7.1-9.0
Palpi	18.0-20.0	—
1st legs	14.0-16.0	—
4th legs	24.0-26.0	—

Coloration similar to that of male.

Dentition of chelicerae somewhat variable but maintaining a general pattern as shown in figure 21. Movable finger with dentition similar to that of male except that anterior and intermediate teeth are always distinct. Principal tooth of fixed finger very large. Anterior tooth of fixed finger missing.

Structure similar to that of male.

Genital opercula as shown in figure 22.

TYPE LOCALITY: Male type of *Datames magna* Hancock from Laredo, Texas, deposition unknown. Female type of *Eremopus mexicanus* Roewer from Mexico in the Frankfurt Museum, under No. 1353/13.

RECORDS: Arizona: Yuma, one male (Brown); Tucson, one young female (Charles Bendine), October, 1940, one young female, November, 1933, one young female (O. Bryant); San Xavier Mission, Pima County, one young female; Mesa, one male; Douglas, May 9, 1927, one male (R. C. Collier); Wickenburg, Yavapai County, June, 1937, one male, and 5 miles north of Wickenburg, Yavapai County, May 16, 1937, one male (R. V. Komarek); Scottsdale, three males (W. H. Vance). California: La Quinta, Riverside County, one young female (D. McKeldey); Hanford, one young female (Nathan Banks); Twentynine Palms, July 1-15, 1945, one young female (Jefferson H. Branch); Indian Wells, Riverside County, two males; Indio, May 1, 1918, one male; Needles, one male (R. P. Querenbeck). Nevada: Las Vegas, summer, 1932, one male (John Christensen and J. W. Lugden). New Mexico: Sandin Mountains, May 28, 1948,

one male (C. J. Gillespie); White Sands National Monument, Otero County, August 2, 1947, one female, June 11, 1947, one male, July 22, 1947, one male (Clyde P. Stroud). Texas: Terrell County, July 8, 1949, one female (Hightower); Chisos Mountains, one young female (O. W. Williams); Mission, May, 1940, one female, April, 1941, one male (Mrs. Vada Pace Wilder); El Paso, December, 1921, one female (Lewis); Edinburg, 1935, two males, two females, March 5, 1937, one male, March 15, 1938, one male, May, 1937, one female (Stanley Mulaik); San Diego, May 25, 1895, one female, April 28, 1895, one female (E. A. Schwarz); Sheffield, June 19, 1928, one female (Mrs. Mary Hall); Rio Grande, April 28, 1926, one male (Utter).

REMARKS: This species is easily recognized as the *Datames magna* of Hancock from his excellent description and illustrations. Roewer properly placed the male but appears to have placed the female under two separate species. This error is easily made, as females vary considerably in size, and the tiny claw on the first leg is easily overlooked. The wide variation in size indicates a possible confusion of two or more species, but in the material available no constant morphological variations could be found. Size and robustness were not considered sufficient causes for further separation.

The specimen contained in the type vial of *Datames constricta* Putnam in the Academy of Natural Sciences of Philadelphia is plainly this species. The specimen does not, however, agree in measurements or description with the original description of *constricta* and is seemingly spurious, making it probable that the original type of *constricta* has been lost or destroyed.

Eremorhax latus,¹ new species

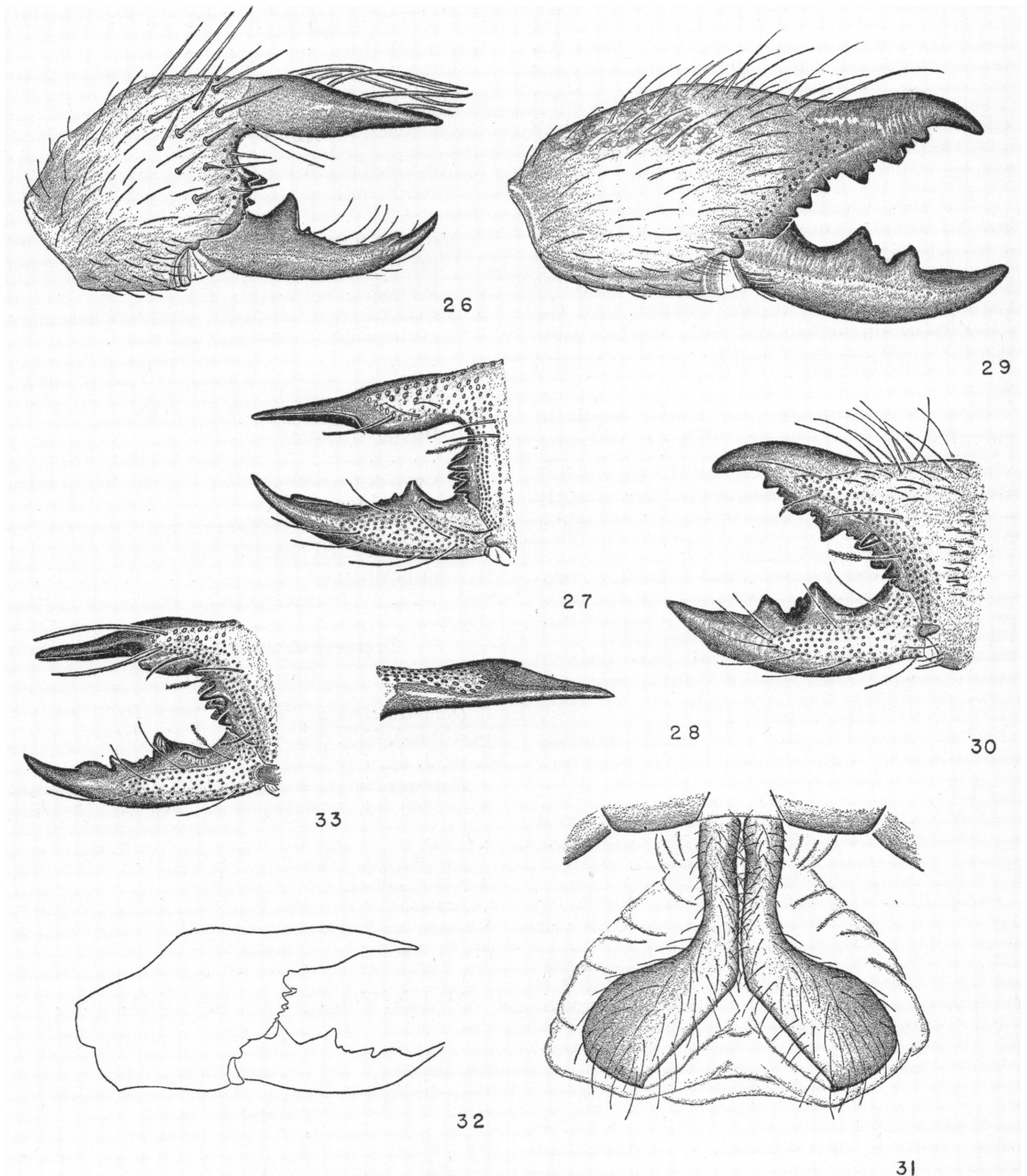
Figures 23-25

MALE HOLOTYPE: Total length, 27.0 mm.

	LENGTH	WIDTH
Chelicerae	7.2 mm.	3.8 mm.
Propeltidium	3.5	5.7
Palpi	21.0	—
1st legs	16.5	—
4th legs	30.0	—

¹ Latin, *latus*, broad; refers to width of fixed finger.

¹ Latin, *striatus*, small groove or furrow; refers to space between opercula.



FIGS. 26-33. 26. *Eremorhax striatus* (Putnam), ectal view of right male chelicera. 27. *Eremorhax striatus* (Putnam), mesal view of right male chelicera. 28. *Eremorhax striatus* (Putnam), dorsal view of fixed finger of right male chelicera. 29. *Eremorhax striatus* (Putnam), ectal view of right female chelicera. 30. *Eremorhax striatus* (Putnam), mesal view of right female chelicera. 31. *Eremorhax striatus* (Putnam), ventral view of female genital opercula. 32. *Eremorhax gigas* (Roewer), ectal view of right male chelicera. 33. *Eremorhax gigas* (Roewer), mesal view of right male chelicera.

width of the eye tubercle; abdominal tergites dusky; apical ends of femora and proximal ends of tibiae of palpi and legs dusky. Mallooli white to yellow. Markings sometimes indistinct.

Dentition of chelicerae variable but maintaining general pattern shown in figures 26 to 28. Movable finger with principal tooth large, intermediate and anterior teeth small, a tooth-like process distad of anterior tooth, and a distinct mesal tooth not visible in lateral view. Most specimens have the anterior tooth represented by a low ridge. Fixed finger straight, wide at base, and abruptly narrowed for half its length. Fondal teeth occurring in two rows of four each, mesal row graded in size I, III, II, IV, ectal row I, II, III, IV. Fourth fondal teeth barely distinguishable from dentate socket margin of movable finger. Fondal notch U-shaped, about two-thirds as wide as fixed finger at base and containing one or more denticles.

Groove of fixed finger apical and mesoventral in position and occupying slightly less than half of the length of the finger. Flagellum complex composed entirely of simple tubular bristles, of which those of the dorsal row are largest and more highly arched. Flagellar area truncate and occupying more than half the finger width. Mesal setae of movable finger simple except for a few dorsal plumose setae near base of finger.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by slightly more than one diameter. Propeltidium wider than long by a ratio of 1 to 1.4.

Metatarsus, tarsus, and tibia provided with scattered cylinder bristles, but there is no scopula on metatarsus. Metatarsus of palpus nearly three times as long as tarsus.

First post-spiracular abdominal sternite not normally provided with ctenidia on its posterior margin.

FEMALES: Total length, 36.0 to 41.0 mm.

	LENGTH	WIDTH
Chelicerae	8.5-10.2 mm.	4.4-4.8 mm.
Propeltidium	4.3- 5.8	7.8-8.6
Palpi	28.0-29.0	—
1st legs	23.0-23.0	—
4th legs	36.0-36.0	—

Coloration similar to that of male, Markings sometimes indistinct. Dentition of chelicerae as shown in figures 29 and 30. Movable finger with principal and anterior teeth large, two intermediate teeth, a suggestion of the distal process found in the male, and a small but distinct mesal tooth. Fixed finger with principal and medial teeth large, a smaller anterior tooth, two intermediate teeth behind principal tooth, two between principal and medial teeth, and one between medial and anterior teeth. Fondal teeth occurring in two rows of four each, mesal row graded I, III, II, IV, ectal row I, II, III, IV. Fourth fondal tooth barely distinguishable from dentate socket margin of movable finger.

Structure similar to that of male.

Ventral opercula of genital segment shown in figure 31.

TYPE LOCALITY: Male types of *Datames cinerea* Putnam, locality unknown, in the Academy of Natural Sciences of Philadelphia. One female, type of *Datames striatus* Putnam from Camp Grant, Arizona (Dr. E. Palmer), in museum of Boston Society of Natural History; and one from California (James Behrnes), was in the Academy of Natural Sciences of Philadelphia but has been lost or destroyed.

RECORDS: Arizona: one male (Nathan Banks); Fort Huachuca, one male; Madera Canyon, Santa Rita Mountains, June, 1898, one male; San Pedro Valley, July 7, 1931, one female; Needles, one female (Querenbeck); Sabino Canyon, Catalina Mountains, west slope station, July 13, 1949, one male (F. Werner and W. Nutting); Brown's Canyon, Baboquivari Mountains, east slope, July 27, 1948, one male (F. Werner and W. Nutting); Gila County, July 18, 1948, two males (F. Werner and W. Nutting); San Bernardino Ranch, Cochise County, July 25, 1949, three males (F. Werner and W. Nutting); Globe, Gila County, July 28, 1948, one female, July 8, 1949, five males, one female (F. Werner and W. Nutting). California: Brawley, August 8, 1914, one male (Bradley). Texas: 10 miles from Hot Springs, on Marathon Road, July 21, 1938, one young female (Stanley Mulaik); Burnham, Brewster County, one female.

Eremorhax gigas¹ (Roewer)

Figures 32, 33

Eremocosta gigas ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 569, fig. 127 (male only).

MALES: Total length, 34.0 to 36.0 mm.

	LENGTH	WIDTH
Chelicerae	8.8- 8.9 mm.	4.2-4.3 mm.
Propeltidium	4.8- 4.9	7.4-7.8
Palpi	33.0-34.0	—
1st legs	27.0-27.0	—
4th legs	41.0-42.0	—

Coloration in alcohol and markings similar to those of *striatus* (Putnam).

Dentition similar to that of *striatus* except that the anterior tooth of the movable finger is large and distinct, the distal process of the movable finger is irregular and not tooth-like, and the fondal notch is indistinct and less than half the width of the fixed finger at the base.

Groove of fixed finger is almost ventral in position rather than mesoventral as in *striatus*. Flagellar area spatulate and occupying less than half of finger width.

Structure otherwise nearly identical with that of *striatus*.

TYPE LOCALITY: Male type of *Eremocosta gigas* Roewer, No. 3044/82, from Tampico, Mexico, in the Frankfurt Museum.

RECORDS: New Mexico: Carlsbad, June 10, 1940, one male (E. S. Deevey), July, 1901, one male (Vernon Bailey). Texas: 9 miles of Alpine, Brewster County, June 2, 1941, one male (S. and D. Mulaik); Boquillas, June 7, 1948, one male (C. and P. Vaurie).

REMARKS: This species is closely related to *striatus* (Putnam). The female is unknown.

Eremorhax titania,² new species

Figures 34-38

MALES: Total length, 26.0 to 35.0 mm.

	LENGTH	WIDTH
Chelicerae	6.8- 8.6 mm.	3.4-4.0 mm.
Propeltidium	3.7- 4.8	5.6-7.0
Palpi	29.0-33.0	—
1st legs	22.5-25.5	—
4th legs	39.0-42.0	—

¹ Greek, *gigas*, a giant.

² Greek, *titán*, the giant, plus *ia*, state of being.

Holotype, larger measurements.

Color in alcohol light yellow, with dusky purple markings as follows: eye tubercle dark, anterior margin of propeltidium dusky with purple. Distal ends of femora of legs and palpi and proximal ends of tibiae sometimes faintly dusky. Malleoli white.

Dentition of chelicerae variable but following the general pattern shown in figures 34 to 37. Movable finger with principal tooth large, anterior tooth small, two intermediate teeth, of which the proximal is larger, and a moderate-sized mesal tooth. On some specimens the anterior tooth is low and blunt and the distal intermediate tooth is minute or missing. Fixed finger straight or very lightly curved downward. Fondal teeth occurring in two rows of four each that are graded in size, ectal row I, II, III, IV, mesal row I, III, II, IV. Fourth fondal teeth scarcely distinguishable from dentate socket margin of movable finger. Fondal notch J-shaped, about three-fourths as wide as base of fixed finger, and commonly bears three or more denticles.

Groove of fixed finger a deep ovate concavity in the ventral or ectoventral surface that occupies the distal two-thirds of the finger. Flagellum complex composed entirely of simple tubular spines. Mesal setae of movable finger simple at the distal end of the finger and plumose proximally and dorsally.

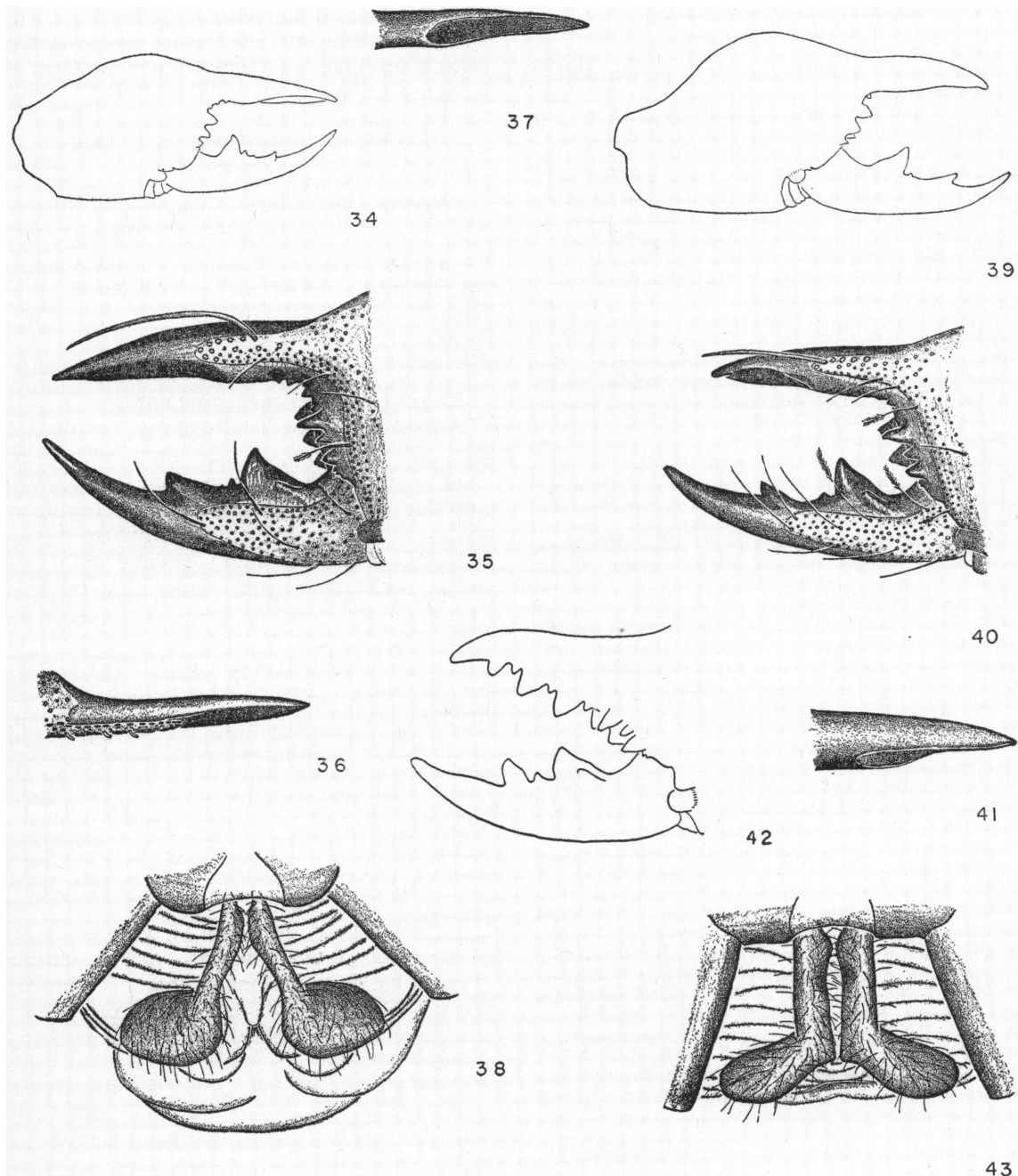
Eye tubercle situated on anterior margin of propeltidium. Eyes separated by slightly less than one diameter. Propeltidium wider than long by a ratio of 1 to 1.5.

Metatarsus, tarsus, and tibia of palpus provided with numerous cylinder bristles but no scopula on metatarsus. Metatarsus of palpus about three times as long as tarsus.

First post-spiracular abdominal sternite not normally provided with ctenidia on its posterior margin. One specimen seen was provided with two widely spaced slender spines.

FEMALES: Total length, 37.0 to 48.0 mm.

	LENGTH	WIDTH
Chelicerae	9.8-13.7 mm.	4.1- 5.9 mm.
Propeltidium	4.0- 5.9	7.5-10.1
Palpi	27.0-36.0	—
1st legs	20.5-27.0	—
4th legs	31.0-42.0	—



FIGS. 34-43. 34. *Eremorhax titania*, new species, ectal view of right male chelicera. 35. *Eremorhax titania*, new species, mesal view of right male chelicera. 36. *Eremorhax titania*, new species, dorsal view of fixed finger of left male chelicera. 37. *Eremorhax titania*, new species, ventral view of fixed finger of left male chelicera. 38. *Eremorhax titania*, new species, ventral view of female genital opercula. 39. *Eremorhax calexcensis*, new species, ectal view of right male chelicera. 40. *Eremorhax calexcensis*, new species, mesal view of right male chelicera. 41. *Eremorhax calexcensis*, new species, ventral view of right male chelicera. 42. *Eremorhax calexcensis*, new species, mesal view of right female chelicera. 43. *Eremorhax calexcensis*, new species, ventral view of female genital opercula.

Allotype, smaller measurements.

Paratype, larger measurements.

Coloration similar to that of male. Markings indistinct.

Dentition of chelicerae with movable finger with principal and anterior teeth large, two small intermediate teeth, and a small but distinct mesal tooth. Fixed finger with large principal and medial teeth, a smaller anterior tooth, one intermediate tooth behind principal tooth, two between principal and medial teeth, and one between medial and anterior teeth. Fondal teeth occurring in two rows of four each, mesal row graded I, III, II, IV, ectal row I, II, III, IV. Fourth fondal tooth barely distinguishable from dentate socket margin of movable finger.

Structure similar to that of male.

Ventral opercula of genital segment shown in figure 38.

TYPE LOCALITY: Male holotype, two male paratypes, from Twentynine Palms, California, July to August, 1945 (Jefferson H. Branch). Female allotype from 8 miles northeast of Las Vegas, Nevada, January and June, 1944 (D. J. Zinn). All in the American Museum of Natural History. Male paratypes are also in the Museum of Comparative Zoölogy, the United States National Museum, California Academy of Sciences, Cornell University, University of Utah, and University of Nebraska.

RECORDS: California: Palm Springs, June, 1945, one male (George Morris); Yermo, June, 1937, one female (Guy Beevor); Twentynine Palms, June, 1945, one male, July 1-15, two males, July-August, 1945, six males (J. H. Branch); Dry Lakes Station, San Diego, September 17, 1935, one male; Brawley, July 7, 1928, one male (O. B. Durham); Daggett, San Bernardino County, September 23, 1948, one male and one young female (T. F. Leigh). Nevada: 10 miles northwest of Las Vegas, July 19, 1944, one male (D. J. Zinn); 12 miles south of Beowawe, June 24, 1941, one male (Ira La Rivers); Las Vegas, June 21, 1940, one male (Ira La Rivers); Las Vegas Army Air Field, Las Vegas, July 9, 1945, one male (D. J. Zinn).

REMARKS: This species and the following are closely related and more easily separated

in the male sex. The female holotype of this species exhibits supernumerary teeth on the right mandible. This condition is illustrated in figure 6.

***Eremorhax calexicensis*,¹ new species**

Figures 39-43

MALES: Total length, 30.0 to 37.0 mm.

	LENGTH	WIDTH
Chelicerae	8.4-10.4 mm.	3.6-4.8 mm.
Propeltidium	4.0- 5.2	6.6-7.6
Palpi	34.0-42.0	—
1st legs	26.0-31.0	—
4th legs	41.0-56.0	—

Holotype, larger measurements.

All specimens badly discolored by alcohol but coloration apparently light yellow to dark yellow, with dusky markings as follows: anterior margin of propeltidium bordered with a dark line, eye tubercle lightly dusky but eyes with dark rings, legs and palpi unmarked or at most lightly dusky at distal ends of femora and proximal ends of tibiae. Mal-leoli white.

Dentition of chelicerae variable but following the general pattern shown in figures 39 to 41. Movable finger with principal tooth large, anterior tooth small, one intermediate tooth near the base of the anterior tooth, and a small but distinct mesal tooth. Fixed finger nearly straight, undulate on the ventral margin, and lightly hooked downward at tip. Fondal teeth occurring in two rows of four each, ectal row graded in size I, II, III, IV, mesal row I, III, II, IV. Fourth fondal teeth scarcely distinguishable from dentate socket margin of movable finger. Fondal notch U-shaped, about one-half as wide as base of fixed finger, and commonly bearing two or three denticules.

Groove of fixed finger a flat, half-oval concavity on the mesoventral surface which occupies a little more than the distal half of the finger. Flagellum complex composed entirely of simple tubular spines. Mesal setae of movable finger simple on distal half and plumose on proximal half of finger at the dorsal margin of the setal area.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by slightly

¹ Of or pertaining to Calexico, California.

less than a diameter. Propeltidium wider than long by a ratio of 1 to 1.6.

Metatarsus, tarsus, and tibia of palpus provided with numerous cylinder bristles, but there is no scopula on metatarsus. Metatarsus of palpus about three and one-half times as long as tarsus.

First spiracular abdominal sternite not normally provided with ctenidia.

FEMALES: Total length, 40.0 to 42.0 mm.

	LENGTH	WIDTH
Chelicerae	10.6–13.8 mm.	4.5– 6.1 mm.
Propeltidium	4.6– 6.0	8.0–10.6
Palpi	32.0–41.0	—
1st legs	24.0–30.0	—
4th legs	42.0–49.0	—

Allotype, larger measurements.

Coloration similar to that of male. Discolored by alcohol.

Dentition of chelicerae as shown in figure 42. Movable finger with principal and anterior teeth large, one small intermediate tooth, and a distinct mesal tooth. Fixed finger with principal and medial teeth large, anterior tooth small, two intermediate teeth, of which one is very small, behind principal tooth, one between principal and medial teeth, and one between medial and anterior teeth. Fondal teeth as in male.

Structure similar to that of male.

Opercula of genital segment shown in figure 43.

TYPE LOCALITY: Male holotype, female allotype, and male paratype from Calexico, California (M. G. Armstrong), in United States National Museum. Paratypes also in the Museum of Comparative Zoölogy, the American Museum of Natural History, California Academy of Sciences, Cornell University, University of Utah, and University of Nebraska.

RECORDS: Arizona: Yuma, two males and one female; Hot Springs, August 16, one male (C. W. North); Tucson, August 6, 1936, one female (Wehle), May 7, 1936, one male (D. L. Ryerson); Congress Junction, July, 1938, one male (J. P. Klein); Hope, Yuma County, August 12, 1948, one male. California: 10 miles southeast of Palm Springs, October, 1947, one male (C. M. Bogert); El Centro, August 13, 1917, one male; Holtville, July 2, 1929, one male (R. H. Beamer);

Coachella, May 18, 1929, two males (E. C. Van Dyke); Poway, San Diego, one male (F. E. Blaisdel). State unknown: Horseshoe Bend of the Colorado River, St. Albatross, one female.

REMARKS: This species is very closely related to *titania*, new species, from which it differs principally in the genital opercula of the female and position of the ventral groove of the fixed finger of the male.

GENUS *EREMOBATES*¹ BANKS

Eremobates BANKS, 1900, Amer. Nat., vol. 24, no. 401, p. 426 (in part). (*Eremobates* of authors, not *Eremobates* Roewer, *sensu stricto*, 1934.)

Eremoperna ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 557 (in part).

Eremopus ROEWER, 1934, in Bronn, *op. cit.*, vol. 5, div. 4, book 4, p. 561 (in part).

Eremognatha ROEWER, 1934, in Bronn, *op. cit.*, vol. 5, div. 4, book 4, p. 566 (in part).

Eremocosta ROEWER, 1934, in Bronn, *op. cit.*, vol. 5, div. 4, book 4, p. 569 (in part).

Eremostata ROEWER, 1934, in Bronn, *op. cit.*, vol. 5, div. 4, book 4, p. 571 (in part).

Small- to moderate-sized Eremobatinae. Fixed finger of males with a mesoventral groove that extends the entire length of the finger. Flagellum complex composed of a dorsal row of simple tubular bristles that are sometimes striate and a ventral row of S-shaped, flattened, plumose bristles that form an arch over the basal third of the mesoventral groove. Apical, plumose bristle of ventral row straight and forming a parallel covering for the apical two-thirds of the mesoventral groove. First post-spiracular abdominal sternite of males with or without ctenidia on its posterior margin. Mesal tooth of movable finger of males and females present or absent. Genital opercula of females variable.

GENOTYPE: *Eremobates pallipes* (Say).

KEY TO GROUPS

MALES

1. Fixed finger with a wide basal notch in dorsal view *scaber* group
Fixed finger straight or at most slightly sinuate in dorsal view 2

¹ Greek, *erēmos*, solitary, plus *bates* (combining form), a climber.

2. Fixed finger with an ectal process near the base *palpisetulosus* group
Fixed finger without such a process 3
3. Mesoventral groove of fixed finger distinctly dilated basally *pallipes* group
Mesoventral groove of fixed finger not distinctly dilated basally *angustus* group

Scaber Group

Males of this group have a broad basal notch of the fixed finger in dorsal view that occupies one-third or more of the length of the finger. The mesoventral groove of the fixed finger is dilated basally. They are provided with two to six ctenidia on first postspiracular abdominal sternite. Females have roughly triangular genital opercula that are well separated along most of their mesal margins. Both rows of fondal teeth graded I, III, II, IV in size.

TYPICAL SPECIES: *Eremobates scaber* (Kraepelin).

KEY TO MALES

1. Metatarsus of palpus with a scopula 2
Metatarsus of palpus without a scopula 5
2. Abdominal ctenidia four in number
 *Eremobates geniculatus* (Simon)
Abdominal ctenidia two in number or apparently absent 3
3. Abdominal ctenidia curved, scimitar-like
 *Eremobates gladiolus*, new species
Abdominal ctenidia straight, needle-like 4
4. Abdominal ctenidia distinct, flattened
 *Eremobates scaber* (Kraepelin)
Abdominal ctenidia indistinct, tubular
 *Eremobates ctenidiellus*, new species
5. Abdominal ctenidia two in number
 *Eremobates ascopulatus*, new species
Abdominal ctenidia four in number 6
6. Fondal notch wider than deep, proximal intermediate tooth of movable finger adjacent to principal tooth
 *Eremobates similis*, new species
Fondal notch deeper than wide, proximal intermediate tooth of movable finger distant from principal tooth
 *Eremobates zinni*, new species

*Eremobates scaber*¹ (Kraepelin)

Figures 44-53

Datames scaber KRAEPELIN, 1899, Mitt. Naturhist. Mus. Hamburg, 16 Jahrgang, p. 243, pl. 2, fig. 19 (female).

¹ Latin, *scaber*, rough or scurfy.

Eremobates scaber KRAEPELIN, 1901, Das Tierreich, no. 12, p. 124 (female).

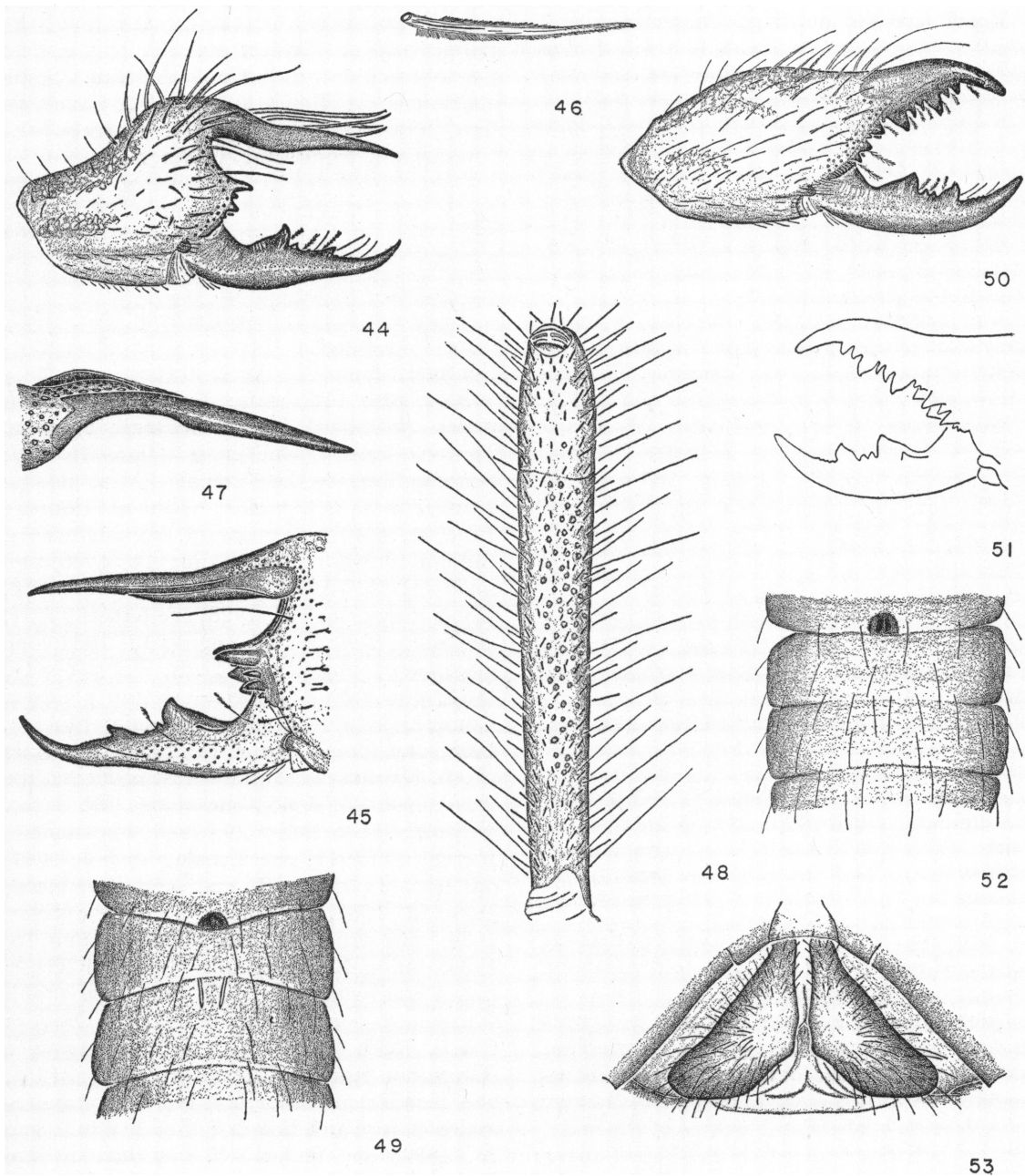
Eremostata scabra ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 573, fig. 324z (female).

MALES: Total length, 14.0 to 22.0 mm.

	LENGTH	WIDTH
Chelicerae	4.0- 6.4 mm.	1.9-3.0 mm.
Propeltidium	2.0- 3.1	2.8-4.3
Palpi	13.0-19.0	—
1st legs	11.0-16.0	—
4th legs	18.0-25.0	—

Coloration in alcohol light yellow to rusty yellow, with dusky purplish markings as follows: chelicerae with one lateral and two dorsal dusky stripes each; eye tubercle dark; propeltidium dusky, except for a median longitudinal stripe the width of the eye tubercle, and darker on the lateral margin; mesopeltidium, metapeltidium, and abdominal tergites dark; distal end of femur, entire length of tibia and metatarsus, and proximal end of tarsus of palpus dusky on dorsal and anterior surfaces; distal end of femora, entire length of tibiae, and proximal end of metatarsi of legs dusky on dorsal and anterior surfaces. Leg markings are indistinct in old alcoholic material and freshly molted specimens. Malleoli white.

Dentition of chelicerae variable but following the general pattern shown in figures 44, 45, and 47. Movable finger with a large principal tooth, a low flattened anterior tooth, two intermediate teeth of which the proximal is larger, and a small indistinct mesal tooth. On some specimens there is a low rounded process distad of the anterior tooth, and the distal intermediate tooth is minute or missing. Fixed finger typical of group; basal notch in dorsal view occupying from one-third to one-half of length of finger, in lateral view finger is lightly bent upward at the distal edge of the notch. Fondal teeth occurring in two rows of four each that are graded in size I, III, II, IV. Fourth fondal teeth scarcely distinguishable from dentate socket margin of movable finger. Fondal notch U-shaped but sharply flattened on its dorsal margin, somewhat wider than the base of the fixed finger, about as wide as deep and usually bearing two or three minute denticles on its ventral margin.



FIGS. 44-53. 44. *Eremobates scaber* (Kraepelin), ectal view of right male chelicera. 45. *Eremobates scaber* (Kraepelin), mesal view of right male chelicera. 46. *Eremobates scaber* (Kraepelin), apical plumose bristle of male flagellum complex. 47. *Eremobates scaber* (Kraepelin), dorsal view of fixed finger of right male chelicera. 48. *Eremobates scaber* (Kraepelin), mesoventral view of apical segments of right male palpus. 49. *Eremobates scaber* (Kraepelin), male abdominal ctenidia. 50. *Eremobates scaber* (Kraepelin), ectal view of right female chelicera. 51. *Eremobates scaber* (Kraepelin), mesal view of right female chelicera. 52. *Eremobates scaber* (Kraepelin), female abdominal ctenidia. 53. *Eremobates scaber* (Kraepelin), ventral view of female genital opercula.

Mesal groove of fixed finger a deep, parallel-sided slot that widens abruptly on the basal quarter of the finger into an oval concavity that extends posteriorly beyond the base of the finger. Flagellum complex typical of genus, with the apical plumose bristle shown in figure 46 not covering the distal third of the mesoventral groove. Mesal setae of movable finger plumose on the proximal half of the finger near the dorsal margin and simple distally.

Eye tubercle situated on the anterior margin of propeltidium. Eyes separated by slightly more than one diameter. Propeltidium wider than long by a ratio of 1 to 1.4.

Metatarsus, tarsus, and tibia of palpus provided with numerous cylinder bristles, and there is a scopula of 40 to 160 rounded papillae on the mesoventral surface of the distal three-fourths of the metatarsus as shown in figure 48. Metatarsus of palpus about three times as long as tarsus.

First post-spiracular abdominal sternite provided with two straight, flattened, abruptly pointed, widely spaced ctenidia (fig. 49).

FEMALES: Total length, 19.0 to 24.0 mm.

	LENGTH	WIDTH
Chelicerae	4.4- 6.4 mm.	1.9-3.0 mm.
Propeltidium	1.7- 2.3	3.3-4.9
Palpi	12.0-12.0	—
1st legs	11.0-13.0	—
4th legs	17.0-20.0	—

Coloration in alcohol similar to that of males. Markings indistinct on old alcoholic or newly molted specimens.

Dentition of chelicerae as shown in figures 50 and 51. Movable finger with principal and anterior teeth large, two small intermediate teeth the proximal of which is larger, an indication of the distal process of the male, and an indistinct mesal tooth. Fixed finger with principal and medial teeth large, a smaller anterior tooth, two intermediate teeth behind principal tooth, two between principal and medial teeth, and one between medial and anterior teeth that is nearly as large as anterior tooth. Some specimens have one of the intermediate teeth behind the principal tooth minute or missing. Fondal teeth same as in male.

Structure similar to that of the male except

there is no scopula on the metatarsus of the palpus and no distinct ctenidia on the first post-spiracular abdominal sternite. Some specimens, as shown in figure 52, have two fine, hair-like trace ctenidia scarcely distinguishable from setal clothing.

Opercula of genital segment as shown in figure 53. Specimens captured *in copula* have opercula more widely separated. Gravid females also have the opercula somewhat separated.

TYPE LOCALITY: Female type, No. 9137, from "Washington Territory" in the collection of E. Simon in Paris, France.

RECORDS: California: Lake Tahoe, two males (Hubbard and Schwarz); Alturas, Modoc County, one male (Jack Hayes); Sonoma County, one female (Mrs. Bush); 4 miles west of Quincey, Plumas County, June 21, 1949, one male (J. W. McSwain). Colorado: Mesa Verde, June 14, 1936, one male (A. M. Woodbury). Idaho: Bear Lake, Hot Springs, July 21, 1928, one female (W. J. Gertsch); Twin Falls, August 13, 1931, one male, one young female (D. E. Fox), July 19, 1931, one male (Maurice Melton); Cassia County, July 17, 1939, one male; Mackie, 1938, one female, June 25, 1938, one male (F. B. Bjorkman); 8 miles west of Horseshoe Bend, July 6, 1943, one male (W. Ivie). Nevada: Reno, May 29, 1940, one female, August 17, 1941, one female, May 1, 1941, one female (Ira La Rivers), and near Reno, June 18, 1931, one male (W. Ivie); Elko, 1934, one male (M. W. Menke), June 16, 1939, one male, one young (Ira La Rivers); Las Vegas, summer, 1932, one male (John Christensen and J. W. Lugden). Oregon: Castle Rock, July 13, 1938, two females (Gray and Schuh); Enterprise, July 13, 1935, one female; Minam, July 14, 1938, two females (Gray and Schuh); The Dalles, June 23, 1882, one female (S. Henshaw); Blue Mountains, July, 1932, one male (Farrar). Utah: Kanab, June 20, 1950, two males (G. F. Knowlton and G. E. Bohart); Myton, July 19, 1941, one female (G. F. Knowlton); Milford, June 29, 1945, one female (Shelford); Logan, July 20, 1938, one female (D. E. Hardy); Salt Lake City, August 21, 1931, four young females, one male (W. J. Gertsch), 1939, one male, October, 1932, one male, one young; Filmore Canyon, June 7, 1934, one

male (W. Ivie); Pine Valley, Millard County, July 15, 1936, one male; Bryce Canyon Park, 1931, one male (J. A. Rowe); San Juan River between Copper and Piute canyons, July 14, 1937, one male (A. M. Woodbury); White Valley, June 16, 1940, one male, June 18, 1940, one male, July 19, 1939, one female (R. W. Fautin); City Creek Canyon, June 18, 1928, one male (W. J. Gertsch); Zion National Park, June 1, 1929, one female (Dixie Woodbury); near Blue Spring, July 12, 1931, one male (R. V. Chamberlin); Saltair, July 12, 1922, two females (E. P. Van Duzee); Delta, August 1, 1949, two males (G. F. Knowlton). Washington: Starbuck, July 4, 1938, one male, June 10, 1938, one female (C. J. Burner); Yakima River opposite Ellensburg, July 8-9, 1882, three females (S. Henshaw).

REMARKS: This species is highly variable in size of males and to some extent in the opercula of the genital segment of the females. Although no tenable characters have been found for separation, it is quite possible that two or more species are still grouped here.

***Eremobates geniculatus*¹ (Simon)**

Figures 54-57

Datames geniculatus SIMON, 1879, Ann. Soc. Ent. France, ser. 5, vol. 7, p. 138, fig. 31 (female).

Eremocosta geniculata ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 570, figs. 324q, 326b (female).

MALES: Total length, 17.0 to 23.0 mm.

	LENGTH	WIDTH
Chelicerae	4.0- 5.3 mm.	1.9-2.6 mm.
Propeltidium	2.0- 2.6	2.9-4.0
Palpi	15.0-18.0	—
1st legs	12.0-15.0	—
4th legs	18.0-23.0	—

Coloration and markings similar to those of *scaber* (Kraepelin). Palpus and leg markings often indistinct, especially on the first and second legs. Dusky covering of propeltidium heaviest just behind the exterior lobes.

Structure nearly identical with that of *scaber*. Intermediate teeth close together at base of principal teeth rather than spread out

between the principal and anterior teeth as in *scaber*. Fossal notch about one and one-half times as wide as base of fixed finger and not so deep as wide. Scopula of palpus same as in *scaber*. First post-spiracular abdominal sternite provided with four straight, flattened ctenidia. Several males examined had a fifth smaller, apparently spurious ctenidium between the mesal pair, and one male had a sixth spurious ctenidium. There also is some variation in the form of the ctenidia: some are lightly curved.

FEMALES: Total length, 17.0 to 23.0 mm.

	LENGTH	WIDTH
Chelicerae	4.8- 5.1 mm.	1.9-2.5 mm.
Propeltidium	2.1- 2.6	3.5-4.0
Palpi	12.0-14.0	—
1st legs	9.0-12.0	—
4th legs	17.0-19.0	—

Coloration and markings similar to those of males.

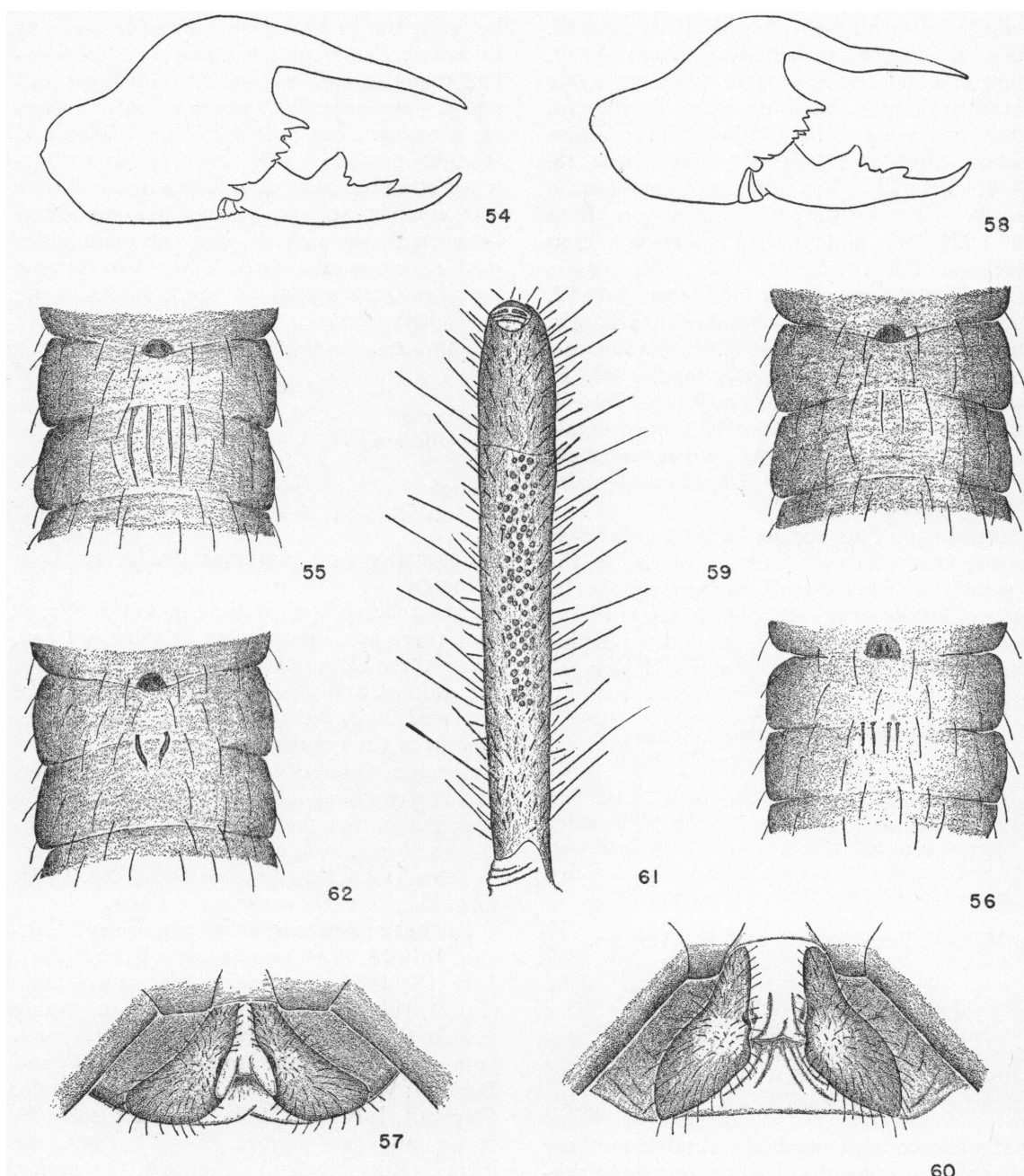
Structure similar to that of males except that there is no scopula or at most a trace, fewer than 15 papillae on the metatarsus of the palpus, and the abdominal ctenidia are fine and hair-like but usually distinguishable from the regular setal clothing.

Specific differences between this species and *scaber* (Kraepelin) can be found in the opercula of the genital segment of the abdomen shown in figure 57.

TYPE LOCALITY: Female type, No. 9135, from Mexico in the museum in Paris.

RECORDS: Arizona: north rim, Grand Canyon, July 18, 1934, two females (Rockefeller), July 18, 1934, one male, one young male (Lutz), July 5-7, 1940, two males, one young female (Gertsch and Hook); Bright Angel, July 10, 1901, one male (Schwarz and Barber); Walnut Canyon, July 22, one male; Flagstaff, July 3-20, 1939, 18 males, eight females, and two young, July 22, 1949, one female (Billy Hughes), August 5, two males, one female (Schwarz and Barber), June 16, 1934, one male (W. Ivie); Williams, June 10, two females (Schwarz and Barber); Tucson, one male; Kaibab Forest, June 14, 1934, one male (Ivie and Rasmussen). California: Upland, one female (Gertsch); San Bernadino, one female. Colorado: Durango, July 2, 1919, one female; 10 miles north of Cortez, June 17, 1934, one male, one young female (W. Ivie

¹ Latin, *geniculatus*, bent or curved; reference obscure.



FIGS. 54-62. 54. *Eremobates geniculatus* (Simon), ectal view of right male chelicera. 55. *Eremobates geniculatus* (Simon), male abdominal ctenidia. 56. *Eremobates geniculatus* (Simon), female abdominal ctenidia. 57. *Eremobates geniculatus* (Simon), ventral view of female genital opercula. 58. *Eremobates ctenidiellus*, new species, ectal view of right male chelicera. 59. *Eremobates ctenidiellus*, new species, male abdominal ctenidia. 60. *Eremobates ctenidiellus*, new species, ventral view of female genital opercula. 61. *Eremobates gladiolus*, new species, mesoventral view of apical segments of right male palpus. 62. *Eremobates gladiolus*, new species, male abdominal ctenidia.

and H. A. Rasmussen); Mesa Verde, July 23, 1941, two males, one female. Nevada: Reno, June 1, 1941, one female, one young female (Ira La Rivers). New Mexico: Chama, two females (William L. Chapel). Utah: Fish Lake, Sevier County, July 1, 1940, one male (Gertsch and Hook); St. George, April, 1924, one female. Washington: Camp Umatilla, June 27, 1862, one female. Wyoming: Sheridan, one male (Banks).

REMARKS: This species closely agrees with the original description of Simon (1879) and that of Roewer (1934). The fact that the type was described from Mexico and, according to Simon's description, has the metatarsus and tarsus dark reddish brown, almost black, leads to some doubt as to the conspecificity of the above-described specimens with Simon's species. Until the type can be studied in detail, however, this placement appears to be the most plausible.

The Wyoming record for this species is probably spurious.

Eremobates ctenidiellus,¹ new species

Figures 58–60

MALES: Total length, 18.0 to 21.0 mm.

	LENGTH	WIDTH
Chelicerae	4.8– 5.8 mm.	2.2–2.6 mm.
Propeltidium	2.4– 2.6	3.6–4.0
Palpi	16.0–19.0	—
1st legs	14.0–16.0	—
4th legs	22.0–24.0	—

Holotype, larger measurements.

Coloration and markings similar to those of *scaber* (Kraepelin) except that the dusky areas are fainter and less distinct.

Structure similar to that of *scaber*. Fixed finger of chelicerae more slender so that the fondal notch is nearly one and one-half times as wide as the base of the finger. Propeltidium wider than long by a ratio of 1 to 1.5.

Ctenidia on first post-spiracular sternite of abdomen two in number, but they are fine, hair-like, and scarcely distinguishable from the other setae clothing the abdomen. One specimen from Colorado had one distinct ctenidium and a reduced scopula.

FEMALES: Total length, 19.0 to 24.0 mm.

¹ Greek, *ctenidium*, diminutive of *ctis*, a comb; refers to ctenidia on the abdomen.

	LENGTH	WIDTH
Chelicerae	4.6– 6.2 mm.	1.8–2.4 mm.
Propeltidium	2.0– 2.4	3.6–4.4
Palpi	13.0–16.0	—
1st legs	11.0–14.0	—
4th legs	18.0–24.0	—

Allotype, smaller measurements.

Coloration and structure nearly identical with those of *scaber* (Kraepelin). Specific differences occur in the opercula of the genital segment of the abdomen. Figure 60 shows the opercula of the allotype, which apparently was taken *in copula* with the holotype. Other females do not have the opercula widely separated.

TYPE LOCALITY: Male holotype and female allotype from 2 miles east of Glenwood, Sevier County, Utah, June 30, 1940 (Gertsch and Hook), in the American Museum of Natural History. Paratypes also in the United States National Museum, Museum of Comparative Zoölogy, University of Utah Museum, and Cornell Museum.

RECORDS: California: Sisson, June 30, one male, one female (J. H. Emerton). Oregon: Wonder, July 1, 1922, one male (C. D. Duncan); Gateway, July 3–6, 1933 (J. M. Piereson). Utah: Zion National Park, July 4–5, 1932, one male, one female (Gertsch); Fort Douglas, May 26, 1934, one male (W. Ivie).

REMARKS: This species is quite closely related to *scaber* (Kraepelin) and is more easily separated in the male sex.

Eremobates gladiolus,² new species

Figures 61–64

MALE HOLOTYPE: Total length, 27.0 mm.

	LENGTH	WIDTH
Chelicerae	6.5 mm.	3.0 mm.
Propeltidium	3.3	5.0
Palpi	21.0	—
1st legs	17.0	—
4th legs	28.0	—

Coloration and markings similar to those of *scaber* (Kraepelin) except that the longitudinal stripes on the chelicerae are indistinct and the legs and palpi are unmarked except for the distal ends of the femora and proximal ends of the tibiae of the fourth legs.

² Latin, *gladiolus*, diminutive of *gladius*, a sword; refers to ctenidia on abdomen.

Structure similar to that of *scaber* except that this species apparently is larger; the metatarsal scopula of the palpus is composed of 80 rounded papillae and extends only two-thirds of the length of the segment; the two ctenidia on the first post-spiracular abdominal sternite are broad, flattened, and scimitar-shaped, and the propeltidium is wider than long by a ratio of 1 to 1.5.

FEMALES: Total length, 19.0 to 26.0 mm.

	LENGTH	WIDTH
Chelicerae	5.8- 6.5 mm.	2.3-2.6 mm.
Propeltidium	2.5- 2.7	4.2-4.4
Palpi	20.0-20.0	—
1st legs	13.0-13.0	—
4th legs	21.0-21.0	—

Allotype, larger measurements.

Paratype, smaller measurements (abdomen shriveled).

Coloration and markings similar to those of male except the stripes on the chelicerae are distinct basally.

Structure nearly identical with that of *scaber* (Kraepelin). Specific differences can be found in the opercula of the genital segment of the abdomen shown in figure 63. The metatarsus of the palpus of this species has, in addition, an apical mesoventral scopula composed of 30 to 40 rounded papillae.

TYPE LOCALITY: Male holotype from Maupin, Oregon, July 19, 1934 (J. M. Pierson), in the American Museum of Natural History. Female allotype from Starbuck, Washington, July 4, 1938 (C. S. Burner), in the American Museum of Natural History. Female paratype from Umatilla, Oregon, June 24, 1882 (S. Henshaw), in the Museum of Comparative Zoölogy. Two female paratypes from Wishram, Washington, June, 1935, one in the United States National Museum and one in the American Museum of Natural History.

RECORDS: Utah: Delta, August 1, 1949, one female (D. M. Allred).

REMARKS: The males and females of this species were not collected together, but the strikingly similar coloration and structure indicate that they belong in a single species. Additional collections may prove them to belong to separate species.

Eremobates zinni,¹ new species

Figures 65-68

MALE HOLOTYPE: Total length, 21.0 mm.

	LENGTH	WIDTH
Chelicerae	5.7 mm.	2.5 mm.
Propeltidium	2.6	3.8
Palpi	19.0	—
1st legs	15.0	—
4th legs	23.0	—

Coloration and markings similar to those of *scaber* (Kraepelin) but differing as follows: dusky markings on legs and palpi indistinct except for distal ends of metatarsi and all of tarsi of palpi which are very dark, propeltidium light except for a narrow dark band on the anterior margin.

Structure similar to that of *scaber* except the fonal notch is considerably deeper than wide, the apical plumose bristle of the flagellum complex extends nearly to the end of the fixed finger, there is no mesoventral scopula on the metatarsus of the palpus, and there are three straight, flattened ctenidia on the first post-spiracular sternite of the abdomen.

Although the holotype carries three ctenidia it is probable that two or four are typical.

FEMALE ALLOTYPE: Total length, 23.0 mm.

	LENGTH	WIDTH
Chelicerae	5.7 mm.	2.5 mm.
Propeltidium	2.4	4.2
Palpi	15.0	—
1st legs	13.0	—
4th legs	21.0	—

Female paratype, same measurements.

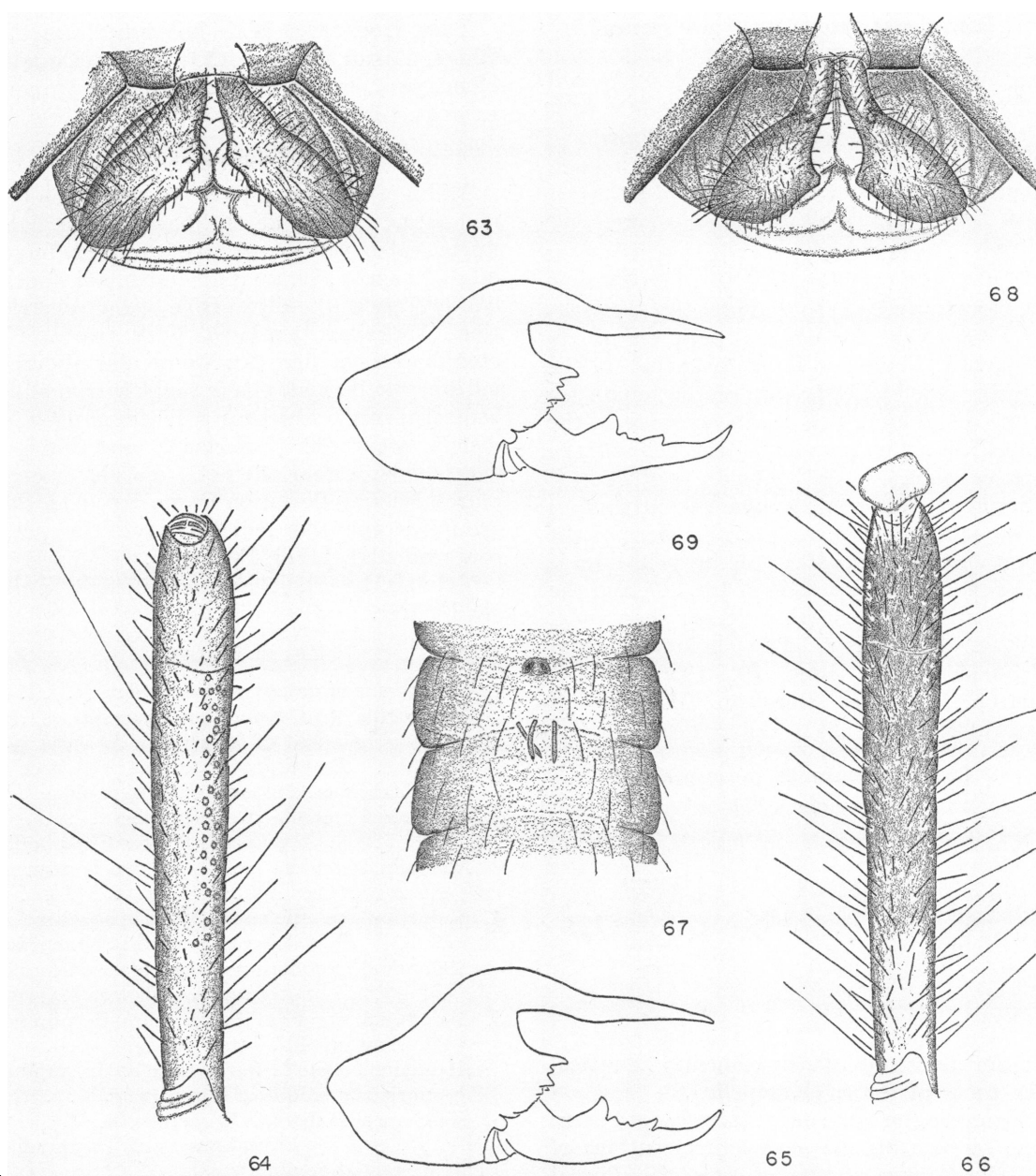
Coloration similar to that of male.

Structure as in *scaber* (Kraepelin). Specific differences are found in the opercula of the genital segment of the abdomen (fig. 68).

TYPE LOCALITY: Male holotype and female allotype from Las Vegas, Nevada, May through August, 1944 (Donald J. Zinn). Female paratype from Las Vegas, Nevada, February through June, 1945 (Donald J. Zinn). All types in the American Museum of Natural History.

REMARKS: Although this species is described here as new, a comparison of the type with that of *geniculatus* (Simon) may prove it to be a synonym of that species.

¹ Named for the collector, Donald J. Zinn.



FIGS. 63-69. 63. *Eremobates gladiolus*, new species, ventral view of female genital opercula. 64. *Eremobates gladiolus*, new species, mesoventral view of apical segments of right female palpus. 65. *Eremobates zinni*, new species, ectal view of right male chelicera. 66. *Eremobates zinni*, new species, mesoventral view of apical segments of right male palpus. 67. *Eremobates zinni*, new species, male abdominal ctenidia. 68. *Eremobates zinni*, new species, ventral view of female genital opercula. 69. *Eremobates ascopulatus*, new species, ectal view of right male chelicera.

Eremobates ascopulatus,¹ new species

Figure 69

MALE HOLOTYPE: Total length, 23.0 mm.

	LENGTH	WIDTH
Chelicerae	5.9 mm.	2.8 mm.
Propeltidium	2.8	4.8
Palpi	20.0	—
1st legs	17.0	—
4th legs	23.0 (tarsi missing)	—

Coloration similar to that of *scaber* (Kraepelin) except that the legs and palpi are nearly unmarked. There is a faint dusky bar on the anterior face of the femora of the fourth leg at the distal end. The dusky covering of the propeltidium is heaviest just behind the exterior lobes.

Structure same as in *scaber* except there is no scopula on the mesoventral surface of the metatarsus of the palpus, the propeltidium is wider than long by a ratio of 1 to 1.7, and the fondal notch is noticeably deeper than wide.

TYPE LOCALITY: Male holotype from Richfield, Utah, June 20, 1930 (W. J. Gertsch), in the American Museum of Natural History.

Eremobates similis,² new species

Figures 70, 71

MALE HOLOTYPE: Total length, 22.0 mm.

	LENGTH	WIDTH
Chelicerae	5.2 mm.	2.6 mm.
Propeltidium	2.5	3.9
Palpi	17.0	—
1st legs	14.0	—
4th legs	22.0	—

Coloration and markings nearly identical with those of *scaber* (Kraepelin).

Structure the same as in *scaber* except there is no scopula on the mesoventral surface of the metatarsus of the palpus, the fondal notch is noticeably wider than deep, and there are four ctenidia on the posterior margin of the first post-spiracular abdominal sternite. A fifth spurious spine occurs between the mesal pair of ctenidia.

¹ Greek, *a*, prefix meaning without, plus Latin, *scopulae*, diminutive of *scopae*, a broom, plus Latin, *atus*, suffix meaning bearing.

² Latin, *similis*, like or similar; refers to similarity to *E. scaber* (Kraepelin).

TYPE LOCALITY: Male holotype from Elk Ridge, Utah, June 13, 1936 (Douglas Henriques), in the collection of the University of Utah.

Palpisetulosus GROUP

Males of this group have a constriction but no distinct notch at the base of the fixed finger. Mesoventral groove of fixed finger dilated basally. There is an ectodorsal, tooth-like process at the distal edge of the constriction. Males are provided with two to 10 ctenidia on the first post-spiracular abdominal sternite. Females have roughly triangular genital opercula which are adjacent anteriorly, widely separated posteriorly, and have a deep oval pit near the ectal margin of each plate. Fondal dentition same as in *scaber* group except the females have the ectal row graded II, I, III, IV in size.

TYPICAL SPECIES: *Eremobates palpisetulosus* Fichter.

KEY TO MALES

1. Metatarsus of palpus with scopula 2
Metatarsus of palpus without scopula 5
2. Scopula composed of fewer than 50 weak papillae . . . *Eremobates scopulatus*, new species
Scopula composed of more than 50 papillae 3
3. Abdominal ctenidia two in number
. *Eremobates tejonus* Chamberlin
Abdominal ctenidia more than two in number 4
4. Abdominal ctenidia normally six in number . . .
. *Eremobates tuberculatus* (Kraepelin)
Abdominal ctenidia normally eight in number
. *Eremobates purpusi* (Roewer)
5. Abdominal ctenidia six or more in number (spurious ctenidia often present) 6
Abdominal ctenidia fewer than six in number (spurious ctenidia seldom present) 7
6. Eight normal abdominal ctenidia
. *Eremobates affinis* (Kraepelin)
Six normal abdominal ctenidia
. *Eremobates gracilidens*, new species
7. Abdominal ctenidia indistinct, linear, and hair-like 8
Abdominal ctenidia distinct, broad, and blade-like 9
8. Two abdominal ctenidia, anterior tooth of movable finger distinctly notched
. *Eremobates marathoni*, new species
Four abdominal ctenidia, anterior tooth of movable finger not or indistinctly notched
. *Eremobates palpisetulosus* Fichter

9. Abdominal ctenidia two in number
 *Eremobates nodularis*, new species
 Abdominal ctenidia four in number
 *Eremobates mormonus* (Roewer)

As *Eremobates girardi* (Putnam) has not been seen, it is not included in the key. From Putnam's description the species appears to be characterized by the lack of a palpal scopula and abdominal ctenidia.

***Eremobates palpisetulosus*¹ Fichter**

Figures 72-79

Eremobates palpisetulosus FICHTER, 1941, Amer. Midland Nat., vol. 25, no. 3, pp. 179-181, figs. 1, 2 (male).

MALES: Total length, 24.0 to 32.0 mm.

	LENGTH	WIDTH
Chelicerae	5.6- 8.0 mm.	3.1-3.6 mm.
Propeltidium	3.3- 3.8	4.9-6.0
Palpi	23.0-27.0	—
1st legs	19.0-22.0	—
4th legs	20.0-37.0	—

Cotype, smaller measurements.

Coloration in alcohol light to rusty yellow, with dusky, purplish markings as follows: chelicerae each with one dorsal and two lateral faint dusky stripes; eye tubercle dark; propeltidium dusky on anterior margins and down sides to posterior ends of exterior lobes; mesopeltidium, metapeltidium, and abdominal tergites dark; tarsus and distal end of metatarsus of palpus dark; fourth legs with distal ends of femora and proximal ends of tibiae faintly dusky. Markings are indistinct on old alcoholic and freshly molted specimens. Malleoli white.

Dentition of chelicerae somewhat variable but following the general pattern shown in figures 72, 73, and 74. Movable finger with principal tooth large, anterior tooth a low, flattened, irregular ridge, two intermediate teeth of which the proximal is larger and nearly contiguous with the principal tooth while the distal is often very tiny or missing, a very small but distinct mesal tooth, and transverse groove on the ventral surface just distad of the anterior tooth. The ventral

groove of the movable finger is more distinct in ectoventral view and the finger is distinctly narrower beyond the groove. Fixed finger in lateral view linear, with margins sinuate and the ectodorsal process nearly indistinguishable from dorsal margin of finger. In mesodorsal view the process is a low peaked ridge which is separated from the base of the finger by less than the width of the finger. Fondal teeth occurring in two rows of four each, the ectal row graded in size I, II, III, IV, the mesal row I, III, II, IV. Fourth fondal teeth scarcely distinguishable from the dentate socket margin of the movable finger except as a larger denticle. Fondal notch U-shaped but flattened on its dorsal margin, slightly narrower than the base of the fixed finger, about twice as long as wide and usually bearing one or more denticles on its proximoventral margin.

Mesal groove a deep, parallel-sided slot which widens into an ovate concavity but does not extend beyond the base of the finger. Flagellum complex typical of genus, with the apical plumose bristle widening along the basal margin in such a way as to appear bent, and the subapical plumose bristle moderately large and straight. The remaining plumose bristles are flexed dorsally to lie nearly parallel with the dorsal row of simple tubular bristles. Mesal setae of movable finger plumose in the basal quarter of the finger near the dorsal margin but simple on the distal three-quarters.

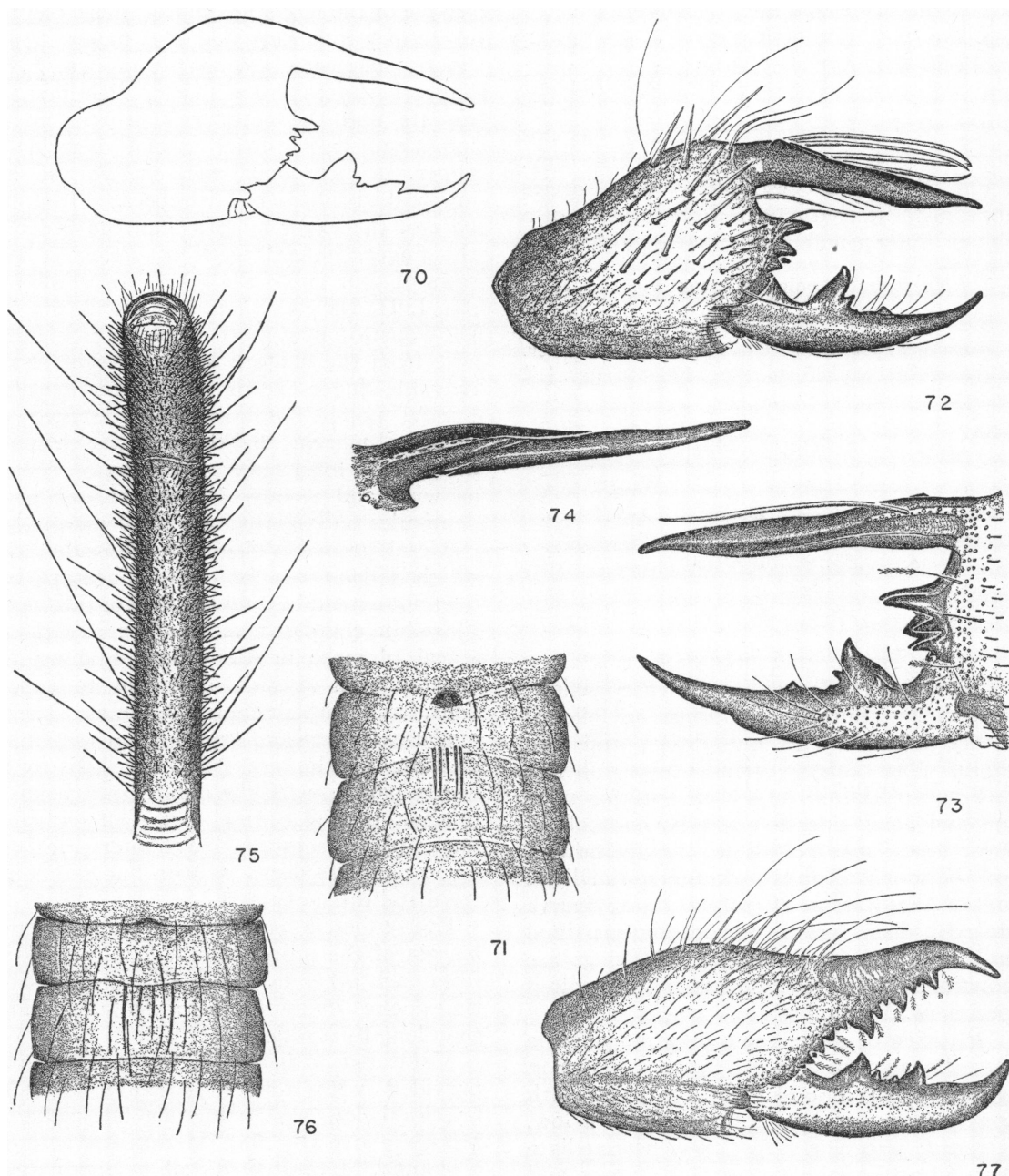
Eye tubercle situated on the anterior margin of the propeltidium. Eyes separated from each other by about one and one-half times one diameter. Propeltidium wider than long by a ratio of 1 to 1.5.

Metatarsus, tarsus, and tibia of palpus provided with numerous heavy cylinder bristles below and numerous fine cylinder bristles above (fig. 75). Metatarsus without a scopula. Metatarsus of palpus about three times as long as tarsus.

First post-spiracular abdominal sternite provided with four fine, hair-like ctenidia as shown in figure 76 which are difficult to distinguish from the setae clothing the abdomen. On some specimens only two ctenidia can be distinguished from the other setae.

FEMALES: Total length, 23.0 to 31.0 mm.

¹ Latin, *palpus*, a feeler, plus *setula*, a small bristle, plus *osus*, full of.



FIGS. 70-77. 70. *Eremobates similis*, new species, ectal view of right male chelicera. 71. *Eremobates similis*, new species, male abdominal ctenidia. 72. *Eremobates palpisetulosus* Fichter, ectal view of right male chelicera. 73. *Eremobates palpisetulosus* Fichter, mesal view of right male chelicera. 74. *Eremobates palpisetulosus* Fichter, dorsal view of fixed finger of right male chelicera. 75. *Eremobates palpisetulosus* Fichter, mesoventral view of apical segments of right male palpus. 76. *Eremobates palpisetulosus* Fichter, male abdominal ctenidia. 77. *Eremobates palpisetulosus* Fichter, ectal view of right female chelicera.

	LENGTH	WIDTH
Chelicerae	6.9- 8.2 mm.	3.0-3.3 mm.
Propeltidium	3.1- 3.3	5.6-5.8
Palpi	19.0-17.0	—
1st legs	17.0-15.0	—
4th legs	26.0-24.0	—

Coloration in alcohol similar to that of males except that markings are generally less distinct. Markings indistinct on old alcoholic specimens.

Dentition of chelicerae as shown in figures 77 and 78. Movable finger with principal and anterior teeth large, two small intermediate teeth, of which the proximal is larger and nearly contiguous with the principal tooth, and a distinct mesal tooth. Fixed finger with principal and medial teeth large, a slightly smaller anterior tooth, two intermediate teeth behind principal tooth, two between principal and medial teeth, and one between the medial and anterior teeth. Fendal teeth same as in male except that the ectal row is graded II, I, III, IV.

Structure same as in male except that the cylinder bristles on the palpi are less numerous.

Opercula of genital segment as shown in figure 79. Some variation in height, and width of the median fleshy area occurs.

TYPE LOCALITY: Male cotype from Sidney, Nebraska, July 9, 1939 (J. C. Swinbank), in the American Museum of Natural History. Male cotype from Harrisburg, Nebraska, June 16, 1939 (V. C. Jacobson), in the museum of the University of Nebraska.

RECORDS: Arizona: Tucson, one male (O. Bryant), July, 1940, one male (W. J. Gertsch); Globe, one female, (Grant). Colorado: Denver, summer, 1933, one female (Mrs. M. East), 1935-1946, one male, two females. Kansas: Logan County, June 22, 1925, one male (R. H. Beamer). Oklahoma: June, 1905, one female (W. R. Shaw); Kenton, June 21, 1933, one female. Texas: Marfa, July 10-25, 1914, one female; Edinburg, 1935, one male (Stanley Mulaik); Fort Davis, May 14, 1912, one female (J. D. Mitchell), July 7, 1921, one female (C. D. Duncan); Midland, June 11, 1947, one male (Howard Davis); Carrizo Springs, Dimmit County, October 1882, one male (Shaupp); Davis Mountains, June 17, 1947, two males, one

female (A. T. McClay); Davis Mountain Junction, July 9, 1948, one female (C. and P. Vaurie); Chisos Basin, Big Bend National Park, June 16, 1948 (M. A. Cazier); Cristoval, June 29, 1948, one male (C. and P. Vaurie); Laredo, Webb County, May 20-24, 1948, one male (F. Werner and W. Nutting).

REMARKS: Although Fichter originally believed this species to be the *pallipes* of earlier authors (not Say), it is distinctly different.

This species is quite variable in size, distinctness of abdominal ctenidia, and female opercula of the genital segment. When this variability is considered in the light of the extensive range recorded here, it seems probable that additional collections will demonstrate a confusion of two species.

Eremobates marathoni,¹ new species

Figures 80, 81

MALE HOLOTYPE: Total length, 33.0 mm.

	LENGTH	WIDTH
Chelicerae	8.8 mm.	4.0 mm.
Propeltidium	4.6	6.5
Palpi	28.0	—
1st legs	24.0	—
4th legs	36.0	—

Paratype, measurements nearly identical with holotype.

Coloration in alcohol very similar to that of *E. palpisetulosus* Fichter except the chelicerae are unmarked and the dusky markings on the propeltidium are limited to a marginal stripe.

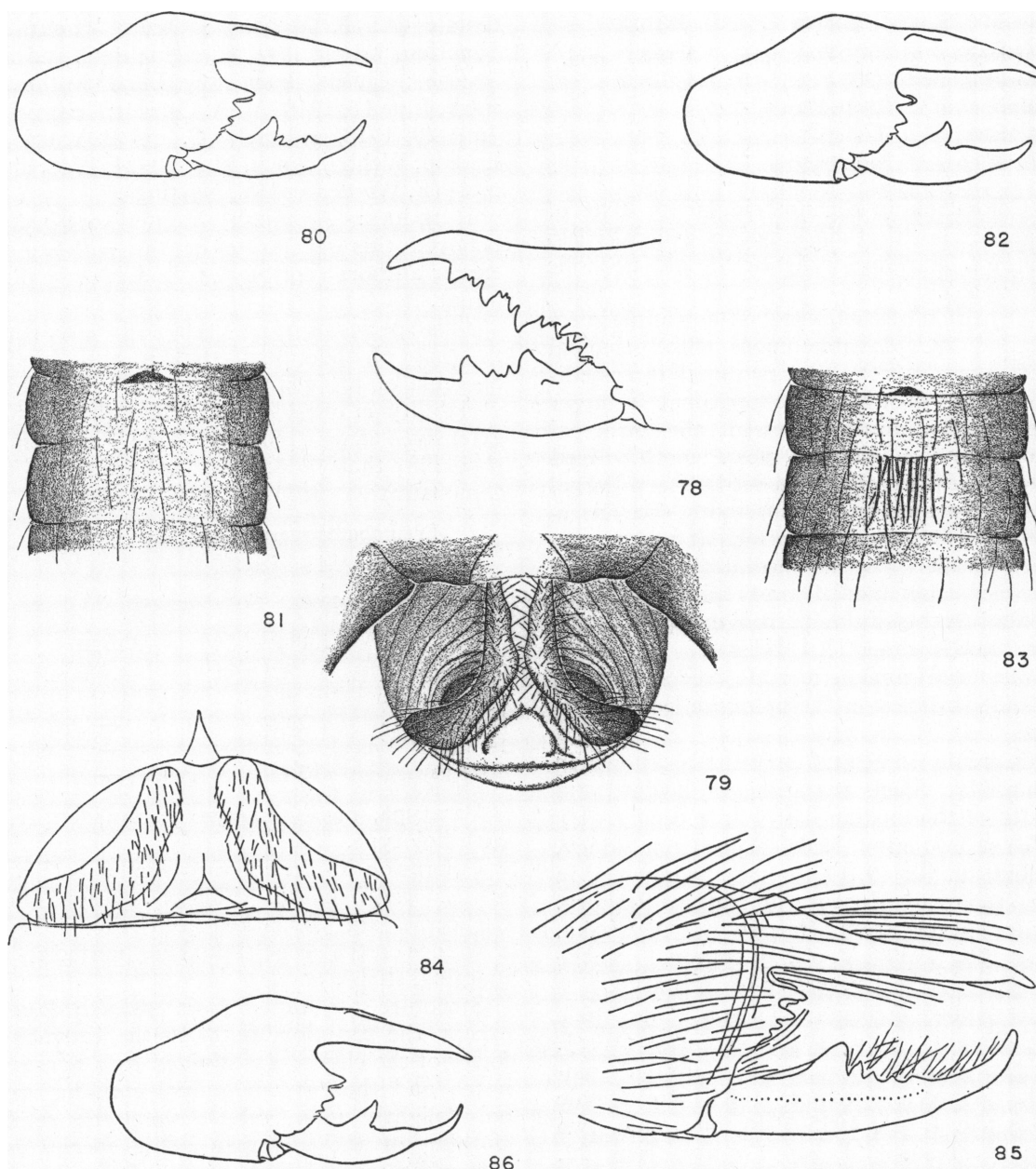
Structure the same as in *palpisetulosus* except the anterior tooth of the movable finger of the chelicera is divided by a narrow notch and the two abdominal ctenidia are only slightly more robust than the setal clothing of the abdomen. This species is somewhat more robust than *palpisetulosus*.

Propeltidium wider than long by a ratio of 1 to 1.4. Metatarsus of palpus 3.4 times as long as tarsus.

TYPE LOCALITY: Male holotype and male paratype from Marathon, Texas, June 12, 1948 (M. A. Cazier), in the American Museum of Natural History.

RECORDS: New Mexico: Lordsburg, July 15, 1948, one male. Texas: Lozier Canyon,

¹ Of or pertaining to Marathon, Texas.



FIGS. 78-86. 78. *Eremobates palpisetulosus* Fichter, mesal view of right female chelicera. 79. *Eremobates palpisetulosus* Fichter, ventral view of female genital opercula. 80. *Eremobates marathoni*, new species, ectal view of right male chelicera. 81. *Eremobates marathoni*, new species, male abdominal ctenidia. 82. *Eremobates affinis* (Kraepelin), ectal view of right male chelicera. 83. *Eremobates affinis* (Kraepelin), male abdominal ctenidia. 84. *Eremobates affinis* (Kraepelin), ventral view of female genital opercula (redrawn from Roewer, 1934). 85. *Eremobates girardi* (Putnam), ectal view of right male chelicera (redrawn from Putnam, 1883). 86. *Eremobates gracilidens*, new species, ectal view of right male chelicera.

Terrell County, July 8, 1948, one male (W. Nutting and F. Werner); Laredo, Webb County, May 20-24, 1948, two males (F. Werner and W. Nutting).

REMARKS: This species and *E. palpisetulosus* Fichter are very closely related. It is probable that the female of this species has been placed under *palpisetulosus*, where it must remain until further collections permit a correlation of the sexes.

***Eremobates affinis*¹ (Kraepelin)**

Figures 82-84

Datames affinis KRAEPELIN, 1899, Mitt. Naturhist. Mus. Hamburg, 16 Jahrgang, p. 242, pl. 2, figs. 20a, 20b (male and female).

Eremobates affinis KRAEPELIN, 1901, Das Tierreich, no. 12, p. 128, fig. 96 (male and female).

Eremoperna affinis ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 558, figs. 129, 324c, 325a (male and female).

MALES: Total length, 20.0 mm.

	LENGTH	WIDTH
Chelicerae	5.6 mm.	2.6 mm.
Propeltidium	2.9	4.2
Palpi	18.0	—
1st legs	15.0	—
4th legs	24.0	—

All three specimens seen have the same measurements.

Coloration and markings in alcohol almost identical with those of *scopulatus*, new species.

Structure similar to that of *scopulatus* except the process of the fixed finger is indistinct in lateral view, there is no scopula on the metatarsus of the palpus, and there are eight linear ctenidia on the first postspiracular abdominal sternite.

Propeltidium wider than long by a ratio of 1 to 1.4. Metatarsus of palpus three times as long as tarsus.

FEMALES: A female of this species has not been examined, and a translation of Roewer's redescription of Kraepelin's type female is included.

"Movable finger with three intermediate teeth. Fifth sternite of the abdomen without ctenidia, pedipalps only hairy, their metatarsi

without scopula and without cylinder bristles. Coloration as in male, but abdominal pleura scarcely darkened. Body length 24 mm. Arizona."

Roewer's illustration of the opercula of the type is redrawn in figure 84.

TYPE LOCALITY: Male and female types, No. 9129, from Arkansas in E. Simon's collection at the museum in Paris, France. Roewer (1934) states that the type (vial) carries besides Kraepelin's label "type" a special label of Simon's giving the collection locality "Arizona," and that Kraepelin's notation was probably in error.

RECORDS: California: Mt. Tamalpais, June, 1905, one male (J. H. Emerton); Sonoma County, one male (Mrs. Bush); Santa Barbara, May 2, 1947, one male (A. Bacon).

REMARKS: Although Roewer placed *affinis* (Kraepelin) and *tuberculatus* (Kraepelin) in different genera, a comparative study of the mesoventral groove and flagellum complex of the fixed finger shows that they are congeneric. Kraepelin seems to have indicated their relationship in naming *affinis*.

This species and *gracilidens*, new species, commonly have spurious abdominal ctenidia. The male figured here has nine ctenidia.

***Eremobates girardi*² (Putnam)**

Figure 85

Datames girardii PUTNAM, 1883, Proc. Davenport Acad. Nat. Sci., vol. 3, p. 257, pl. 2, figs. 12, 12a (male).

Eremobates girardi KRAEPELIN, 1901, Das Tierreich, no. 12, p. 128 (male).

Eremobates girardi ROEWER, 1934 in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 575, fig. 328 (male).

The type of this species was in the Academy of Natural Sciences of Philadelphia but has been lost or destroyed. None of the specimens examined agree with Putnam's figures or description. It appears to be closely related to *palpisetulosus* Fichter but apparently differs in coloration and markings and in lacking abdominal ctenidia.

As the original description of the species is not readily available a transcript is given below. Putnam's illustration of the chelicera also has been redrawn for use.

¹ Latin, *affinis*, neighboring; probably refers to relationship with Kraepelin's species *tuberculatus*.

² Named for the collector, Girard.

"♂ Length, twenty-two mm. entire color dark blackish brown, except tarsus and metatarsus of feet are paler, abdomen above shows traces of a broad dorsal band.

"Head, six mm. broad, four mm. long, anterior border nearly straight, slightly convex retreating rapidly at the sides; posterior border, broadly obtusely truncated posteriorly; hairs short, fine, sparse; eye prominence, only moderately elongated and projected; eyes brown with black pupil, their interval greater than their diameter; hairs irregular (broken off).

"Mandibles: base three mm. upper finger four mm. long; base only moderately convex, suddenly contracted at the upper finger; furnished with numerous stiff spines, finer hairs intermingled; upper finger one-third longer than the base, subulate, nearly straight directed downwards, and slightly outwards, unarmed beneath, an elevated obtusely pointed knob above, near the base; furnished inside with a brush of stiff brown hairs directed forwards. No flagellum.

"The (fond) of the jaw approximately vertical, prolonged anteriorly at the teeth; armed with two rows of three teeth each; the outer row with upper tooth largest, second next, third smallest, inner row small, of nearly equal size; a cavity formed between the two rows of teeth into which the large tooth of the lower finger fits.

"Lower finger with a large conical tooth near its base; concave inward, convex outward, at its base an elongated conical small tooth projecting forwards, followed after an interval by a minute denticle and then by two obtusely rounded elevations, a short distance beyond which the finger is distinctly constricted; usual brush of hairs inside; carina on outside extending to point.

"Maxillary palpus: femur seven mm., tibia eight mm., metatarsus six mm., tarsus two mm.; tibia fusiform, tibia and tarsus enlarged toward the extremity; femur, tibia and tarsus with very fine, rather long hairs, some of them almost spiny; also numerous shorter, fine, pale colored hairs; tibia and metatarsus furnished in addition with very numerous short, stiff brown conical spines or very stiff hairs, some of them truncated.

"Fourth legs: femur, eight mm., tibia eight

mm., metatarsus five and a half mm., tarsus four mm., claws 1.3 mm., femur with fine hairs, no spines, tibia with fine hairs, some long, and several spines toward the extremity, that at the end being largest and longest; metatarsus with fine irregular hairs; nine spiny hairs at regular intervals below, not reaching to the extremity; several other irregular spines; tarsus hairy and with a number of spines below.

"Third legs: tibia five and a half mm. with spines on outer extremity; metatarsus five mm., with two rows of dorsal spines, six outside, four inside; one row of three ventral spines; hairs as usual fine and unequal; tarsus two mm. long with usual brush of hairs beneath. Abdomen oval, rounded, slightly hairy; genital opening a longitudinal slit in a slight elevation. A pair of spiracular openings on the posterior portion of each of the second and third segments, none on the fourth.

"One ♂ Museum Acad. Sci., Phila. Ark., Capt. Marcy. (Description written October 22, 1880)."

***Eremobates gracilidens*,¹ new species**

Figures 86, 87

MALES: Total length, 20.0 to 22.0 mm.

	LENGTH	WIDTH
Chelicerae	6.1- 5.4 mm.	2.9-2.5 mm.
Propeltidium	3.0- 2.8	4.6-4.4
Palpi	Both mangled to 21.0	—
1st legs	18.0-16.0	—
4th legs	Both mangled to 26.0	—

Holotype, larger specimen (abdomen mangled on small specimen).

Coloration and markings in alcohol similar to those of *palpisetulosus* Fichter except the legs and palpi are unmarked, the propeltidium has only a narrow dusky line on the anterior margin, and the prosomal tergites are light.

Structure similar to that of *affinis* (Kraepelin) except the anterior tooth of the movable finger is an evenly rounded lobe, the distal end of the finger is slender and crescent-shaped, the process of the fixed finger is a rounded spur which is nearly indistinguishable in lateral view, and there

¹ Latin, *gracilis*, slender, plus *dens*, a tooth; refers to tip of movable finger.

are six hair-like ctenidia on the first post-spiracular abdominal sternite. The holotype exhibits eight ctenidia, two of which are spurious.

Propeltidium wider than long by a ratio of 1 to 1.5. Metatarsus of palpus 3.2 times as long as tarsus.

TYPE LOCALITY: Male holotype from Twentynine Palms, California, March-April, 1945 (Jefferson H. Branch), in the American Museum of Natural History. Male paratype from Argus Mountains, Arizona, April, 1891 (K.), in the United States National Museum.

Eremobates scopulatus,¹ new species

Figures 88-91

MALES: Total length, 17.0 to 21.0 mm.

	LENGTH	WIDTH
Chelicerae	4.5- 5.8 mm.	2.4-2.7 mm.
Propeltidium	1.8- 2.7	3.0-4.6
Palpi	16.0-19.0	—
1st legs	13.0-16.0	—
4th legs	21.0-26.0	—

Holotype, larger measurements.

Coloration and markings in alcohol similar to those of *palpisetulosus* Fichter except the propeltidium is dusky save for a light median stripe about as wide as the space between the eyes, and the palpi and legs are faintly dusky on the apical ends of the femora and all of the tibiae. Markings are indistinct on newly molted or old alcoholic specimens.

Structure similar to that of *palpisetulosus*. This species differs by having the movable finger with the intermediate teeth reduced to denticles and an indistinct mesal tooth, the process of the fixed finger in lateral view a distinct rounded lobe, the fondal notch as wide as deep but not so wide as base of fixed finger, a narrow basal scopula of 10 to 40 very weak papillae on the metatarsus of the palpus, and six ctenidia on the first post-spiracular abdominal sternite. Some specimens have a spurious seventh ctenidium.

Propeltidium wider than long by a ratio of 1 to 1.6. Metatarsus of palpus 2.6 times as long as tarsus.

FEMALES: Total length, 24.0 to 29.0 mm.

¹ Latin, *scopulae*, diminutive of *scopae*, a broom, plus Latin, *atus*, suffix meaning provided with.

	LENGTH	WIDTH
Chelicerae	5.6-6.6 mm.	2.5-2.9 mm.
Propeltidium	2.8- 3.1	4.3-4.5
Palpi	17.0-18.0	—
1st legs	14.0-16.0	—
4th legs	24.0-26.0	—

Allotype, larger measurements.

Coloration and markings in alcohol similar to those of male.

Structure similar to that of *palpisetulosus* Fichter and nearly identical with that of *mormonus* (Roewer). Specific differences are found in the opercula of the genital segment of the abdomen (fig. 91).

TYPE LOCALITY: Male holotype from Las Vegas, New Mexico, 1931, in the American Museum of Natural History. Female allotype and female paratype, from Las Vegas, Nevada, February to June, 1945 (Donald J. Zinn), also in the American Museum of Natural History.

RECORDS: California: Los Angeles, Silver Lake Park, March 12, 1914, one male (D. N. Fisk); Mt. View, November, 1941, two females (E. M. Ehrhorn); Walnut Creek, July 8, 1903, one female; Yuba County, one female; Avalon, Santa Catalina, May 4, 1939, one male, November 18, 1927, one male, one female; Claremont, one male; Poway, San Diego County, one male (F. E. Blaisdel). Nevada: Winnemucca Lake, north-west edge, July 4, 1941, one female (La Rivers); Virgin Mountains, May 2, 1939, one male (William P. Nyo). Utah: St. George, one female (R. V. Chamberlin).

Eremobates mormonus² (Roewer)

Figures 92-94

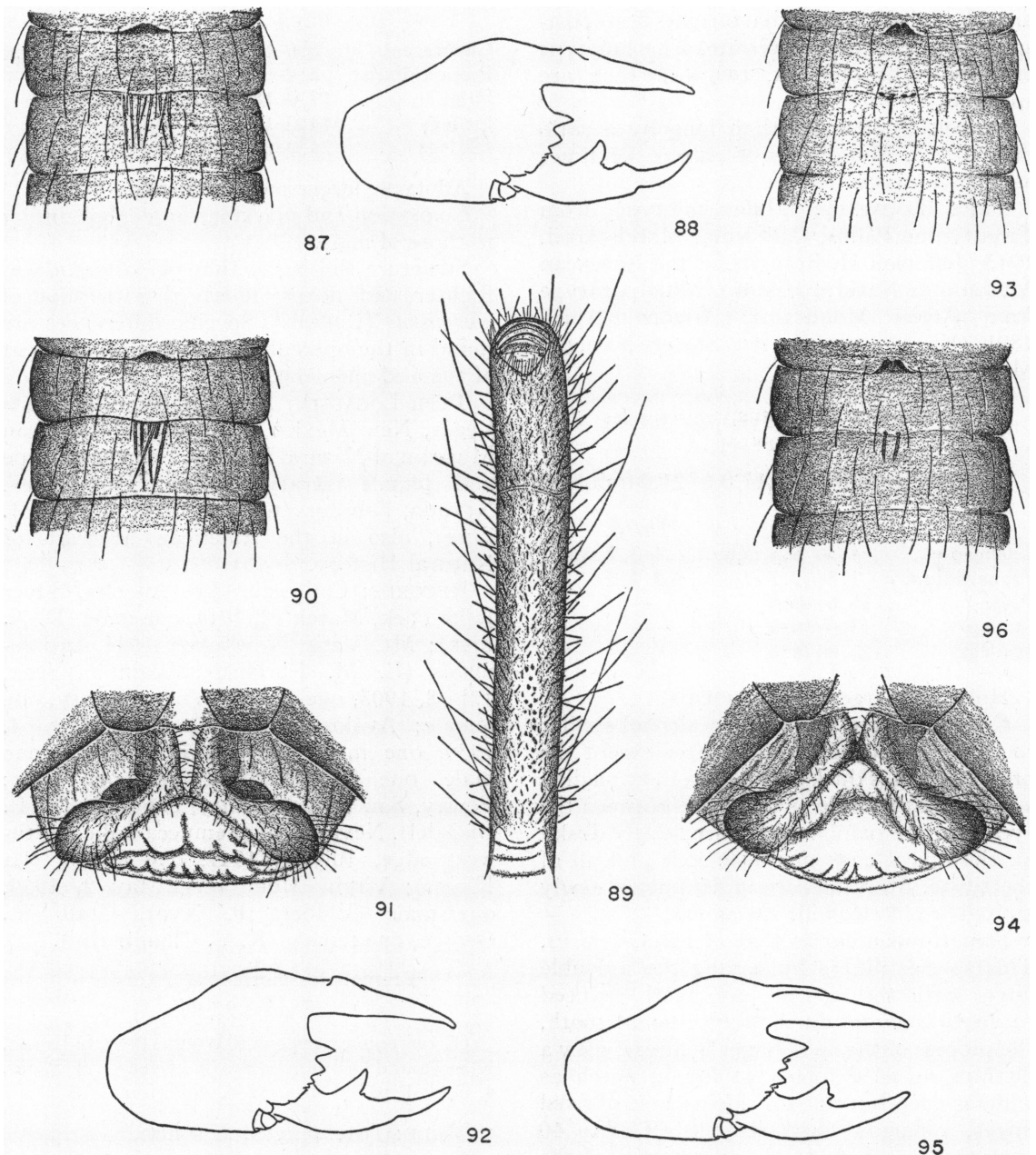
?*Eremoperna mormona* ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 561, figs. 323e, 324f (female).

MALE: Total length, 27.0 mm.

	LENGTH	WIDTH
Chelicerae	7.0 mm.	3.2 mm.
Propeltidium	2.7	4.6
Palpi	25.0	—
1st legs	19.0	—
4th legs	31.0	—

Coloration and markings similar to those of *palpisetulosus* Fichter except the dusky

² Greek, *mormon*, a hideous monster.



FIGS. 87-96. 87. *Eremobates gracilidens*, new species, male abdominal ctenidia. 88. *Eremobates scopulatus*, new species, ectal view of right male chelicera. 89. *Eremobates scopulatus*, new species, mesoventral view of apical segments of right male palpus. 90. *Eremobates scopulatus*, new species, male abdominal ctenidia. 91. *Eremobates scopulatus*, new species, ventral view of female genital opercula. 92. *Eremobates mormonus* (Roewer), ectal view of right male chelicera. 93. *Eremobates mormonus* (Roewer), male abdominal ctenidia. 94. *Eremobates mormonus* (Roewer), ventral view of female genital opercula. 95. *Eremobates nodularis*, new species, ectal view of right male chelicera. 96. *Eremobates nodularis*, new species, male abdominal ctenidia.

marking on the anterior margin of the propeltidium is faint and there are no distinct markings on the palpi and legs.

Structure similar to that of *palpisetulosus* except the process of the fixed finger in lateral view is a clearly projecting, blade-like structure that is rounded in front, angulate behind, and separated from the base of the finger by more than the width of the finger. This species differs further in having the fondal notch only one and one-half times as long as wide and in having four short, distinct ctenidia on the first post-spiracular abdominal sternite.

Propeltidium wider than long by a ratio of 1 to 1.6. Metatarsus of palpus 3.3 times as long as tarsus.

FEMALES: Total length, 24.0 to 27.0 mm.

	LENGTH	WIDTH
Chelicerae	6.1- 7.5 mm.	2.6-3.2 mm.
Propeltidium	2.6- 3.2	4.4-5.4
Palpi	17.0-20.0	—
1st legs	14.0-16.0	—
4th legs	22.0-26.0	—

Allotype, larger measurements.

Coloration and markings in alcohol similar to those of male. Markings indistinct on old alcoholic specimens.

Structure similar to *palpisetulosus* Fichter except the mesal tooth of the movable finger is an indistinct peaked ridge.

The two species are best separated by differences in the opercula of the genital segment shown in figure 94.

TYPE LOCALITY: Female type of *Eremoperna mormonus* Roewer, No. 3446/288, from Utah in the museum at Frankfurt, Germany.

RECORDS: Arizona: Santa Catalina Mountains, one female (Lutz); Pima County, one female; Yuma Desert, March, 1894, one female (Mearns); Littlefield, April 18, 1932, one male, one female. California: Fresno, August 18, 1942, one male (S. Celones); south Sonoma County, July 3, 1910, one female (J. A. Kusche); Dry Valley, 14 miles southeast of Monterey, Monterey County, one male (E. F. Ricketts). New Mexico: Carlsbad, July 26, 1938, one female (Bjorkman); 20 miles east of Lordsburg, July 15, 1948, one female. Texas: Chisos Mountains, Basin, July 26, 1938, one female; Alpine, July 14, 1921, one female (C. D. Duncan);

El Paso, June 19, 1948, two females (M. A. Cazier). Utah; Moab, June 18, 1934, one female (Rasmussen and Ivie).

REMARKS: The females of this species appear to be *Eremoperna mormonus* Roewer, but an examination of Roewer's type may prove otherwise. For the present this placement seems to be the most logical. One of the three males seen was provided with a scopula of about 70 weak papillae and had slightly longer abdominal ctenidia. It was placed in this species because of its coloration and dentition. Additional material may separate another species or subspecies.

***Eremobates nodularis*,¹ new species**

Figures 95, 96

MALES: Total length, 19.0 to 30.0 mm.

	LENGTH	WIDTH
Chelicerae	5.2- 8.0 mm.	2.6-4.0 mm.
Propeltidium	2.5- 3.9	4.2-6.6
Palpi	14.0-22.0	—
1st legs	12.0-18.0	—
4th legs	20.0-30.0	—

Coloration in alcohol similar to that of *palpisetulosus* Fichter except the markings on the propeltidium are faint and the legs and palpi are unmarked.

Structure similar to that of *palpisetulosus* except the movable finger in lateral view exhibits no anterior tooth and only one intermediate tooth that arises on the distal margin of the principal tooth. In dorsal view traces of the apparently missing teeth can be seen. This species also differs in having the fondal notch little more than half as wide as the base of the fixed finger, the ectal row of fondal teeth graded I, III, II, IV, in size, the propeltidium wider than long by a ratio of 1 to 1.6, and two, short, flattened ctenidia on the first post-spiracular abdominal sternite.

TYPE LOCALITY: Male holotype from Carlsbad, New Mexico, July 26, 1938 (Bjorkman), in the American Museum of Natural History.

RECORDS: Arizona: Tucson, one male (O. Bryant). Texas: Big Bend Park, August, 1947, one male (Fritz Putlitz).

¹ Latin, *nodulus*, diminutive of *nodus*, a knot, plus *aris*, suffix meaning pertaining to; refers to dentition of movable finger.

REMARKS: A study of the illustration and description of *Eremognatha guenini* Roewer indicates these species are closely related. This species can be separated from *guenini* by the possession of two ctenidia on the first post-spiracular abdominal sternite. Roewer also does not report a mesoventral groove of the fixed finger for *guenini*.

***Eremobates purpusi*¹ (Roewer)**

Figures 97-100

Eremopus purpusi ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 561, figs. 324g, 326a (female).

MALE: Total length, 21.0 mm.

	LENGTH	WIDTH
Chelicerae	6.0 mm.	3.0 mm.
Propeltidium	mangled and not measurable	
Legs and palpi	mangled and not measurable	

Coloration and markings in alcohol apparently almost identical with those of *scopulatus*, new species.

Structure similar to that of *scopulatus* except there is no mesal tooth on the movable finger, the process on the fixed finger is a rounded lobe, which is nearly indistinguishable in lateral view, there is a broad, dense scopula of about 150 papillae on the metatarsus of the palpus, which extends almost the length of the segment, and there are nine linear ctenidia on the first post-spiracular abdominal sternite. One ctenidium appears to be spurious.

FEMALES: Total length, 19.0 to 23.0 mm.

	LENGTH	WIDTH
Chelicerae	5.8- 6.4 mm.	2.6-2.9 mm.
Propeltidium	2.5- 2.6	4.2-4.5
Palpi	14.0-15.0	—
1st legs	13.0-13.5	—
4th legs	21.0-22.0	—

Coloration and markings in alcohol nearly identical with those of *E. scopulatus*, new species.

Structure also similar to that of *scopulatus* except the opercula of genital segment enclose a semicircular fleshy area as shown in figure 100.

TYPE LOCALITY: Female type, No. 9332, from Tlaquilotepe, Mexico, in the Berlin Museum.

¹ Derivation and reference obscure.

RECORDS: California: San Diego, June 22, 1947, one female (C. B. Perkins), one female, one female and one young (Marx); Fresno, June 10, 1907, one male; Claremont, one male; Stanford University, May, 1922, one female (C. D. Duncan); Hullville, Lake County, June 10, 1917, one male, one female (F. E. Blaisdel); Coronado, October 24, 1890, three females (F. E. Blaisdel); Trez Pinos, San Benito County, June 24, 1933, one female; Pacific Grove, one male, one female (E. C. Starks), Snowline Camp, Eldorado County, July 7, 1948, one female (H. H. Blakemore).

REMARKS: Although this placement is believed to be correct, final judgment must be reserved until Roewer's type can be studied. The number of normal abdominal ctenidia on the males appears to be eight, but one or two spurious ctenidia often occur.

***Eremobates tejonus*² Chamberlin**

Figure 101

Eremobates tejonus CHAMBERLIN, 1925, Bull. Mus. Comp. Zool., vol. 67, p. 236.

MALE TYPE: Body mangled, not measurable.

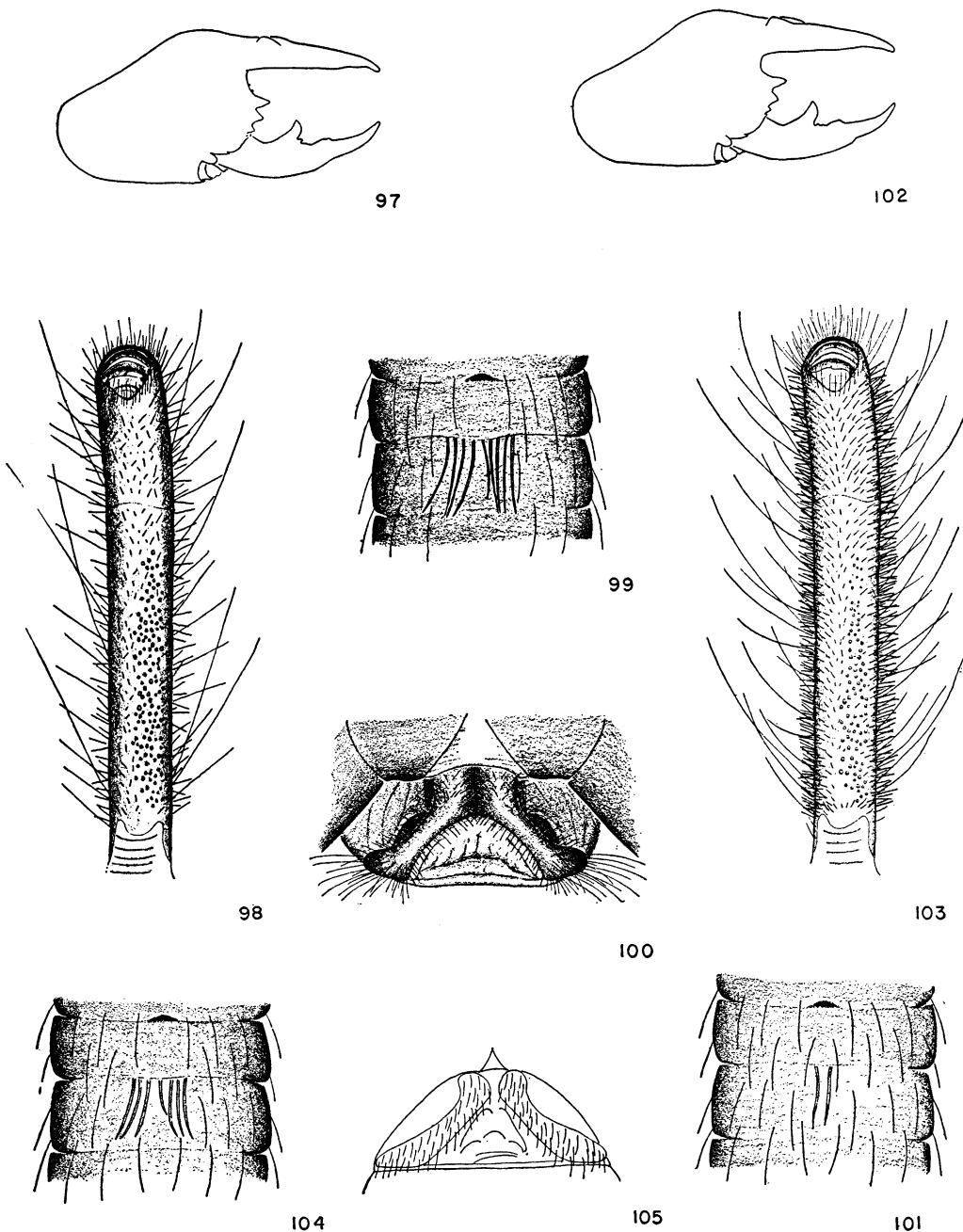
Coloration and markings discolored by alcohol and age but apparently similar to those of others in the group.

Structure very similar to that of *purpusi* (Roewer) from which it can be easily separated by the presence of only two long, flattened ctenidia on the first post-spiracular abdominal sternite, a scopula of about 100 papillae on the metatarsus of the palpus, and by having the fondal notch only one-half as wide as the base of the fixed finger and about one and one-half times deeper than wide.

TYPE LOCALITY: Male type from stomach of *Bufo* sp. taken at Fort Tejon, California, no further data, in the Museum of Comparative Zoölogy.

REMARKS: At the time that the type was studied no ocular micrometer was available for accurate measurements of the chelicerae and propeltidium, but the species is readily identifiable by the characteristics given above. Chamberlin apparently overlooked the dorsal process of the fixed finger which is not clearly visible from a lateral view.

² Latin, of or pertaining to Fort Tejon, California.



FIGS. 97-105. 97. *Eremobates purpusi* (Roewer), ectal view of right male chelicera. 98. *Eremobates purpusi* (Roewer), mesoventral view of apical segments of right male palpus. 99. *Eremobates purpusi* (Roewer), male abdominal ctenidia. 100. *Eremobates purpusi* (Roewer), ventral view of female genital opercula. 101. *Eremobates tejonus* Chamberlin, male abdominal ctenidia. 102. *Eremobates tuberculatus* (Kraepelin), ectal view of right male chelicera. 103. *Eremobates tuberculatus* (Kraepelin), mesoventral view of apical segments of right male palpus. 104. *Eremobates tuberculatus* (Kraepelin), male abdominal ctenidia. 105. *Eremobates tuberculatus* (Kraepelin), ventral view of female genital opercula (redrawn from Roewer, 1934).

Eremobates tuberculatus¹ (Kraepelin)

Figures 102-105

Datames tuberculatus KRAEPELIN, 1899, Mitt. Naturhist. Mus. Hamburg, 16 Jahrgang, p. 241, pl. 2, fig. 18 (male).

Eremobates tuberculatus KRAEPELIN, 1901, Das Tierreich, no. 12, p. 122, fig. 88 (male).

Eremognatha tuberculata ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, pp. 567, 568, figs. 116b, 322f, 324o (male and female).

MALES: Total length, 19.0 to 25.0 mm.

	LENGTH	WIDTH
Chelicerae	6.2- 6.3 mm.	2.8-2.9 mm.
Propeltidium	2.9- 3.2	4.4-4.5
Palpi	19.5-21.0	—
1st legs	16.0-17.0	—
4th legs	25.0-27.0	—

Coloration nearly identical with that of *scopulatus*, new species, except that there are no dusky markings on the palpi and legs. All specimens seen are alcohol bleached, and some markings may be found on freshly collected material.

Structure same as in *scopulatus* except the process of the fixed finger is not distinct in lateral view and the papillae on the metatarsus of the palpus are much more numerous, numbering 60 to 90. The papillae tend to be larger and more distinct on this species.

There are six ctenidia on the first post-spiracular abdominal sternite. One of the three specimens studied had a seventh spurious spine between the medial pair of ctenidia.

TYPE LOCALITY: Male type, No. 8374, from California, in the Hamburg Museum.

RECORDS: California: Potter Valley, Mendocino County, May 7, 1917, one male (F. E. Blaisdel); Mokelumne Hill, 1899, one male (F. E. Blaisdel); Blue Lakes, Lake County, June 23, 1917, one male (F. E. Blaisdel); Pollock Pines, Eldorado County, July 10, 1948, one male (P. H. Hurd); Snowline Camp, Eldorado County, July 11, 1948, one male (J. W. McSwain).

REMARKS: This species and *scopulatus*, new species, are very closely related, and it may be that *scopulatus* will become a syno-

¹ Latin, *tuberculum*, diminutive of *tuber*, a protuberance, plus *atus*, suffix meaning provided with; apparently refers to process on fixed finger.

nym when a larger series of *tuberculatus* is available for study.

The female of this species has not been seen. Roewer had a female, and his figure of the opercula is redrawn here for purposes of comparison (fig. 105).

Pallipes GROUP

Males of this group have a constriction but no distinct notch at the base of the fixed finger. Mesoventral groove of fixed finger is dilated basally. The males may or may not be provided with ctenidia on the first post-spiracular abdominal sternite. Females have roughly triangular opercula that are adjacent in the anterior third to half of their length but are moderately separated posteriorly. Both rows of fondal teeth are graded in size I, III, II, IV.

TYPICAL SPECIES: *Eremobates pallipes* (Say).

KEY TO MALES

1. Metatarsus of palpus with scopula 2
Metatarsus of palpus without scopula . . . 4
2. Fondal notch distinctly wider than base of fixed finger, abdominal ctenidia not normally present 3
Fondal notch not so wide, or only as wide, as base of fixed finger, two abdominal ctenidia *Eremobates californicus* (Simon)
3. Scopula of 10 to 40 papillae
Scopula of 50 to 70 papillae
Scopula of 50 to 70 papillae *Eremobates durangonus* Roewer
Scopula of 50 to 70 papillae *Eremobates pallipes* (Say)
4. First post-spiracular abdominal sternite with four or five ctenidia, malleoli black
First post-spiracular abdominal sternite without ctenidia, malleoli white
First post-spiracular abdominal sternite without ctenidia, malleoli white *Eremobates putnami* (Banks)
First post-spiracular abdominal sternite without ctenidia, malleoli white *Eremobates suspectus*, new species

Eremobates pallipes² (Say)

Figures 106-114

Galeodes pallipes SAY, 1823, in James, Edwin, Account of an expedition from Pittsburgh to the Rocky Mountains . . . under . . . Major Stephen H. Long, vol. 2, p. 3 (female).

Galeodes subulata SAY, 1823, in James, Edwin, *op. cit.*, vol. 2, p. 3 (male). (Not *Galeodes subulata* Girard.)

Gluvia cinerascens KOCH, 1842, Arch. Naturgesch., vol. 1, p. 355 (male).

Datames cinerascens SIMON, 1879, Ann. Soc.

² Latin, *pallidus*, pale, plus *pes*, foot.

Ent. France, ser. 5, vol. 9, p. 139 (female, not male).

Eremobates cinerascens KRAEPELIN, 1901, Das Tierreich, no. 12, p. 122, fig. 89 (male).

Eremostata cinerascens ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 573, fig. 322 (male, not female).

Eremostata arizonica ROEWER, 1934, in Bronn, op. cit., vol. 5, div. 4, book 4, p. 572, figs. 324w, 327e (female).

Eremobates pallipes FICHTER, 1940, Amer. Midland Nat., vol. 24, p. 355, figs. 1-4 (male and female). (Not *pallipes* of authors.)

MALES: Total length, 15.0 to 26.0 mm.

	LENGTH	WIDTH
Chelicerae	4.5- 7.2 mm.	2.2-3.7 mm.
Propeltidium	2.2- 3.5	3.5-5.8
Palpi	14.0-20.0	—
1st legs	11.0-17.0	—
4th legs	18.0-26.0	—

Coloration in alcohol light to rusty yellow, with dusky markings as follows: chelicerae with one lateral and two dorsal faint dusky stripes, eye tubercle dusky, propeltidium with a narrow dusky band on the anterior margin, mesopeltidium, metapeltidium, and abdominal tergites dark. Some specimens have these tergites lighter in the middle. Legs and palpi light yellow. Malleoli white.

Dentition of chelicerae variable but following the general pattern shown in figures 106 to 108. Movable finger with a large principal tooth, an anterior tooth about half the size of the principal tooth, two intermediate teeth, the proximal of which is larger and contiguous with the principal tooth, and a distinct mesal tooth. Fixed finger typical of group: straight, needle-like, and with a narrow basal constriction from a dorsal view. Fourth fondal teeth scarcely distinguishable from dentate socket margin of movable finger. Fondal notch V-shaped, with the ventral margin lightly curved, about twice as wide as the base of the fixed finger, and bearing one or two minute denticles on its ventral margin.

Groove of fixed finger a deep, parallel-sided slot that widens abruptly on the basal quarter of the finger into an ovate concavity that extends beyond the base of the finger. Flagellum complex typical of genus, with the S-shaped plumose bristles not covering the

base of the ovate concavity and the apical plumose bristle not covering the distal fourth to fifth of the mesoventral groove. Mesal setae of movable finger weakly plumose on the proximal third of the finger and simple distally.

Eye tubercle situated on the anterior margin of propeltidium. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.6.

Metatarsus, tarsus, and tibia of palpus provided with numerous fine cylinder bristles and a scopula of 40 to 80 closely grouped papillae on the mesoventral surface of the distal half to two-thirds of the metatarsus. Metatarsus of palpus about three times as long as tarsus.

First post-spiracular abdominal sternite not usually provided with ctenidia.

FEMALES: Total length, 22.0 to 32.0 mm.

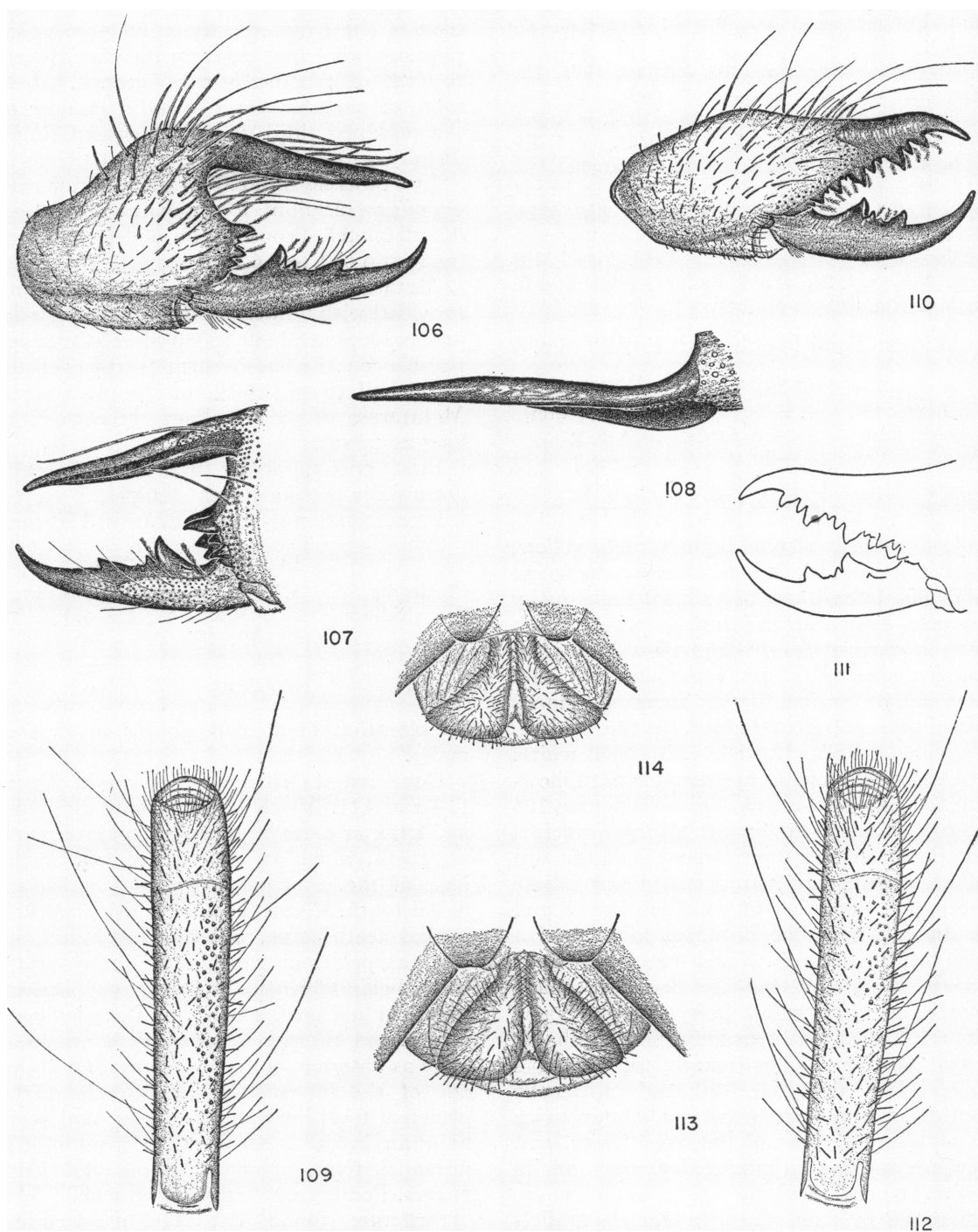
	LENGTH	WIDTH
Chelicerae	5.7- 7.3 mm.	2.7-3.4 mm.
Propeltidium	2.5- 3.3	4.8-6.1
Palpi	15.0-19.0	—
1st legs	12.0-16.0	—
4th legs	21.0-26.0	—

Coloration in alcohol similar to that of males.

Dentition of chelicerae as shown in figures 110 and 111. Movable finger with principal and anterior teeth large, two small intermediate teeth, which are closely grouped at the base of the principal tooth, and a distinct mesal tooth. Fixed finger with principal and medial teeth large, anterior tooth half as large as principal tooth, three intermediate teeth behind principal tooth, two between principal and medial teeth, and one between medial and anterior teeth which is nearly as large as anterior tooth. Some specimens have one of the intermediate teeth behind the principal tooth minute or missing, and some have an irregular serration in front of the principal teeth of the movable and fixed fingers. Fondal teeth same as in male.

Structure similar to that of male except there is no scopula or at most a trace of the scopula found on the metatarsus of the palpus.

Variations of the opercula are shown in figures 113 and 114.



FIGS. 106-114. 106. *Eremobates pallipes* (Say), ectal view of right male chelicera. 107. *Eremobates pallipes* (Say), mesal view of right male chelicera. 108. *Eremobates pallipes* (Say), dorsal view of fixed finger of right male chelicera. 109. *Eremobates pallipes* (Say), mesoventral view of apical segments of right male palpus. 110. *Eremobates pallipes* (Say), mesal view of right female chelicera. 112. *Eremobates pallipes* (Say), mesoventral view of apical segments of right female palpus showing a trace of scopula. 113. *Eremobates pallipes* (Say), ventral view of female genital opercula. 114. *Eremobates pallipes* (Say), a variation of female genital opercula.

TYPE LOCALITY: Female type of *Galeodes pallipes* Say and male type of *Galeodes subulata* Say from 20 miles south of Denver, Colorado, near the mouth of the Platte Canyon in the foothills of the Rocky Mountains have been lost or destroyed. Lectotype of *Gluvia cinerascens* Koch, No. 9131, in the museum in Paris, France. Type of *Eremostata arizonica* Roewer, No. 8481, in the museum of Hamburg, Germany.

RECORDS: Arizona: Santa Catalina Mountains, June 18, 1933, one male (O. Bryant); Kitts Peak, Rincon, Baboquivari Mountains, August 1-4, 1916, one male, one female; near Ranger Station, Mt. Lemmon, Santa Catalina Mountains, July 12-15, 1940, one male, one female (Gertsch and Hook). Colorado: Waterton, August 8, 1947, two males (Mrs. Verdos); Denver, July 5, 1939, one male; Colorado Chautaugua, Boulder, July 14, 1908, one male; Colorado City, July 24, 1903, one male; Cheyenne Canyon, south of Colorado Springs, July 20, 1903, one male; Denver, 1935-1946, two males, two females (Walker Van Riper); Fort Collins, one male, one female (C. T. Baker); Yuma County, one male; Larkspur, one female. Idaho: Meridian, July, 1919, one female (J. R. Fields). Kansas: Garden City, one female (C. O. Townsend); Great Bend, September 5, 1896, one female (W. S. Hill); Neville, July 8, 1892, one female (A. J. Brown); "Perry Park County," August 11, 1927, one male (Roger C. Smith); Ashland, one female (Roger C. Smith). Missouri: Kirkwood, one female (M. E. Murtfeldt). Montana: Billings, August, 1927, one female (Stewart Lockwood); Bozeman, July 4, 1935, one male; Gordon, August, 1937, one female; Columbus, June 21, 1933, one female; Culbertson, July 16, 1934, one female; Baker, July 15, 1935, one female; Billings, July 19, 1901, one female (A. B. Panwick); Great Falls, April 21, 1934, one female (F. Smith). Nebraska: Arapahoe, May, 1901, one female (W. J. Ireland); Culbertson, 1922, one female; Lincoln, August 30, 1934, one female, August 4, 1934, one female, June 4, 1938, two females (Edson Fichter); McCook, Redwillow County, August 1, 1940, one male, one female (Paul T. Gilbert); Scottsbluff, Scotts Bluff County, July 11, 1939, one female (E. A.

Olson); Hemingford, Box Butte County, July 6, 1939, one male, one female (Edson Fichter); Northport, Morrill County, July 3, 1936, one male (W. Paine); Sidney, Cheyenne County, July 17, 1937, one female (R. D. Hughes); Crawford, Dawes County, July 7, 1939, one female (T. M. Stout); Rushville, Sheridan County, June 19, 1936, one female (E. M. Huckfeldt); Lewellen, Garden County, July 30, 1937, one male, two females (H. A. Blackstone); Ogallala, Keith County, July 26, 1935, one male (J. W. Hepperly); Roscoe, Keith County, October 5, 1934, one female (H. J. Chamberlin); Grant, Perkins County, July 22, 1935, one female (T. H. Alexander); Imperial, Chase County, July 15, 1939, one male (E. J. Fruhling); Haigler, Dundy County, July 19, 1937, one male (Mrs. J. Havlik); Brady, Lincoln County, July 3, 1939, one male (Edson Fichter); Hayes Center, Hayes County, June 24, 1936, one female (S. E. Lingo); Palisade, Hitchcock County, July 24, 1937, one female (Bernard Modrell); St. Ann, Frontier County, July 29, 1939, two females (John Wasia); Dorsey, Holt County, September 12, 1936, one female (Mrs. J. E. Wiley); Burton, Keyapaha County, July 7, 1937, one male (E. E. Ritterbush); Lexington, Dawson County, August 18, 1932, one female (James C. Adams); Elwood, Gosper County, August 14, 1937, one female (D. C. Joy); Oxford, Furnas County, July 14, 1936, one female (M. Brown); St. Paul, Howard County, August 2, 1937, one female (A. W. Krueger); Alexandria, Thayer County, July 19, 1939, one female; Hartington, Cedar County, August 3, 1939, one female (J. C. Rosse). New Mexico: Kaehler, July, 1913, one male, one female (W. R. Walton); Clovis, August 8, 1935, one female (F. R. Lawler); Aztec, two males; 8 miles west of Carrizozo, Lincoln County, July 27, 1947, one male (Clyde P. Stroud); White Sands National Monument, Otero County, August 8, 1947, three females (Clyde P. Stroud); Pinedale, July 17, 1948, three males; Navajo Reservation, near Pinedale, one male; Blackrock, July 28, 1948, one female. North Dakota: Bowman, July 11, 1935, one female (Leland Roan); Mandan, June, 1923, one male (Earl H. Tostevin). Oklahoma: Charleston, one female; Logan,

three females (A. P. Gilbert); Woods County, July 25, 1930, one male (R. D. Bird). South Dakota: one male. Texas: Stanton, one female (W. X. Barnes); Colorado City, Mitchell County, June–October, 1910, one male (T. C. Merrill); Mobeetie, 1910, two females; Edinburg, 1938, one male (aberrant) (S. and D. Mulaik). Utah: Mud Springs, September 2, 1941, one female (W. Ivie). Wyoming: Douglas, July 23, 1945, one male; Cheyenne, August 8, 1948, one male (W. T. Brettell); Laramie, July 13, 1948, one female (Sylvia Myers).

REMARKS: This species is, without question, Say's species. Fichter (1940) demonstrated this fact morphologically but because of a lack of adequate material believed that the wide geographic separation of the then known distribution of *pallipes* Say and *cinerascens* Koch indicated two separate species. Roewer's *arizonica* seems to be a variation of *pallipes*.

Eremobates californicus¹ (Simon)

Figures 115–117

Datames californicus SIMON, 1879, Ann. Soc. Ent. France, ser. 5, vol. 9, p. 143, pl. 3, fig. 37 (female).

Eremobates californicus KRAEPELIN, 1901, Das Tierreich, no. 12, p. 125 (female).

Eremopus californicus ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 564, figs. 324n, 326b (female).

MALES: Total length, 19.0 to 27.0 mm.

	LENGTH	WIDTH
Chelicerae	5.3– 6.6 mm.	2.6–3.3 mm.
Propeltidium	2.4– 3.4	3.8–5.1
Palpi	17.0–22.0	—
1st legs	14.0–17.0	—
4th legs	22.0–29.0	—

Coloration and markings similar to those of *E. pallipes* (Say) except that the propeltidium is dusky, with a narrow light median stripe, the metatarsi and tarsi of the palpi are dark, and the apical ends of the femora and proximal ends of the tibiae of legs two, three, and four are dusky.

Structure similar to that of *pallipes* except that there are two ctenidia on the first post-

spiracular abdominal sternite, the metatarsus of the palpus is provided with a scopula of 50 to 100 papillae, the fondal notch is not so wide, or at most is just as wide, as the base of the fixed finger, and the fixed finger is often curved upward, sometimes strongly so. Some specimens have one or more denticles on the lower margin of the fixed finger. Two specimens examined had no abdominal ctenidia.

The propeltidium is wider than long by a ratio of 1 to 1.5, and the metatarsus of the palpus is three times as long as the tarsus.

FEMALES: Total length, 18.0 to 30.0 mm.

	LENGTH	WIDTH
Chelicerae	5.8– 7.1 mm.	2.8–3.4 mm.
Propeltidium	3.2– 3.4	5.2–5.6
Palpi	15.0–18.0	—
1st legs	12.0–15.0	—
4th legs	20.0–23.0	—

Coloration and markings in alcohol similar to those of male.

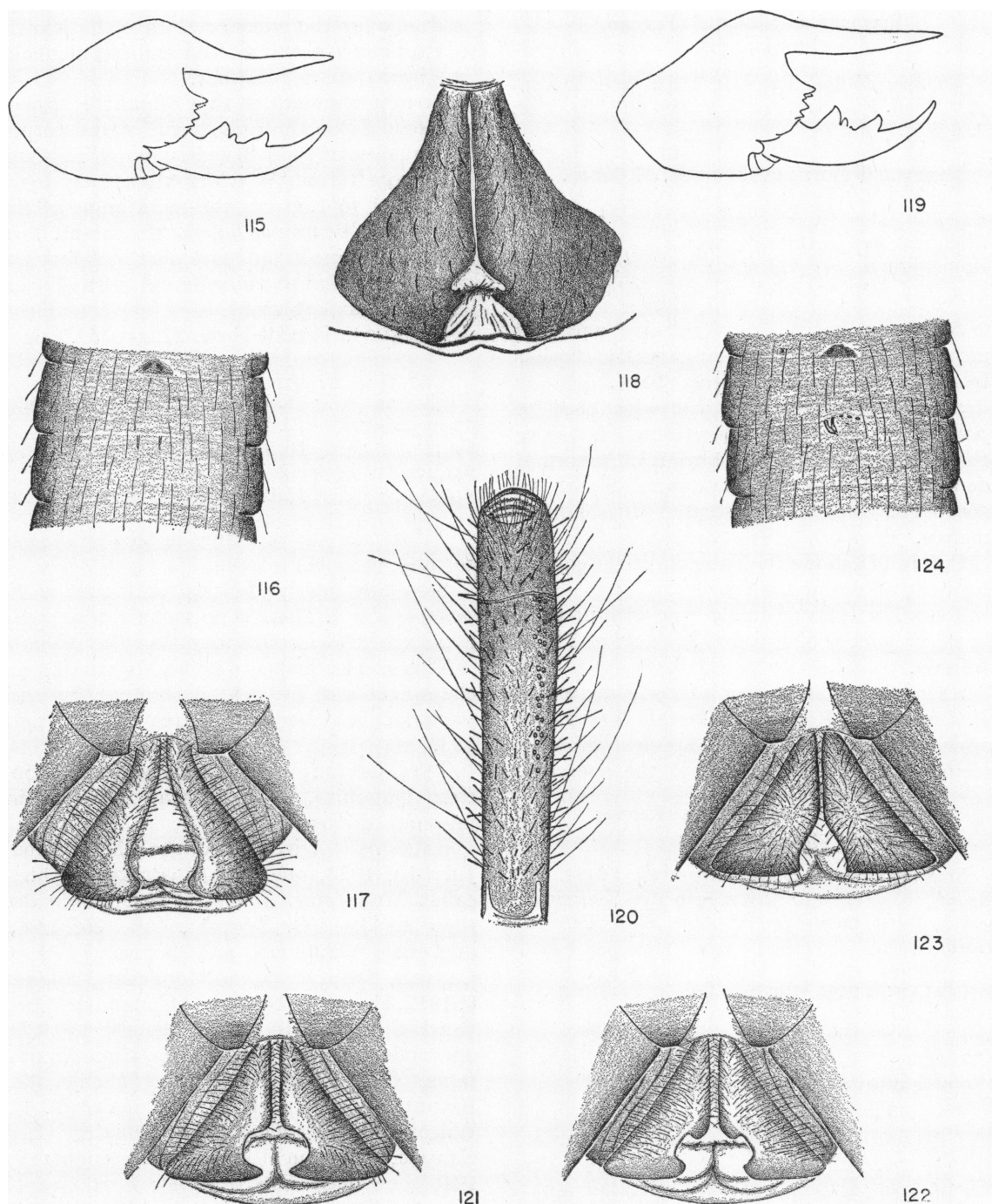
Structure similar to that of *E. pallipes* (Say).

Figure 117 shows the opercula of the genital segment.

TYPE LOCALITY: Female type, No. 9133, from Mariposa, California (J. Thevenet), in the Simon collection in the Paris Museum.

RECORDS: Arizona: Tucson, August, 1934, one female (P. Steckler). California: San Diego, one female. Montana: Mingusville, one female. New Mexico: Santa Fe, one female. Texas: Sonora, May 28, 1939, one male (O. G. Babcock), July 15, 1930, one male, one female (Bishopp), July 5, 1921, one male (Mrs. O. G. Babcock), August 14, 1926, one male (Bishopp); Georgetown, May 12, 1934, one female (R. W. Tinsley); Kingsville, January 26, 1928, one male (C. T. Reed); Chisos Mountains, Texas Basin, July 25, 1938, one female; Gillespie County, June 14, 1934, one male (J. N. Knull); San Antonio, June 16, 1938, one male (F. Vick); Reeves County, August 17, 1935, one male; Hayes, San Marcos Hill, N. W., Vogelsangs Camp, April 21, 1935, one male (Jones); 4 miles east of Dryden, September 4, 1939, one male (D. and S. Mulaik); Brazos County, June 10, 1936, one male, two females (J. H. Robinson).

¹ Latin, of or pertaining to California.



FIGS. 115-124. 115. *Eremobates californicus* (Simon), ectal view of right male chelicera. 116. *Eremobates californicus* (Simon), male abdominal ctenidia. 117. *Eremobates californicus* (Simon), ventral view of female genital opercula. 118. *Eremobates dilatatus* (Putnam), ventral view of female genital opercula. 119. *Eremobates durangonus* Roewer, ectal view of right male chelicera. 120. *Eremobates durangonus* Roewer, mesoventral view of apical segments of right male palpus. 121. *Eremobates durangonus* Roewer, ventral view of female genital opercula. 122. *Eremobates durangonus* Roewer, a variation of female genital opercula. 123. *Eremobates durangonus* Roewer, a variation of female genital opercula. 124. *Eremobates putnami* (Banks), male abdominal ctenidia.

Eremobates dilatatus¹ (Putnam)

Figure 118

Datames dilatata PUTNAM, 1883, Proc. Davenport Acad. Nat. Sci., vol. 3, p. 259, pl. 1, fig. 3, pl. 2, fig. 15.

FEMALE TYPE: Total length, 31.0 mm.

	LENGTH	WIDTH
Chelicerae and teeth badly worn		
Propeltidium	6.4 mm.	8.2 mm.
Legs and palpi mangled, not measurable		

Specimen badly discolored by age and alcohol but coloration apparently similar to that of *Eremobates pallipes* (Say).

Structure nearly identical with that of *pallipes* except the propeltidium is wider than long by a ratio of 1 to 1.3. Abnormal dentition occurs on the left mandible of the specimen. Putnam illustrated this abnormality.

Figure 118 shows the opercula of the genital segment of the abdomen.

TYPE LOCALITY: Female type with no data in the Academy of Natural Sciences of Philadelphia.

REMARKS: This species is closely related to *E. durangonus* Roewer. Although *durangonus* appears to be a variable species, *dilatatus* seems to differ significantly in the opercula.

Eremobates durangonus² Roewer

Figures 119–123

Eremobates durangonus ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 557, figs. 323a, 324b (female).

MALES: Total length, 20.0 to 27.0 mm.

	LENGTH	WIDTH
Chelicerae	4.8– 6.6 mm.	2.6–3.4 mm.
Propeltidium	2.4– 3.5	3.6–5.2
Palpi	18.0–21.0	—
1st legs	14.5–17.5	—
4th legs	25.0–28.0	—

Coloration and markings in alcohol similar to those of *E. pallipes* (Say) except that the apical end of the metatarsus and all the tarsus of the palpus are dusky and the propeltidium

is dusky for the anterior third of its length. Markings on newly molted and old alcoholic specimens are not distinct.

Structure similar to that of *pallipes* except the scopula on the metatarsus of the palpus is composed of 10 to 40 widely spaced papillae, the propeltidium is wider than long by a ratio of 1 to 1.5, and the metatarsus of the palpus is 2.4 times as long as the tarsus. Two males examined had two small abdominal ctenidia similar to those found normally on *E. californicus* (Simon).

FEMALES: Total length, 22.0 to 32.0 mm.

	LENGTH	WIDTH
Chelicerae	6.4– 8.4 mm.	2.6–3.7 mm.
Propeltidium	2.6– 4.7	4.0–6.7
Palpi	16.0–21.0	—
1st legs	Both missing to 18.0	—
4th legs	22.0–28.0	—

Coloration and markings in alcohol similar to those of male.

Structure nearly identical with that of *E. pallipes* (Say). There is no scopula or at most a trace of the scopula found on the male.

This species seems to be highly variable in the opercula of the genital segment. Several variations are shown in figures 121, 122, and 123.

TYPE LOCALITY: Female types, No. 9256, from Dinamita, Durango State, Mexico, in museum of Paris, France.

RECORDS: Arizona; White Mountains, July 10, 1933, one female (Parker); Chiricahua Mountains, August 5, 1933, one male, three females (O. Bryant), June 26, 1897, one male (Hubbard and Schwarz); Bear Canyon, Santa Catalina Mountains, August 9, 1937, one male (Steckler); Canada del Oro, Santa Catalina Mountains, August 1, 1937, one male (Steckler); Santa Catalina Mountains, October 1, 1938, one female (O. Bryant); Fort Huachuca, one male (T. E. Wilcox), three males, one female; Carr Canyon, Huachuca Mountains, August 9, 1940, one male (E. S. Ross); Fort Grant, July 18, 1817, one male; Santa Rita Range, May 5, 1932, one male, two females (R. Flock); Tucson, September, one female (Carpenter), two males (O. Bryant), July–August, 1935, one male, two females (P. Steckler); Reef, one male, one female; Chirichaw, July 6, 1934, one female (F.

¹ Latin, *dilatatus*, dilated or extended. Reference obscure.

² Latin, of or pertaining to Durango, Mexico.

Carbine); Duncan, on Route 70, September 7, 1939, two females (D. and S. Mulaik); Patagonia, August 8, 1940, one male (E. S. Ross). California: San Diego, one male. Texas: Kingsville, one female (C. T. Reed); Carrizo Spring, Dimmit County, October, 1887, one female (Shaupp).

REMARKS: These specimens are tentatively assigned to *Eremobates durangonus* Roewer on the basis of the similar genital opercula. A variation of these plates agrees somewhat with those of *Eremobates cinerascens* (Koch) as figured by Roewer (1934), and it may be that the latter species will have to be validated if a study of Koch's type can be made.

***Eremobates putnami*¹ (Banks)**

Figure 124

Datames putnami BANKS, 1898, Proc. California Acad. Sci., ser. 3, zool., vol. 1, p. 290, pl. 17, fig. 29 (male and female).

MALE COTYPE: Total length, 30.0 mm.

	LENGTH	WIDTH
Chelicerae	9.3 mm. ^a	4.6 mm. ^a
Propeltidium	4.8 ^a	6.4 ^a
Palpi	Mangled	—
1st legs	20.0	—
4th legs	32.0	—

^a Rough measurements over millimeter rule.

Coloration bleached in alcohol but apparently eye tubercle light, light yellow on legs, palpi, and propeltidium; the abdomen deep purple, with slightly darker prosomal and abdominal tergites. All setae and hairs are dark except ctenidia and a few tarsal setae. Malleoli black except on distal margins.

Structure similar to that of *E. pallipes* (Say) except the anterior tooth is an indistinct ridge, the mesal groove of fixed finger is enlarged at base into an ovate depression, and there are five (one spurious and three broken off) flattened, scimitar-like ctenidia on the first post-spiracular abdominal sternite. Propeltidium wider than long by 1 to 1.3. Metatarsus of palpus about three times as long as tarsus.

YOUNG FEMALE COTYPE: Total length, 29.0 mm.

¹ Named in dedication for J. D. Putnam.

Coloration and structure similar to those of male. The specimen is subadult and has underdeveloped genital opercula.

TYPE LOCALITY: Male and young female cotypes from San José del Cabo, October, no further data, in the Museum of Comparative Zoölogy.

REMARKS: Although this species seems to belong in the *pallipes* (Say) group of this genus, it is strikingly different in the dentition of the movable finger of the chelicerae, coloration of the malleoli and spines, and in the development of the abdominal ctenidia. When additional material is available it may prove to belong to a separate group of the genus *Eremobates*.

***Eremobates suspectus*,² new species**

Figures 125, 126

MALES: Total length, 19.0 to 23.0 mm.

	LENGTH	WIDTH
Chelicerae	4.6–5.5 mm.	2.2–2.8 mm.
Propeltidium	2.3–3.2	3.4–4.5
Palpi	19.0–18.5	—
1st legs	15.0–14.5	—
4th legs	24.0–23.0	—

Holotype, smaller measurements.

Coloration in alcohol similar to that of *E. pallipes* (Say) except the dusky markings on the propeltidium cover all except a light median ovate area and the apical half of the metatarsus and all the tarsus of the palpi and the apical ends of the femora and proximal ends of the tibiae of legs two, three, and four are somewhat dusky.

Structure very similar to that of *pallipes* except the fondal notch is only slightly wider than the base of the fixed finger, there is no scopula on the metatarsus of the palpus, the metatarsus of the palpus is 2.7 times as long as the tarsus, and the propeltidium is wider than long by a ratio of 1 to 1.4.

FEMALE ALLOTYPE: Total length, 23.0 mm.

	LENGTH	WIDTH
Chelicerae	6.2 mm.	2.7 mm.
Propeltidium	2.5	4.7
Palpi	16.0	—
1st legs	13.5	—
4th legs	22.0	—

² Latin, *suspectus*, distrusted or under suspicion.

Coloration and markings in alcohol similar to those of male except the palpal markings are faint.

Dentition worn but apparently similar to that of *E. pallipes* (Say). Minor differences include the presence of only two intermediate teeth behind the principal tooth and a badly worn or missing intermediate tooth between the medial and anterior teeth.

Structure similar to that of male except there is no scopula on the metatarsus of the palpus.

Figure 126 shows the opercula of the genital segment.

TYPE LOCALITY: Male holotype and female allotype from White Mountains, 10 miles northeast of White River, Arizona, July 8 to 11, 1940 (Gertsch and Hook), in the American Museum of Natural History. Male paratype, E 30, no further data, in the American Museum of Natural History. Male paratype from Mesa, Arizona, September 11, 1935 (E. Sanders), in the collection of Harriet Exline Frizzell.

RECORDS: Arizona: 4 miles north of White River, White Mountains, Navajo County, July 20-22, 1948, one male.

REMARKS: The single female described here was associated with a male of this species but is nearly identical with females of the variable species *Eremobates durangonus* Roewer and when further material has been collected may prove to belong to the latter species.

It is also possible that this species may, when the type is studied, prove to be *Eremobates toltecus* Pocock, a species described from Mexico.

Angustus GROUP

Males of this group have a constriction but no distinct notch at the base of the fixed finger. Mesoventral groove of fixed finger is not dilated basally. The males are not usually provided with ctenidia on the first postspiracular abdominal sternite. Females have roughly triangular opercula that are adjacent but are prolonged laterobasally. Both rows of fondal teeth are graded in size I, III, II, IV.

TYPICAL SPECIES: *Eremobates angustus*, new species.

KEY TO MALES

- Metatarsus of palpus without scopula
 *Eremobates angustus*, new species
 Metatarsus of palpus with a scopula of 30 to 40
 papillae . . . *Eremobates cruzi*, new species

Eremobates angustus,¹ new species

Figures 127-133

MALES: Total length, 19.0 to 25.0 mm.

	LENGTH	WIDTH
Chelicerae	5.6- 5.9 mm.	2.8-3.1 mm.
Propeltidium	2.6- 2.8	4.8-4.9
Palpi	18.0-19.0	—
1st legs	15.0-16.0	—
4th legs	23.0-25.0	—

Holotype, larger measurements.

Coloration and markings similar to those of *pallipes* (Say) except the dusky band on the anterior margin of the propeltidium often extends behind the eye tubercle and down the lateral margins.

Structure similar to that of *pallipes* except in the following characters. Movable finger with the anterior tooth low, flattened, flanged ectally, and occurring near the middle of the length of the finger, and the mesal setae plumose on the basal half of the finger, and simple on the distal half. Flagellum complex with the basal plumose setae only weakly curved and lying nearly parallel with the mesal groove. Mesal groove not distinctly enlarged at the base. Metatarsus of palpus without a mesoventral scopula.

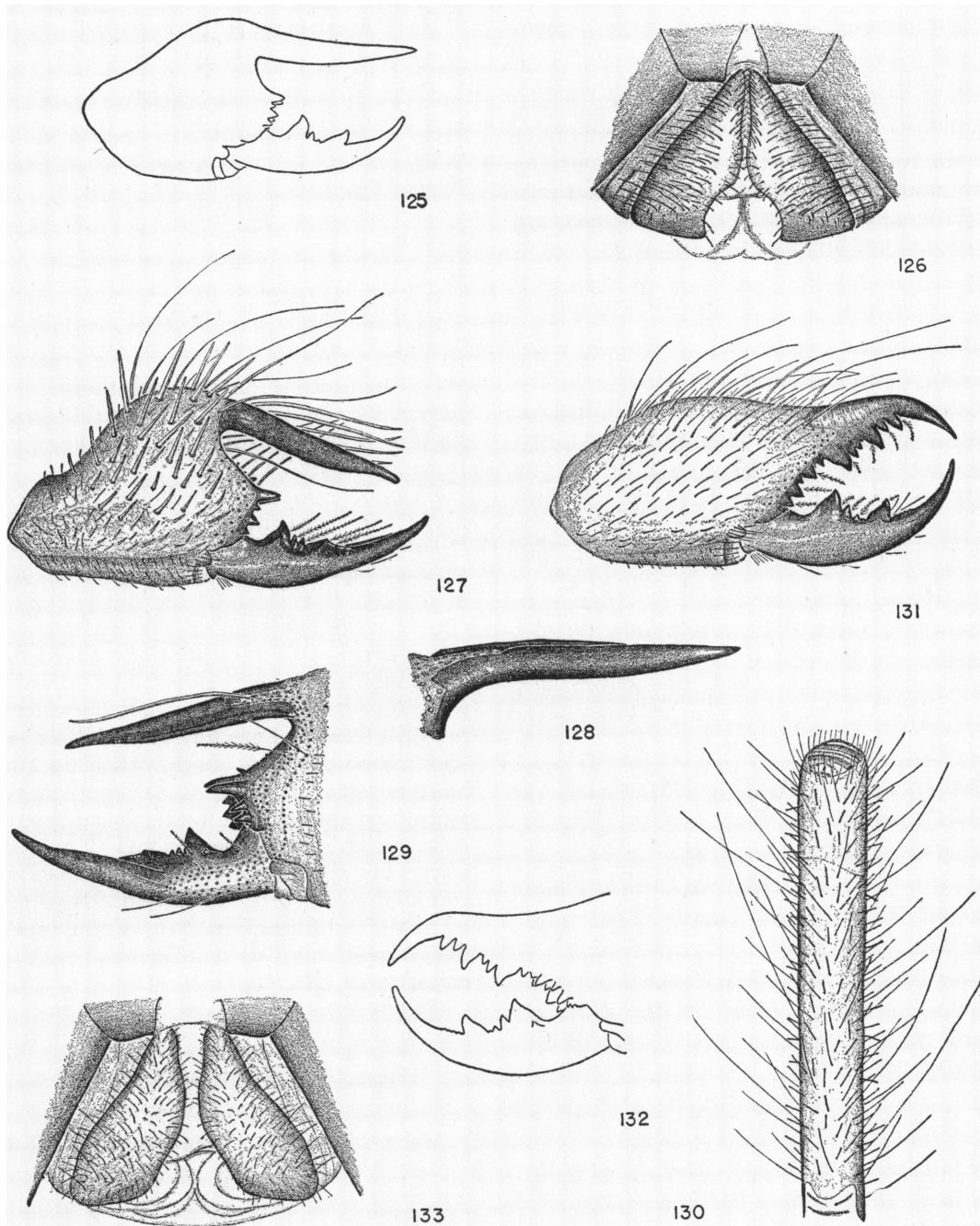
Propeltidium wider than long by a ratio of 1 to 1.7. Metatarsus of palpus 2.6 times longer than tarsus.

FEMALES: Total length, 26.0 to 28.0 mm.

	LENGTH	WIDTH
Chelicerae	5.4- 6.2 mm.	2.5-3.0 mm.
Propeltidium	2.8- 2.9	4.4-4.9
Palpi	15.0-17.0	—
1st legs	13.0-15.0	—
4th legs	21.0-23.0	—

Allotype, smaller measurements.

¹ Latin, *angustus*, narrow; refers to groove of fixed finger.



FIGS. 125-133. 125. *Eremobates suspectus*, new species, ectal view of right male chelicera. 126. *Eremobates suspectus*, new species, ventral view of female genital opercula. 127. *Eremobates angustus*, new species, ectal view of right male chelicera. 128. *Eremobates angustus*, new species, dorsal view of fixed finger of right male chelicera. 129. *Eremobates angustus*, new species, mesal view of right male chelicera. 130. *Eremobates angustus*, new species, mesoventral view of apical segments of left male palpus. 131. *Eremobates angustus*, new species, ectal view of right female chelicera. 132. *Eremobates angustus*, new species, mesal view of right female chelicera. 133. *Eremobates angustus*, new species, ventral view of female genital opercula.

Coloration and markings in alcohol essentially the same as in the male.

Structure the same as in *pallipes* except that the intermediate teeth behind the principal tooth on the fixed finger commonly are two in number, there is no scopula on the metatarsus of the palpus, and the opercula on the genital segment of the abdomen are significantly different as shown in figure 133.

TYPE LOCALITY: Male holotype, female allotype, and male paratype from Madera Canyon, Santa Rita Mountains, Arizona, July 16, 1940 (Gertsch and Hook), in the American Museum of Natural History. Ramsay Canyon, Huachuca Mountains, Arizona, July 10 to 15, 1941, three males, one female (A. B. Klots). Male and female paratypes also in the Museum of Comparative Zoölogy and the United States National Museum.

RECORDS: Arizona; Oslar, Huachuca Mountains, August 19, 1903, one female; Garden Canyon, north slope of Huachuca Mountains, July 26, 1949, two males, one female (F. Werner and W. Nutting); Madera Canyon, north slope, Santa Rita Mountains, three males, one female (F. Werner and W. Nutting); Patagonia Mountains on Lochiel Road, Santa Cruz County, July 28, 1948, one female; Washington, August 8, 1932, one male, two females. Texas: Sonora, April 24, 1932, one female (Bishopp).

REMARKS: Females of this species agree rather closely with Roewer's *Eremostata dinamita* from Mexico in general description and opercular form. However, the dentition differs widely from Roewer's figure of the dentition pattern, so that *angustus* is maintained as a separate species. The great distance separating the collection localities of the two species supports this stand.

Males of this species agree closely in dentition pattern with those in Roewer's figure of *Eremoseta titschacki* Roewer, but several differences are to be found in Roewer's description and figure. Roewer mentions no mesal groove of the fixed finger for *titschacki*, does not describe or figure a low ridge replacing the anterior tooth of the movable finger, and figures all of the mesal setae of the movable finger as plumose.

***Eremobates cruzi*,¹ new species**

Figures 254, 255

MALE HOLOTYPE: Total length, 23.0 mm.

	LENGTH	WIDTH
Chelicerae	6.5 mm.	3.2 mm.
Propeltidium	3.6	4.6
Palpi	18.5	—
1st legs	16.5	—
4th legs	26.0	—

Coloration and structure very similar to those of *E. angustus*, new species. This species differs from *angustus* in having a scopula of 30 to 40 papillae on the metatarsus of the palpus. The dentition of the movable finger is slightly different from that of *angustus* as shown in figure 254.

TYPE LOCALITY: Male holotype and two male paratypes from Bear Valley, Santa Cruz County, Arizona, July 20, 1949 in the Museum of Comparative Zoölogy.

EREMOTHERA,² NEW GENUS

Moderate-sized Eremobatinae. Fixed finger of males a flanged, shovel-like structure, with a weak mesal groove that does not extend the length of the finger. Flagellum complex composed of two large, dorsal, spatulate bristles between which is a long, slender, apically plumose spine and a basal group of short, slender, simple spines. First postspiracular abdominal sternite of males with ctenidia on its posterior margin. Mesal tooth of movable finger present. Ectal row of fonal teeth graded in size III, I, IV, II; mesal row I, III, II, IV.

GENOTYPE: *Eremothera sculpturata*, new species.

***Eremothera sculpturata*,³ new species**

Figures 134–138

MALE HOLOTYPE: Total length, 25.0 mm.

	LENGTH	WIDTH
Chelicerae	5.4 mm.	2.8 mm.
Propeltidium	2.8	5.0
Palpi	20.0	—
1st legs	17.0	—
4th legs	27.0	—

¹ Of or pertaining to Santa Cruz County, Arizona.

² Greek, *eremus*, solitary, plus *ther*, wild animal.

³ Latin, *sculptura*, a carving, plus *atus*, suffix meaning provided with; refers to form of the fixed finger.

Coloration in alcohol light to straw yellow, with dusky purplish markings as follows: chelicerae with one lateral and two dorsal dusky stripes which are more distinct towards the base; eye tubercle dark; propeltidium dusky, darker on the anterior margin, with two light areas at the postero-lateral corners and a thin light median stripe, mesopeltidium, metapeltidium, and abdominal tergites dark; distal ends of femora and proximal ends of tibiae of fourth legs faintly dusky. Malleoli white.

Dentition of chelicerae as shown in figures 134 to 136. Movable finger with large principal tooth, an anterior tooth about half as large as the principal tooth, two intermediate teeth, of which the proximal is considerably larger, and a distinct mesal tooth. Fixed finger a short, squarely blunt, shovel-like structure with two large, rounded, flange-like lobes, forming the lateral shoulders. Fondal notch obscure but carrying two small and one large denticule.

Mesal groove of fixed finger and flagellum complex same as for genus. Mesal setae of movable finger plumose on the basal third of the articulation area but simple distally.

Eye tubercle situated on the anterior margin of the propeltidium. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.7.

Metatarsus, tarsus, and tibia of palpus provided with numerous cylinder bristles, but there is no scopula on the metatarsus. Metatarsus of palpus about three times as long as tarsus.

First post-spiracular abdominal sternite provided with seven elongate, hair-like ctenidia, one of which appears to be spurious.

TYPE LOCALITY: Male holotype from Arizona, 1923 (Mr. Ortembery), no further data, in the American Museum of Natural History. Male paratype from Alamo, Arizona, no further data, in the collection of Cornell University.

REMARKS: This striking species differs greatly in the peculiar structure of the fixed finger from any other species of Eremobatidae seen. Otherwise it appears to be a species of Eremobatinae.

Eremothera barberi,¹ new species

Figures 139-141

FEMALE HOLOTYPE: Total length, 16.0 mm.

	LENGTH	WIDTH
Chelicerae	5.0 mm.	2.0 mm.
Propeltidium	2.0	3.6
Palpi	13.0	—
1st legs	10.0	—
4th legs	18.0	—

Coloration in alcohol straw yellow, with dusky markings as follows: eye tubercle dark; prosomal and abdominal tergites dusky and distal end of metatarsus and all of tarsus of palpus dark. Malleoli white. Specimen alcohol faded and may have had additional markings not visible at this time.

Dentition of chelicerae as shown in figures 139 and 140. Movable finger with principal tooth large, anterior tooth about two-thirds as large as principal tooth, two intermediate teeth, of which the proximal is considerably larger, and a distinct mesal tooth. Fixed finger with principal tooth large, medial tooth large, anterior tooth moderately large, and two intermediate teeth behind principal tooth, two between principal and anterior teeth, and one between medial and anterior teeth that is more than half as large as anterior tooth.

Mesal setae of movable finger plumose on the basal three-fourths of the articulation area but simple distally. Eye tubercle situated on the anterior margin of the propeltidium. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.8.

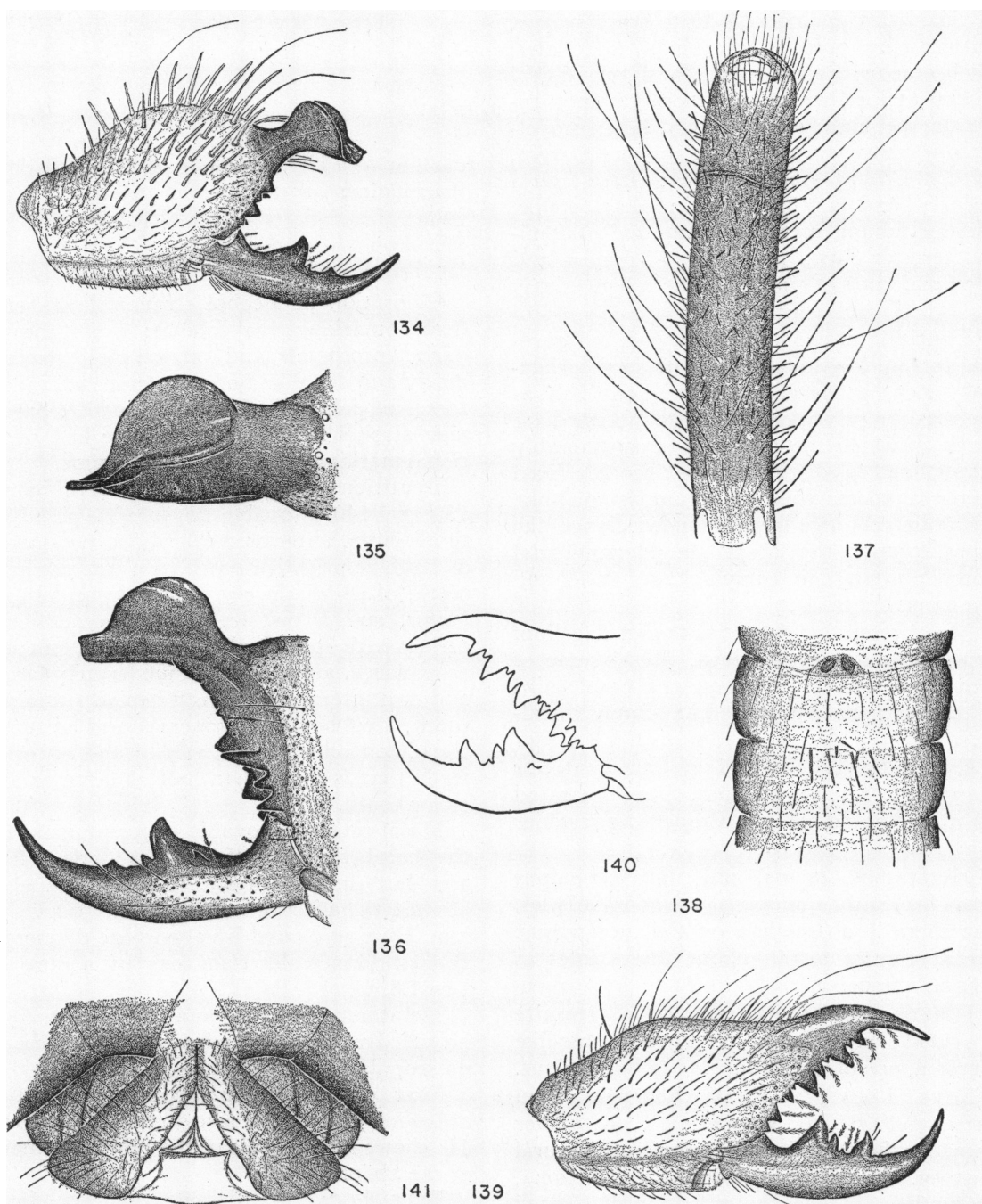
Metatarsus, tarsus, and tibia of palpus provided with cylinder bristles, but there is no scopula on the metatarsus.

First post-spiracular abdominal sternite apparently without trace ctenidia. Figure 141 shows the opercula of the genital segment of the abdomen.

TYPE LOCALITY: Female holotype from Brownsville, Texas (H. S. Barber), in the United States National Museum.

REMARKS: This species is placed in this genus on the basis of the fondal dentition which appears to be relatively constant for

¹ Named for the collector, H. S. Barber.



FIGS. 134-141. 134. *Eremothera sculpturata*, new species, ectal view of right male chelicera. 135. *Eremothera sculpturata*, new species, dorsal view of fixed finger of right male chelicera. 136. *Eremothera sculpturata*, new species, mesal view of right male chelicera. 137. *Eremothera sculpturata*, new species, mesoventral view of apical segments of left male palpus. 138. *Eremothera sculpturata*, new species, male abdominal ctenidia. 139. *Eremothera barberi*, new species, ectal view of right female chelicera. 140. *Eremothera barberi*, new species, mesal view of right female chelicera. 141. *Eremothera barberi*, new species, ventral view of female genital opercula.

groups within the genera. It may prove to be the female of *Eremothera sculpturata*, new species, but the larger size of the two males seen seems to exclude this possibility.

THEROBATINAE, NEW SUBFAMILY

Eremobatidae with two claws on the tarsus of the first leg and with chelicerae from two and one-half to three times as long as wide. Fixed finger of male chelicera style-like, with or without a ventral or mesoventral groove and with or without modified teeth. Males usually with ctenidia on sternite of first post-spiracular segment of abdomen.

KEY TO GENERA

MALES

1. Dorsal bristles of flagellum complex simple and tubular *Therobates*
Dorsal bristles of flagellum complex plumose, striate, or otherwise modified 2
2. Fixed finger distinctly sinuate . . . *Chanbria*
Fixed finger straight or at most weakly curved or undulate *Hemerotrecha*

THEROBATES,¹ NEW GENUS

Eremobates of authors, in part.

Large- to small-sized Therobatinae. Fixed finger of male chelicera with a mesal or mesoventral groove. Flagellum complex composed of a dorsal row or group of simple tubular bristles, a mesal row or group of plumose bristles, and a ventral or basal row or group of simple tubular bristles. The plumose bristles partially or completely cover the mesoventral groove. First post-spiracular abdominal sternite of males with ctenidia on its dorsal margin. Mesal tooth of movable finger of males and females present or absent. Opercula of females variable.

GENOTYPE: *Therobates bilobatus*, new species.

KEY TO GROUPS

MALES

1. Apical plumose bristle of flagellum complex conspicuously enlarged and flattened *branchi* group
Apical plumose bristle of flagellum complex not conspicuously enlarged 2
2. Mesoventral groove of fixed finger distinct, movable finger not modified *bilobatus* group
Mesoventral groove of fixed finger indistinct,

¹ Greek, *ther*, a wild animal, plus *bates* (combining form), a climber.

movable finger modified apically *imperialis* group

Branchi GROUP

Moderate- to small-sized species. Males with mesal groove of fixed finger a deep narrow slot containing no distinct carinae. Apical plumose bristles of flagellum complex enlarged and flattened, covering part of the apical portion of mesal groove. Ventral tubular bristles of complex grouped in fondal notch. Known females have the opercula scalloped or lobate on their ectal margins, adjacent on their mesal margins except for a small triangular area near their posterior ends and elevated at the postero-mesal angles. Ectal row of fondal teeth graded in size I, III, II, IV; mesal row I, II, III, IV. In addition to the usual clothing the metatarsi of the palpi are provided below with two unequal rows of stout spines.

TYPICAL SPECIES: *Therobates branchi*, new species.

KEY TO MALES

1. Moderate-sized species, about 20 mm. long, anterior tooth of movable finger a rounded knob 2
Small-sized species, about 15 mm. long, anterior tooth of movable finger acute. 3
2. Mesal groove extending posteriorly beyond apex of first fondal tooth. Metatarsus of palpus with a mesoventral scopula *Therobates branchi*, new species
Mesal groove not extending beyond apex of first fondal tooth. Metatarsus of palpus without scopula *Therobates medialis*, new species
3. Fixed finger with margins undulate. First post-spiracular abdominal sternite with four ctenidia *Therobates cameronensis*, new species
Fixed finger with margins evenly curved. First post-spiracular abdominal sternite with two ctenidia . . . *Therobates morrissi*, new species

Therobates branchi,² new species

Figures 142-150

MALES: Total length, 21.0 to 28.0 mm.

	LENGTH	WIDTH
Chelicerae	5.3- 7.5 mm.	2.2-3.0 mm.
Propeltidium	2.7- 3.3	4.8-5.5
Palpi	24.0-29.0	—
1st legs	19.0-23.0	—
4th legs	31.0-36.0	—

² Named for the collector, Jefferson H. Branch.

Holotype, larger measurements.

Coloration in alcohol light to straw yellow, with dusky purplish markings as follows: eye tubercle dark; abdominal tergites faintly dusky; distal ends of metatarsi and all of tarsi of palpi faintly dusky. Malleoli white.

Dentition of chelicerae variable but following general pattern shown in figures 142 to 144. Movable finger with a large principal tooth, two widely spaced intermediate teeth, a small rounded anterior tooth, and an indistinct mesal tooth. Supernumerary intermediate teeth are common. Fixed finger long and narrow, with the ventral margin decidedly undulate. All fondal teeth are distinct from dentate socket margin of movable finger. Fondal notch U-shaped, about as wide as the base of the fixed finger and containing one or more denticles.

Groove of fixed finger a deep, parallel-sided slot that is mesoventral in position and does not extend to the base of the finger. Flagellum complex typical of group, with the apical plumose bristle not covering the distal fourth of the mesoventral groove. Mesal setae of movable finger plumose on the proximal half of the finger and simple distally.

Eye tubercle situated on the anterior margin of propeltidium. Eyes separated by slightly more than one diameter. Propeltidium wider than long by a ratio of 1 to 1.7.

Metatarsus and tibia of palpus provided below with a double row of long, robust spines, with long, heavy, cylinder bristles below and small fine ones above. Metatarsus with a scopula of 40 to 50 widely spaced, rounded papillae on the mesoventral surface which extends nearly the entire length of the segment. Metatarsus of palpus about three and one-half times as long as tarsus.

First post-spiracular abdominal sternite provided with four long, linear ctenidia that extend over the anterior margin of the next segment.

FEMALES: Total length, 24.0 to 26.0 mm.

	LENGTH	WIDTH
Chelicerae	6.4- 6.7 mm.	2.4-2.5 mm.
Propeltidium	2.7- 3.0	4.4-4.8
Palpi	22.0-23.0	—
1st legs	16.0-17.0	—
4th legs	28.0-29.0	—

Female allotype, larger measurements.

Coloration in alcohol similar to that of males.

Dentition of chelicerae as shown in figures 147 and 148. Movable finger with principal tooth large, two widely spaced intermediate teeth, anterior tooth about two-thirds as large as principal tooth, an uneven serration in front of anterior tooth, and an indistinct mesal tooth. Fixed finger with principal and medial teeth equally large, a smaller anterior tooth, two intermediate teeth between principal and medial teeth, two between medial and anterior teeth, and an uneven serration in front of anterior tooth. Supernumerary teeth are common, especially on movable finger. Fondal teeth same as in male.

Structure similar to that of male except there is no scopula on the metatarsus of the palpus, and no distinct ctenidia on the first post-spiracular abdominal sternite. Some specimens have four trace ctenidia that are scarcely distinguishable from setae clothing the abdomen.

Opercula of genital segment as shown in figure 150.

TYPE LOCALITY: Male holotype, female allotype, and male and female paratypes from Twentynine Palms, California, July to August, 1945 (Jefferson H. Branch), in the American Museum of Natural History.

RECORDS: Nevada: Las Vegas, summer, 1932, two females (John Christensen and J. W. Lugden).

REMARKS: The specimens described here all appear to be newly molted adults, and it is possible that additional markings appear on older specimens.

***Therobates gertschi*,¹ new species**

Figure 151

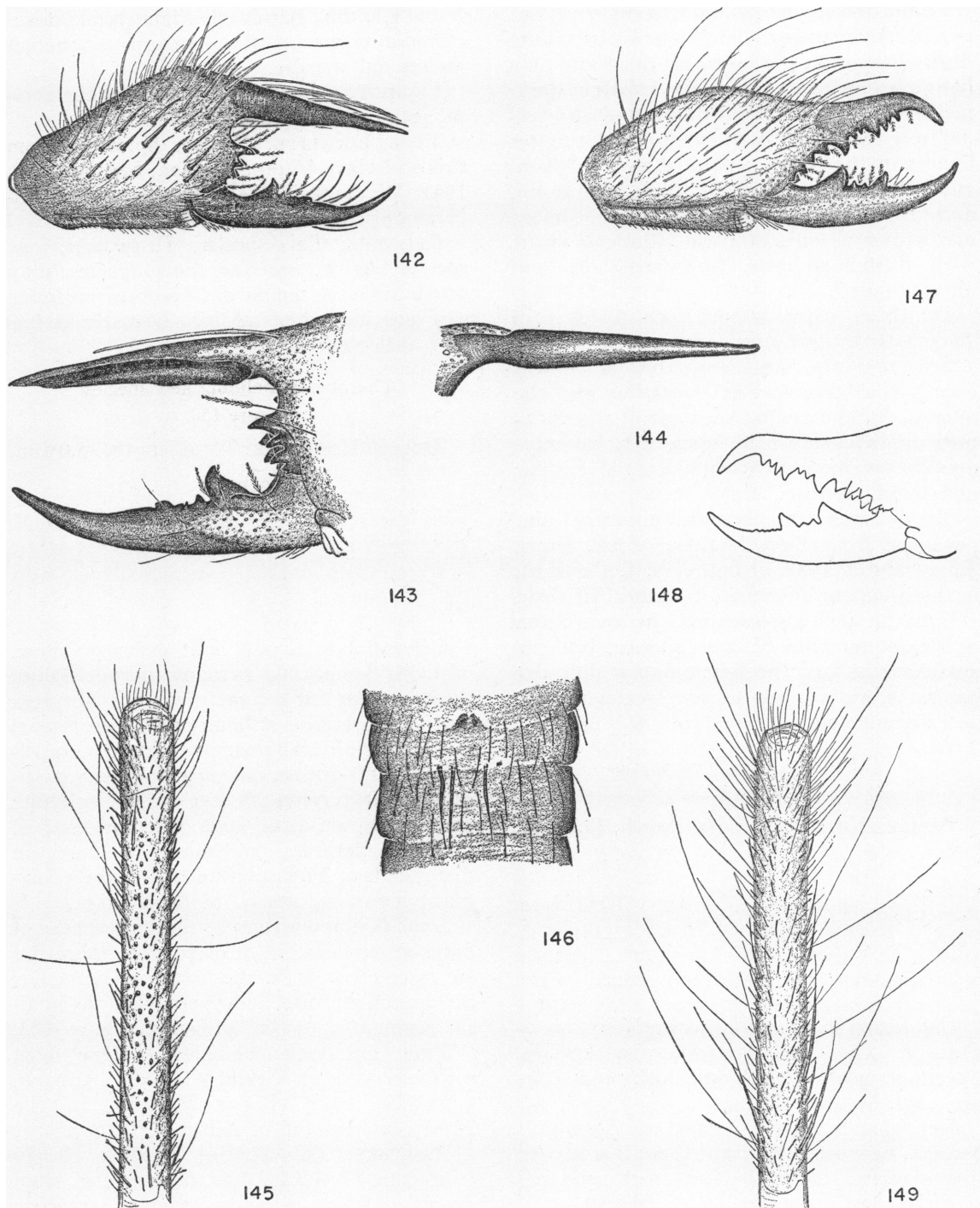
FEMALES: Total length, 18.0 to 19.0 mm.

	LENGTH	WIDTH
Chelicerae	5.1- 5.3 mm.	2.0-2.1 mm.
Propeltidium	2.1- 2.2	3.1-3.3
Palpi	17.5-18.0	—
1st legs	13.0-13.0	—
4th legs	23.0-25.0	—

Holotype, larger measurements.

Paratype, smaller measurements.

¹ Named for the collector, W. J. Gertsch.



FIGS. 142-149. 142. *Therobates branchi*, new species, ectal view of right male chelicera. 143. *Therobates branchi*, new species, mesal view of right male chelicera. 144. *Therobates branchi*, new species, dorsal view of fixed finger of right male chelicera. 145. *Therobates branchi*, new species, mesoventral view of apical segments of left male palpus. 146. *Therobates branchi*, new species, male abdominal ctenidia. 147. *Therobates branchi*, new species, ectal view of right female chelicera. 148. *Therobates branchi*, new species, mesal view of right female chelicera. 149. *Therobates branchi*, new species, mesoventral view of apical segments of right female palpus.

Coloration in alcohol light to rusty yellow, with dusky markings as follows: propeltidium dusky except on the posterior third and on a light median ovate area; eye tubercle dark; mesopeltidium, metapeltidium, and abdominal tergites dusky, with abdominal tergites lighter in the middle; palpi dusky on distal ends of femora and all of tibiae, metatarsi, and tarsi; legs dusky on distal ends of femora and proximal ends of tibiae. Malleoli white, with dusky pedicels. Specimens old and alcohol faded.

Dentition worn but similar to that of *Therobates branchi*, new species.

Structure also similar to that of *branchi* except that this species is smaller and the opercula of the genital segment of the abdomen differ as shown in figure 151. No trace ctenidia occur on the first post-spiracular abdominal sternite.

TYPE LOCALITY: Female holotype and paratype from Zion National Park, Utah, July 4 and 5, 1932, at light (W. J. Gertsch), in the American Museum of Natural History.

REMARKS: This species may be a variation of *Therobates branchi*, new species, but the smaller size and proportionately different genital sternite prompt its placement here as a distinct species.

***Therobates iviei*,¹ new species**

Figure 152

FEMALE HOLOTYPE: Total length, 28.0 mm.

	LENGTH	WIDTH
Chelicerae	7.4 mm.	2.6 mm.
Propeltidium	2.5	4.8
Palpi	20.0	—
1st legs	16.0	—
4th legs	27.0	—

Coloration in alcohol apparently similar to that of *Therobates gertschi*, new species. Specimen newly molted and dusky markings are faint. Malleoli white.

Dentition similar to that of *Therobates branchi*, new species, except there is a minute intermediate tooth behind the principal tooth of the fixed finger.

Structure similar to that of *branchi* except for the proportional width of the propeltidium which is wider than long by a ratio of

1 to 1.9. Six barely distinguishable trace ctenidia occur on the first post-spiracular abdominal sternite.

Figure 152 shows the opercula of the genital segment of the abdomen.

TYPE LOCALITY: Female holotype from Colossal Cave Camp, Arizona, September 8, 1941 (W. Ivie), in the collection of the University of Utah.

REMARKS: This species, *T. gertschi*, new species, or *T. malkini*, new species, may prove to be the female of *Therobates medialis*, new species, when additional material has been collected.

***Therobates malkini*,² new species**

Figure 153

FEMALE HOLOTYPE: Total length, 23.0 mm.

	LENGTH	WIDTH
Chelicerae	6.8 mm.	2.6 mm.
Propeltidium	3.0	4.1
Palpi	18.0	—
1st legs	15.0	—
4th legs	24.0	—

Coloration in alcohol light to rusty yellow, with dusky markings as follows: propeltidium dusky except for a light median ovate area and two posterior submarginal ovate areas; eye tubercle dark; mesopeltidium, metapeltidium, and abdominal tergites dusky, with abdominal tergites lighter in the middle; palpi dusky on distal ends of femora and all of tibiae, metatarsi, and tarsi; legs dusky on distal ends of femora, all of tibiae, and proximal ends of metatarsi. Malleoli white.

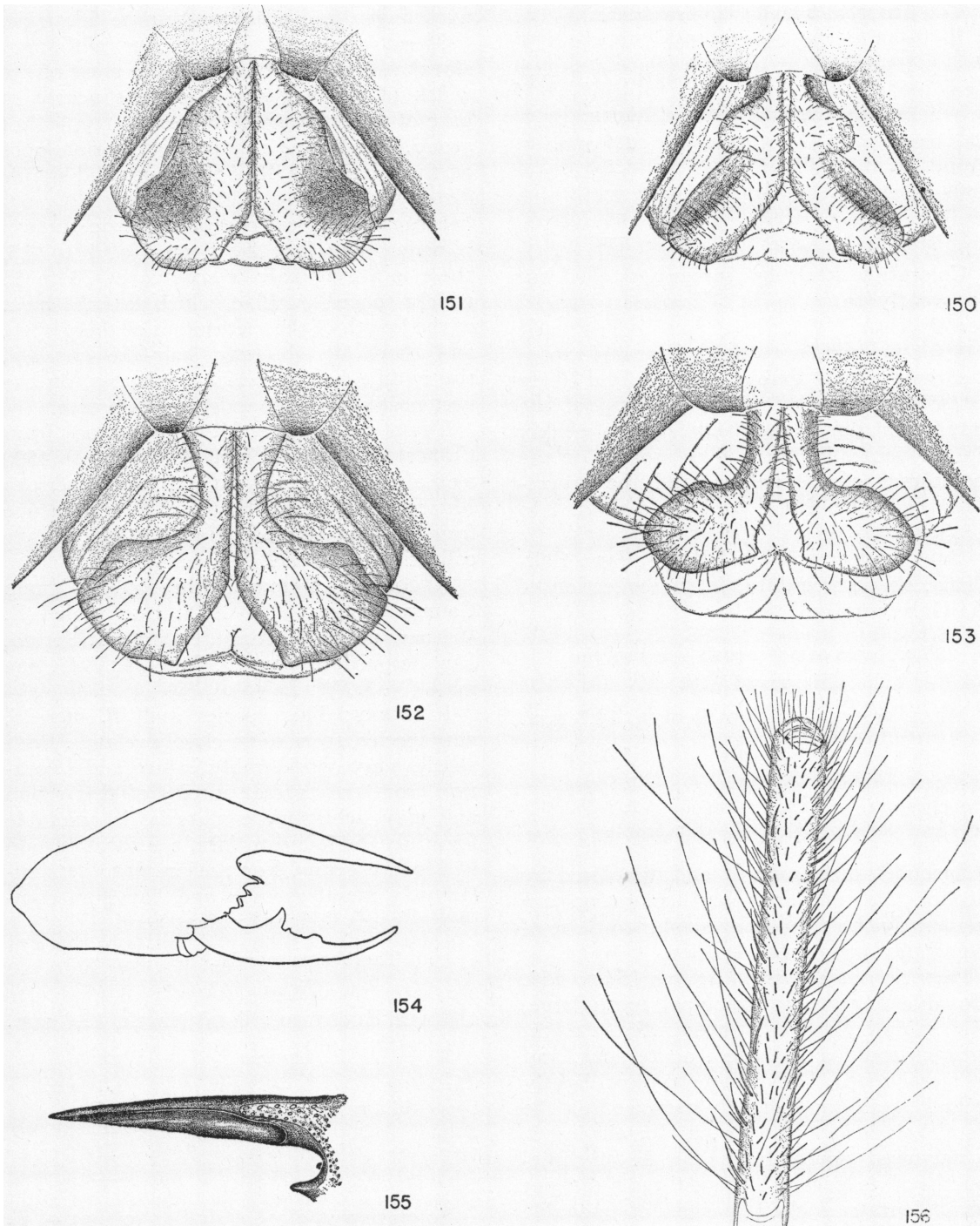
Dentition and structure similar to those of *branchi*, new species, except that there are six trace ctenidia on the first post-spiracular abdominal sternite, and opercula of the genital segment differ as shown in figure 153.

TYPE LOCALITY: Female holotype from southern rim of Grand Canyon, Arizona, June 29, 1947 (Borys Malkin), in the American Museum of Natural History.

REMARKS: This species is quite closely related to *Therobates iviei*, new species, from which it differs in coloration and structure of opercula. The collection of additional material may prove the two to belong to the same variable species.

¹ Named for the collector, Wilton Ivie.

² Named for the collector, Borys Malkin.



FIGS. 150-156. 150. *Therobates branchi*, new species, ventral view of female genital opercula. 151. *Therobates gertschi*, new species, ventral view of female genital opercula. 152. *Therobates iviei*, new species, ventral view of female genital opercula. 153. *Therobates malkini*, new species, ventral view of female genital opercula. 154. *Therobates medialis*, new species, ectal view of right male chelicera. 155. *Therobates medialis*, new species, mesal view of fixed finger of right male chelicera. 156. *Therobates medialis*, new species, mesoventral view of apical segments of right male palpus.

***Therobates medialis*¹**, new species

Figures 154-156

MALE HOLOTYPE: Total length, 22.0 mm.

	LENGTH	WIDTH
Chelicerae	7.1 mm.	2.9 mm.
Propeltidium	2.6	4.0
Palpi	26.0	—
1st legs	20.0	—
4th legs	32.0	—

Coloration in alcohol somewhat faded but apparently same as in *Therobates branchi*, new species.

Structure similar to that of *branchi* except the mesoventral groove of the fixed finger extends posteriorly only to the tip of the first fondal tooth, the fixed finger is weakly sinuate ventrally, there is no scopula on the metatarsus of the palpus, and the propeltidium is wider than long by a ratio of 1 to 1.5.

TYPE LOCALITY: Male holotype from California, no further data, in the collection of the University of Utah.

***Therobates cameronensis*²**, new species

Figures 157-161

MALE HOLOTYPE: Total length, 14.0 mm.

	LENGTH	WIDTH
Chelicerae	3.5 mm.	1.5 mm.
Propeltidium	2.1	2.8
Legs and palpi mangled, not measurable		

Specimen dismembered and discolored by alcohol, but markings and coloration are apparently the same as or similar to those of *Therobates branchi*, new species.

Dentition as shown in figures 157 to 159. Movable finger with principal tooth large, two minute, spaced, intermediate teeth, anterior tooth a flattened, acute spur, and no mesal tooth. Fixed finger typical, lightly arched basally and slightly narrowed on the distal half in lateral view, in dorsal view it is narrowed gradually in the distal three-fourths of its length. All fondal teeth distinct from dentate socket margin of movable finger. Fondal notch obscure, irregularly U-shaped, less than half as wide as base of

fixed finger, and bearing a minute denticule.

Mesal groove of fixed finger a distinct slot that broadens basally to fill most of the width of the finger and extends nearly to base of finger. Flagellum complex typical of group. Mesal setae of movable finger plumose on the proximal half of the finger and simple distally.

Structure typical except the propeltidium is wider than long by a ratio of 1 to 1.3, there is a long narrow scopula of 20 to 25 widely spaced papillae, which extends most of the length of the metatarsus of the palpus, and there are six long, hair-like ctenidia, the middle pair of which is shorter, on the first post-spiracular abdominal sternite.

TYPE LOCALITY: Male holotype from Cameron, Arizona, April 30, 1936, at 4500 feet altitude (O. Bryant), in the American Museum of Natural History. Male paratype from Yuma, Arizona, May 4, 1918, in the collection of Cornell University.

RECORDS: Arizona: Ehrenburg, Yuma County, August 11, 1948, one male (F. Werner and W. Nutting). California: Yermo, San Bernardino County, June 24, 1949, one male (N. R. W. Leigh).

REMARKS: This species and *T. morrissi*, new species, seem to be closely related. Both species vary considerably in size and coloration from the typical species of this group and may, when more material is available for study, be found to form a separate group within the genus. For the present the similarity in mesal grooves and flagellum complexes forces their placement here.

***Therobates morrissi*³**, new species

Figures 162-164

MALE HOLOTYPE: Total length, 13.0 mm.

	LENGTH	WIDTH
Chelicerae	4.1 mm.	2.1 mm.
Propeltidium	2.6	3.5
Palpi	11.0	—
1st legs	9.0	—
4th legs	15.0	—

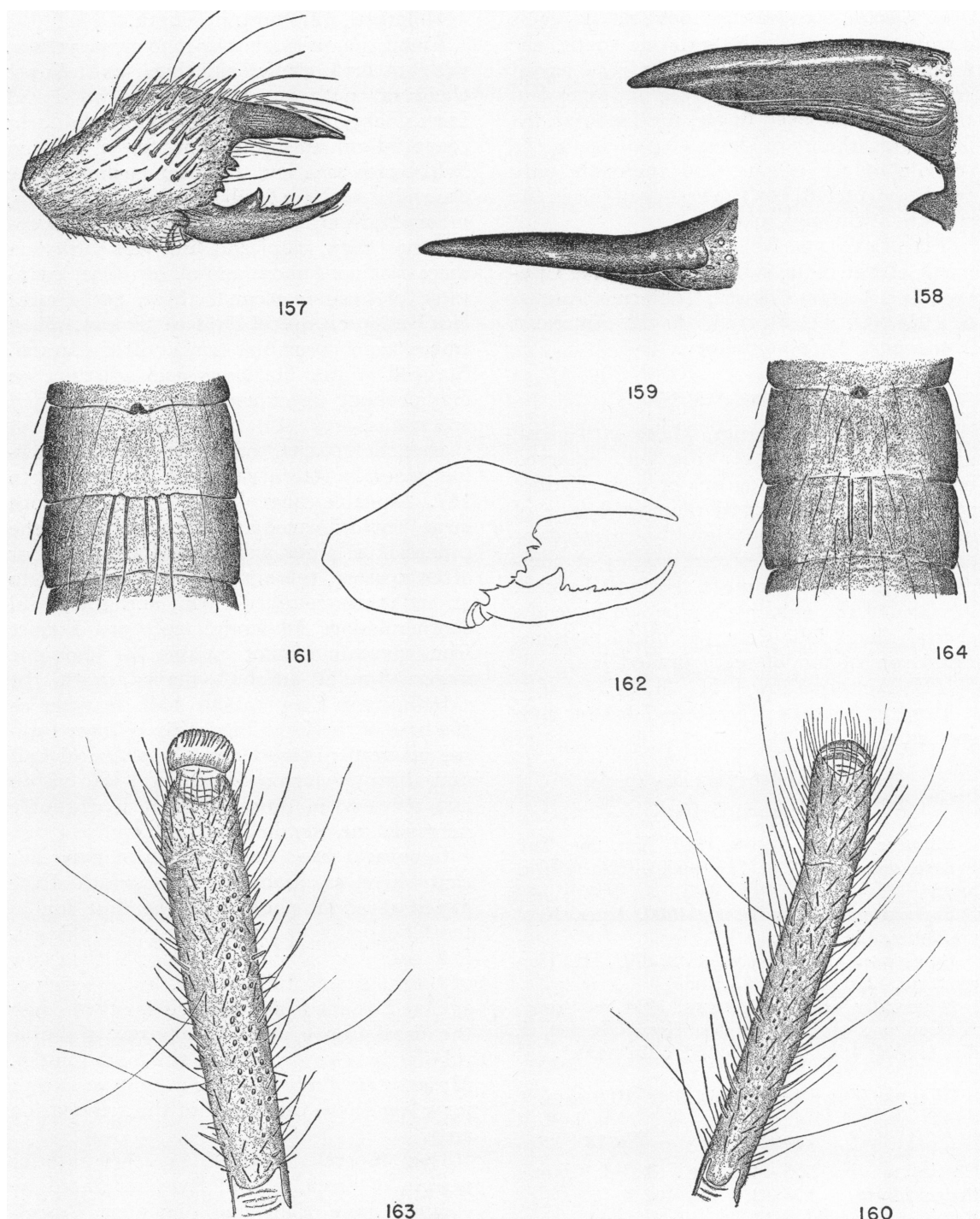
Coloration in alcohol similar to that of *T. branchi*, new species, except the propeltidium is nearly uniformly dusky and the legs are dusky on all segments.

Structure similar to that of *T. cameronensis*,

¹ Latin, *medialis*, middle; refers to the position of the mesoventral groove of the fixed finger.

² Latin, of or pertaining to Cameron, Arizona.

³ Named for the collector, G. D. Morris.



FIGS. 157-164. 157. *Therobates cameronensis*, new species, ectal view of right male chelicera. 158. *Therobates cameronensis*, new species, mesal view of fixed finger of right male chelicera. 159. *Therobates cameronensis*, new species, dorsal view of fixed finger of right male chelicera. 160. *Therobates cameronensis*, new species, mesoventral view of apical segments of right male palpus. 161. *Therobates cameronensis*, new species, male abdominal ctenidia. 162. *Therobates morrisoni*, new species, ectal view of right male chelicera. 163. *Therobates morrisoni*, new species, mesoventral view of apical segments of right male palpus. 164. *Therobates morrisoni*, new species, male abdominal ctenidia.

new species, except the movable finger is serrate in front of the anterior tooth, the fixed finger is nearly straight, the mesal groove of the fixed finger does not extend to the base of the fixed finger, the fondal notch is distinct, there are about 40 papillae in the scopula of the palpus, and there are only two heavy ctenidia on the first post-spiracular sternite of the abdomen.

TYPE LOCALITY: Male holotype from 1 mile north of San Dimas Park, San Dimas Canyon, Los Angeles County, California, August 6, 1947 (G. D. Morris), in the American Museum of Natural History.

Bilobatus GROUP

Moderate-sized species. Males with mesal groove of fixed finger distinct, enlarged basally, and containing one or more distinct carinae or ridges. Apical plumose bristle of flagellum complex not greatly enlarged or elongated. Ventral tubular bristles of complex situated in a group in the fondal notch. Females of the only species known have the genital plates lobate on the mesal margins. Ectal row of fondal teeth graded in size I, II, III, IV; mesal row I, III, II, IV.

TYPICAL SPECIES: *Therobates bilobatus*, new species.

Therobates bilobatus,¹ new species

Figures 165-173

Datames pallipes SIMON, 1879, Ann. Soc. Ent. France, ser. 5, vol. 9, p. 139 (male). (Not *pallipes* Say.)

Eremobates pallipes BANKS, 1900, Amer. Nat., vol. 30, p. 427 (male).

Eremobates pallipes KRAEPELIN, 1901, Das Tierreich, no. 12, p. 126, fig. 93 (male).

Eremobates pallipes ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 555, figs. 116d, 322a (male).

MALES: Total length, 14.0 to 20.0 mm.

	LENGTH	WIDTH
Chelicerae	3.5- 4.8 mm.	1.3-1.9 mm.
Propeltidium	1.4- 2.0	2.4-5.3
Palpi	14.0-18.0	—
1st legs	9.0-13.0	—
4th legs	17.0-23.0	—

¹ Latin, *bi* (combining form), two, plus Latin, *lobatus*, lobed; refers to form of genital plates.

Holotype, 18.0 mm. in length.

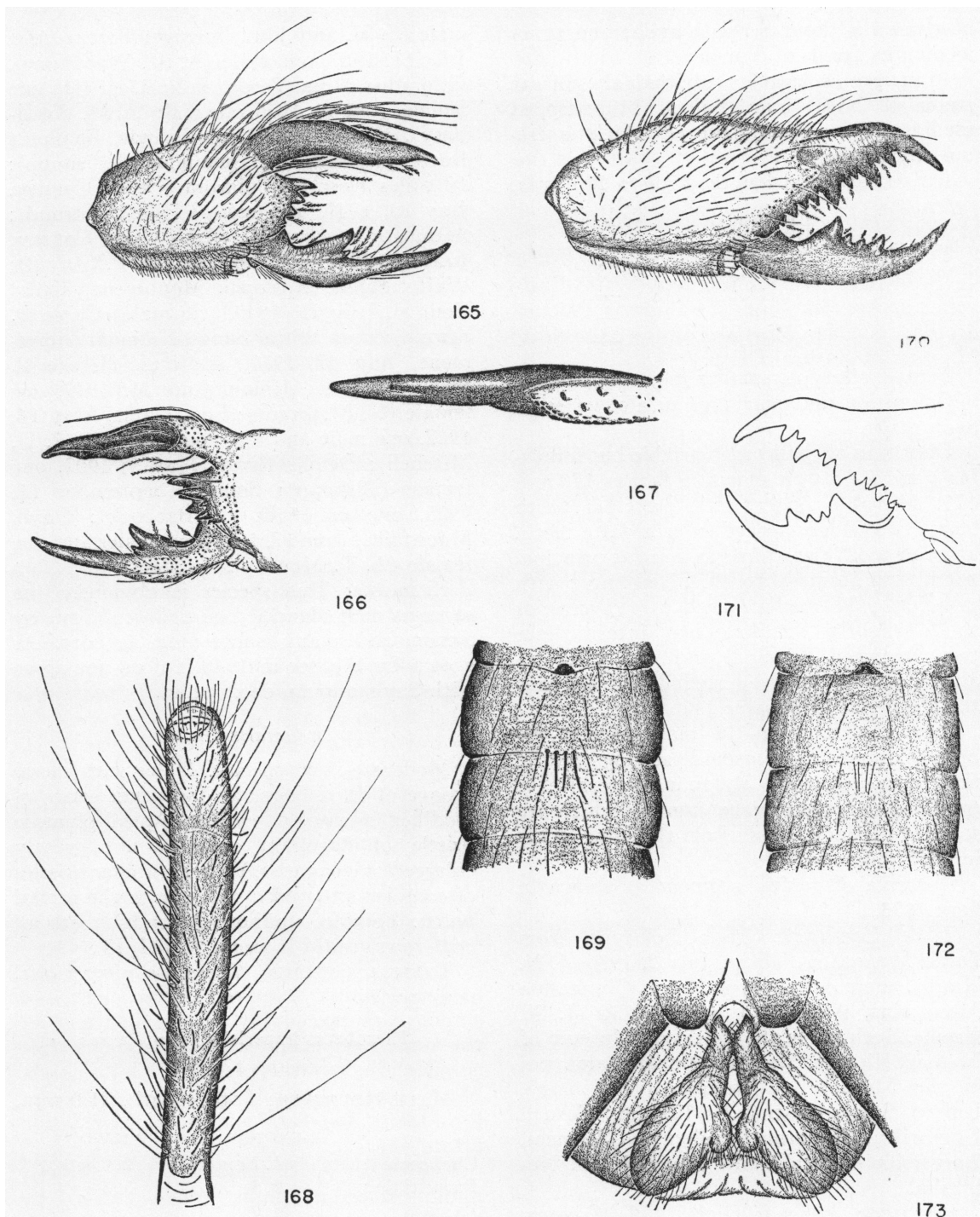
Coloration in alcohol light to straw yellow, with dusky purple markings as follows: chelicerae with one lateral and two dorsal faint dusky stripes each; eye tubercle dark; propeltidium dusky except for a median light ovate area and a lighter median stripe the width of the eye tubercle; mesopeltidium, metapeltidium, and abdominal tergites faintly dusky; palpi and first legs dusky on apical ends of femora and all of tibiae, metatarsi, and tarsi; second, third, and fourth legs dusky on apical ends of femora, all of tibiae, and proximal ends of metatarsi. Malleoli white. Markings are indistinct on old alcoholic specimens and newly molted specimens.

Dentition of chelicerae variable but following general pattern shown in figures 165 to 167. Movable finger with principal tooth large, two intermediate teeth, of which the proximal is larger and the distal minute or often missing, the anterior tooth reduced to an indistinct rounded ridge, and the mesal tooth missing. All fondal teeth are distinct from dentate socket margin of movable finger. Fondal notch V-shaped, with the sides incurved and about half as wide as the base of the fixed finger. Fixed finger typical of group; curved dorsally on basal half and abruptly narrow above on distal half in lateral view, in dorsal view it is abruptly narrowed mesally on distal half.

Groove of fixed finger a deep narrow slot that widens gradually to fill the width of the finger at about the tip of the first fondal tooth beyond which it does not extend. Flagellum complex typical of group, with a row of dorsal simple tubular bristles, a series of similar S-shaped plumose bristles that cover the mesal groove, and a basal group of simple tubular bristles situated in the fondal notch. Mesal setae of movable finger plumose except for a few at the distal end of the articulation area.

Eye tubercle situated on the anterior margin of propeltidium. Eyes separated by slightly more than one diameter. Propeltidium wider than long by a ratio of 1 to 1.7.

Metatarsus and tibia of palpus provided below with a single mesal row of long, robust spines and with long heavy cylinder bristles below and short fine ones above. Metatarsus



FIGS. 165-173. 165. *Therobates bilobatus*, new species, ectal view of right male chelicera. 166. *Therobates bilobatus*, new species, mesal view of right male chelicera. 167. *Therobates bilobatus*, new species, dorsal view of fixed finger of right male chelicera. 168. *Therobates bilobatus*, new species, meso-ventral view of apical segments of left male palpus. 169. *Therobates bilobatus*, new species, male abdominal ctenidia. 170. *Therobates bilobatus*, new species, ectal view of right female chelicera. 171. *Therobates bilobatus*, new species, mesal view of right female chelicera. 172. *Therobates bilobatus*, new species, female abdominal ctenidia. 173. *Therobates bilobatus*, new species, ventral view of female genital opercula.

of palpus without scopula and three times as long as tarsus.

First post-spiracular abdominal sternite provided with four linear, blunt-tipped ctenidia, the middle pair of which is frequently shorter.

FEMALES: Total length, 17.0 to 20.0 mm.

	LENGTH	WIDTH
Chelicerae	4.2- 5.0 mm.	1.6-2.0 mm.
Propeltidium	1.4- 1.8	3.1-3.6
Palpi	11.0-13.0	—
1st legs	8.0-10.0	—
4th legs	16.0-18.0	—

Female allotype, smaller measurements.

Coloration and markings in alcohol same as in males.

Dentition of chelicerae variable but following general pattern shown in figures 170 and 171. Movable finger with principal tooth large, two widely spaced intermediate teeth, anterior tooth two-thirds as large as principal tooth, and no mesal tooth. Fixed finger with principal and medial teeth large, anterior tooth slightly smaller, two intermediate teeth between principal and medial teeth, and one tooth between medial and anterior teeth. Fondal teeth same as in male.

Structure same as in male except the propeltidium is twice as wide as long and the first post-spiracular abdominal sternite is provided only with trace ctenidia which are scarcely distinguishable from the setae clothing the abdomen.

Opercula of genital segment as shown in figure 173.

TYPE LOCALITY: Male holotype from Davis Mountains, Texas, July 2, 1936 (J. N. Knull). Female allotype from Chiricahua Mountains, Arizona, July 18, 1936 (J. N. Knull). Both are in the American Museum of Natural History. Male and female paratypes in the Museum of Comparative Zoölogy, United States National Museum, Cornell University, California Academy of Sciences, University of Utah, and University of Nebraska.

RECORDS: Arizona: Globe, Gila County, July 8, 1949, two males (F. Werner and W. Nutting), July 16, 1948, one female (F. Werner and W. Nutting); Canada Del Oro, Santa Catalina Mountains, August 1, 1937, one female (Steckler); Tucson, June 6, one

male (S. H. and J. L. Sperry); Totem Pole, July 17, 1937, one male (A. M. Woodbury). Colorado: Mesa Verde, July 23, 1941, one female, June 14, 1936, one male (A. M. Woodbury). New Mexico: Hot Springs, Elephant Butte, June 26, 1935, one female (Bishopp); 10 miles west of Tularosa, Otero County, July 10, 1947, one male (Clyde P. Stroud); Alamogordo, Army Air Base, Otero County, June 10, 1947, one male (Clyde P. Stroud); White Sands National Monument, Otero County, July 21, 1947, one male (Clyde P. Stroud); near White Sands National Monument, July 17, 1947, one male (Clyde P. Stroud). Texas: Alpine, June 21, 1949, one female (G. M. Bradt); Fort Davis, May 14, 1912, one male and one young female (J. D. Mitchell); Devil's River, May 5, 1907, one female (Bishopp); Sonora, September 15, 1925, one male (O. G. Babcock); Davis Mountains, June 17, 1947, two males and one female (A. T. McClay).

REMARKS: This species is obviously the same as that identified as *pallipes* (Say) by Simon and many succeeding authors. As shown by Fichter in 1940 it does not agree with Say's original description.

Imperialis GROUP

Moderate-sized species. Males with mesal groove of fixed finger an indistinct series of modified creases and carinae. Apical plumose bristle of flagellum complex not greatly enlarged or elongated. Ventral tubular bristles of complex situated in a group in the fondal notch. Females unknown. Fondal teeth of both rows graded in size I, III, II, IV.

TYPICAL SPECIES: *Therobates imperialis*, new species.

Therobates imperialis,¹ new species

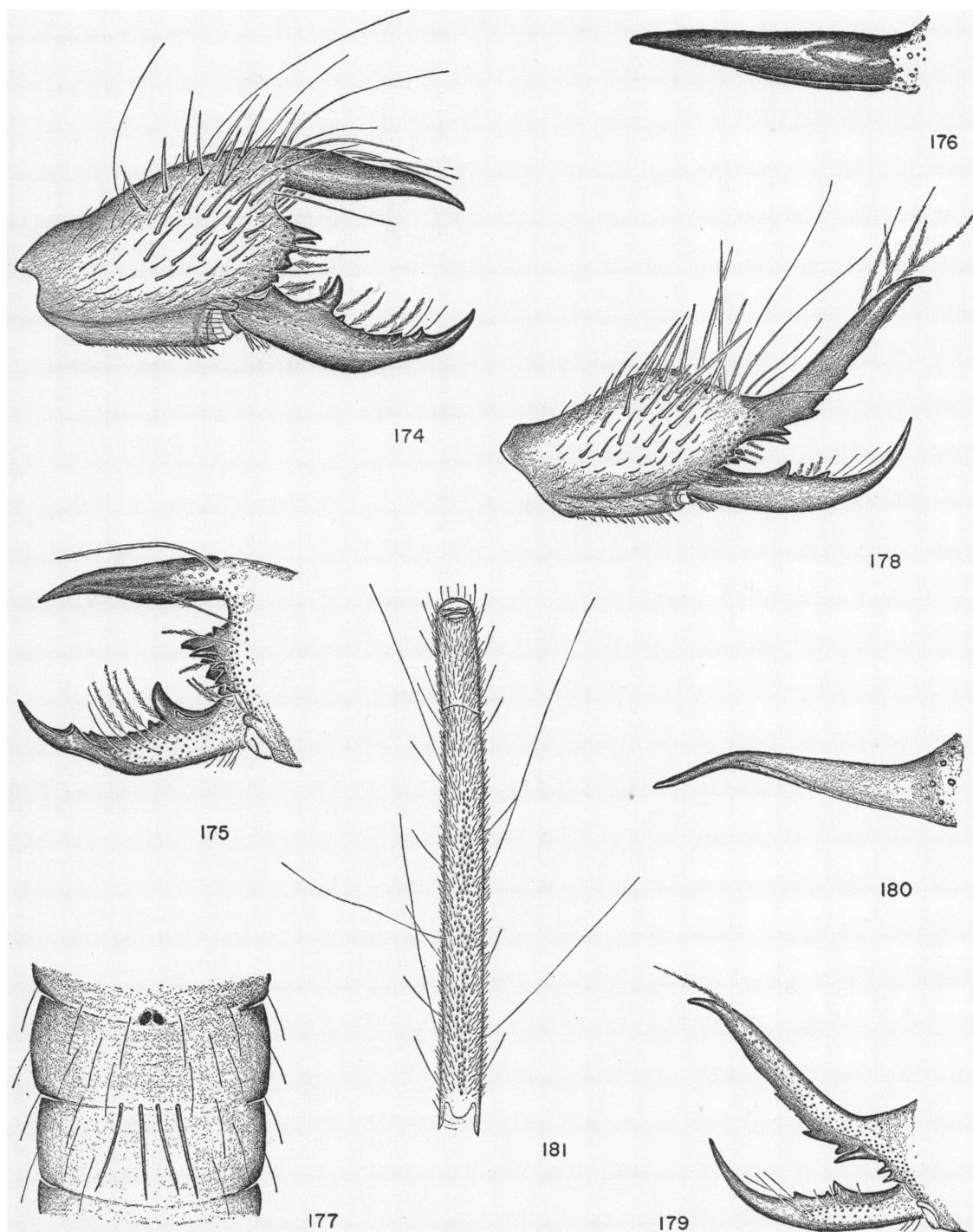
Figures 174-177

MALE HOLOTYPE: Total length, 21.0 mm.

	LENGTH	WIDTH
Chelicerae	4.7 mm.	2.0 mm.
Propeltidium	2.3	3.3
Palpi	20.0	—
1st legs	15.0	—
4th legs	26.0	—

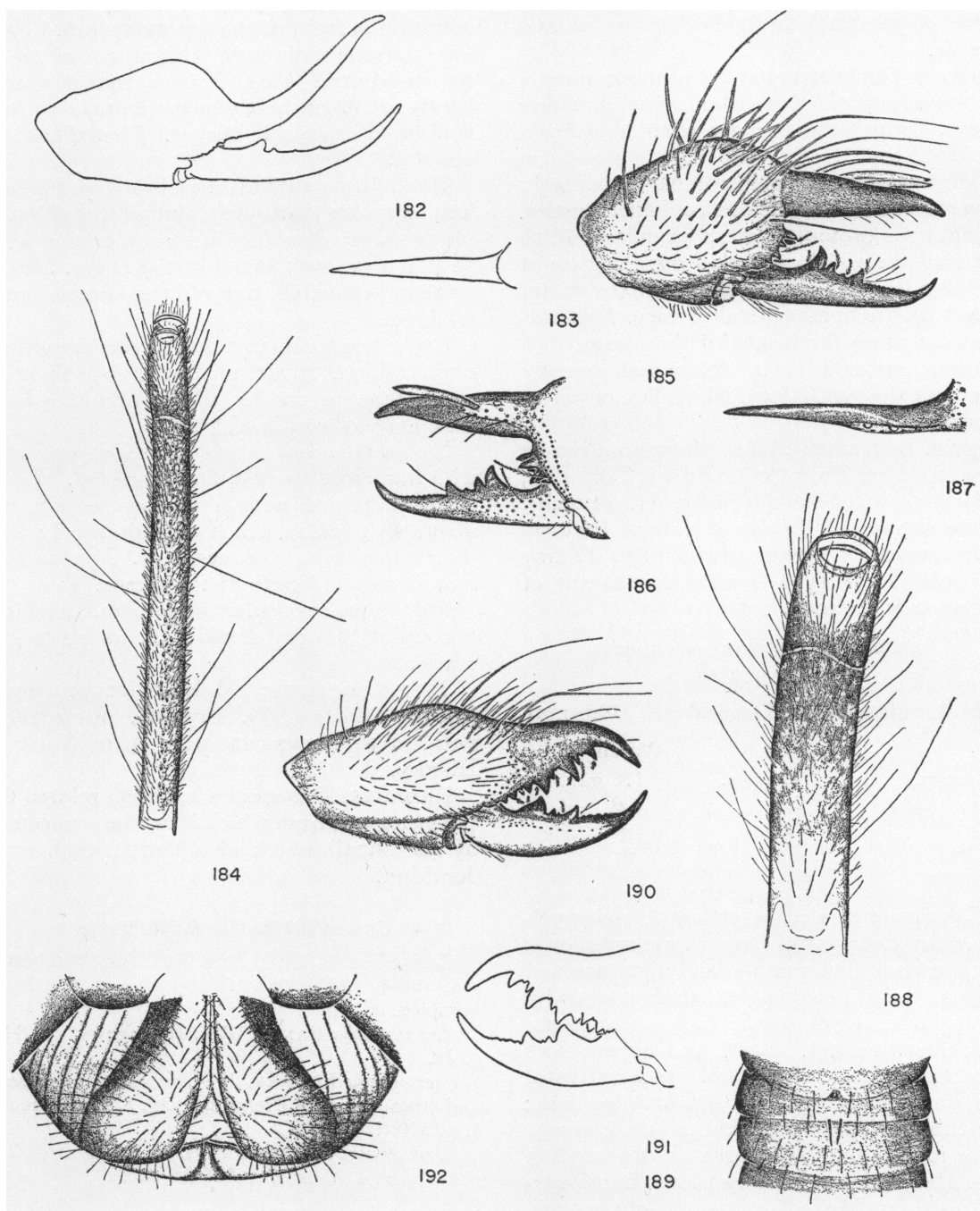
Coloration in alcohol white to light yellow,

¹ Latin, *imperialis*, imperial.



FIGS. 174-181. 174. *Therobates imperialis*, new species, ectal view of right male chelicera. 175. *Therobates imperialis*, new species, mesal view of right male chelicera. 176. *Therobates imperialis*, new species, dorsal view of fixed finger of right male chelicera. 177. *Therobates imperialis*, new species, male abdominal ctenidia. 178. *Chanbria regalis*, new species, ectal view of right male chelicera. 179. *Chanbria regalis*, new species, mesal view of right male chelicera. 180. *Chanbria regalis*, new species, dorsal view of fixed finger of right male chelicera. 181. *Chanbria regalis*, new species, mesoventral view of apical segments of left male palpus.

² Latin, *regalis*, regal.



FIGS. 182-192. 182. *Chanbria serpentinus*, new species, ectal view of right male chelicera. 183. *Chanbria serpentinus*, new species, dorsal view of fixed finger of right male chelicera. 184. *Chanbria serpentinus*, new species, mesoventral view of apical segments of left male palpus. 185. *Hemerotrecha banksi*, new name, ectal view of right male chelicera. 186. *Hemerotrecha banksi*, new name, mesal view of right male chelicera. 187. *Hemerotrecha banksi*, new name, dorsal view of fixed finger of right male chelicera. 188. *Hemerotrecha banksi*, new name, mesoventral view of apical segments of right male palpus. 189. *Hemerotrecha banksi*, new name, male abdominal ctenidia. 190. *Hemerotrecha banksi*, new name, ectal view of right female chelicera. 191. *Hemerotrecha banksi*, new name, mesal view of right female chelicera. 192. *Hemerotrecha banksi*, new name, ventral view of female genital opercula.

setae of movable finger both plumose and simple.

Eye tubercle situated on anterior margin of propeltidium. Eyes about one diameter apart. Propeltidium wider than long by a ratio of 1 to 1.3.

Metatarsus and tarsus of palpus entirely covered with numerous weak cylinder bristles. Metatarsus provided with a scopula of 70 to 150 papillae which extends from the base of the segment for about three-fourths of its length on the mesoventral surface. Metatarsus four times the length of the tarsus.

First post-spiracular abdominal sternite not provided with ctenidia on its posterior margin.

TYPE LOCALITY: Male holotype and male paratype from Twentynine Palms, California, July 1 to 15, 1945 (Jefferson H. Branch), in the American Museum of Natural History.

REMARKS: The genus of which this striking solpugid is the type is named in honor of Jefferson H. Branch.

***Chanbria serpentinus*,¹ new species**

Figures 182-184

MALE HOLOTYPE: Total length, 19.0 mm.

	LENGTH	WIDTH
Chelicerae	4.8 mm.	1.6 mm.
Propeltidium	2.4	2.0
Palpi	32.0	—
1st legs	13.5	—
4th legs	26.0	—

Coloration in alcohol yellow to rusty yellow, with dusky purplish markings as follows: distal ends of femur, tibia, and metatarsus of palpus dark, metatarsus dark ventrally throughout length, tarsus dark on proximal end; first, second, third, and fourth legs with femur dark on anterior face at distal end, anterior face of tibia of fourth leg dark; eye tubercle dark; propeltidium dark except for a longitudinal oval area on the median line. Abdominal tergites discolored but apparently dusky. Malleoli white to light yellow.

Dentition of chelicerae as shown in figures 182 and 183. Movable finger lightly curved, with principal tooth small, anterior tooth very small but distinct, two tiny intermediate teeth, no mesal tooth, and an indistinct

serration in front of the anterior tooth. Fixed finger strongly sinuate, with traces of teeth on its ventral edge. Fourth fondal tooth barely distinguishable from dentate socket margin of movable finger. Fondal notch obscure.

Fixed finger without mesal groove. Flagellum complex composed almost entirely of plumose setae which increase in size and flatness towards the end of the finger. Mesal setae of movable finger both simple and plumose.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by slightly more than a radius. Propeltidium wider than long by a ratio of 1 to 1.2.

Metatarsus and tarsus of palpus covered with numerous weak cylinder bristles. Metatarsus provided with a narrow scopula of about 40 papillae which extends nearly the entire length of the segment. Metatarsus four times the length of the tarsus.

First post-spiracular abdominal sternite not provided with ctenidia on its posterior margin.

TYPE LOCALITY: Male holotype from Tucson, Arizona (O. Bryant), no further data, in the American Museum of Natural History.

REMARKS: This species is closely related to the genotype, from which it can be separated by the small size and different cheliceral dentition.

GENUS *HEMEROTRECHA*² BANKS

Cleobis BANKS, 1899, Proc. Ent. Soc. Washington, vol. 4, p. 314. (Not *Cleobis* of authors.) Preoccupied.

Hemerotrecha BANKS, 1903, Ent. News, vol. 14, p. 78.

Eremochelis ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 570 (in part).

Eremognatha ROEWER, 1934, in Bronn, *op. cit.*, vol. 5, div. 4, book 4, p. 566 (in part).

Small- to moderate-sized Hemerobatinae. Males with fixed finger style-like, the lower edge of which is irregularly undulate or bears one or more modified teeth and with no, or at most a very faint, mesal groove.

¹ Latin, *serpentus*, a snake, plus *inus*, suffix meaning like; refers to shape of fixed finger.

² Greek, *hemera*, day, plus *trecho*, to run; refers to diurnal habits.

Flagellum complex consisting of a dorsal row of striate bristles, the striae formed by very tiny setae and a ventral row of curved plumose setae which are more distinctly plumose towards the apical end of the finger. Opercula of females variously developed.

GENOTYPE: *Hemerotrecha banksi*, new name.

KEY TO GROUPS

MALES

1. Eyes separated by one and one-half to two diameters *banksi* group
Eyes separated by one or less than one diameter 2
2. Striate bristles of flagellum complex all simple and tubular *texana* group
Some striate bristles of flagellum plumose and flattened. 3
3. Apical striate bristle of flagellum complex flattened *serrata* group
Apical striate bristle of flagellum complex not flattened. *branchi* group

Banksi GROUP

Small species. Males with ventral margin of fixed finger irregularly undulate. Striate bristles of flagellum complex indistinctly striate, with apical and subapical bristles broad and flattened. Plumose plates of females roughly triangular, with their mesal margins nearly parallel for their entire length. Eyes separated by one and one-half to two diameters. Both rows of fondal teeth graded I, III, II, IV in size.

TYPICAL SPECIES: *Hemerotrecha banksi*, new name.

KEY TO MALES

1. Fixed finger normally tapered at tip.
 *Hemerotrecha banksi*, new name
Fixed finger modified at tip, not normally tapered 2
2. Fixed finger bulbous at tip
 *Hemerotrecha californica* (Banks)
Fixed finger truncate at tip
 *Hemerotrecha truncata*, new species

Hemerotrecha marginata Kraepelin is not included in the key, as the species has not been examined. It differs from the species included here by having four instead of two ctenidia on the first post-spiracular abdominal sternite.

Hemerotrecha banksi,¹ new name

Figures 185-192

Hemerotrecha californica BANKS, 1903, Ent. News, vol. 14, p. 79 (male). (Not *Cleobis californica* Banks, 1899.)

MALES: Total length, 10.0 to 12.0 mm.

	LENGTH	WIDTH
Chelicerae	2.2- 3.1 mm.	0.9-1.3 mm.
Propeltidium	1.2- 1.3	1.9-2.2
Palpi	7.0- 9.0	—
1st legs	5.0- 7.0	—
4th legs	11.0-13.0	—

Coloration in alcohol rusty yellow, with dusky purplish markings as follows: eye tubercle dark; propeltidium faintly dusky, darker on anterior margin; mesopeltidium, metapeltidium, and abdominal tergites dark but scarcely darker than rest of abdomen; venter dark; palpi dark on tarsi and distal end of metatarsi, faintly dusky on tibiae and femora; legs dark, lighter on tarsi and metatarsi. Some specimens have propeltidium, chelicerae, and lighter segments of palpi light, rusty yellow with the dusky markings very faint. Malleoli dark on distal margins.

Dentition of chelicerae variable but following the general pattern shown in figures 185 to 187. Movable finger with large principal tooth, anterior tooth about half the size of principal tooth, two intermediate teeth, of which the proximal is larger, a series of eight to 10 denticles in front of anterior tooth, and no mesal tooth. Fixed finger broad, undulate, and blunt at the tip. Fondal notch U-shaped, obscure, and only one-third as wide as base of fixed finger.

Flagellum complex typical of group, with dorsal row of five striate bristles tubular except for apical and subapical bristles which are broad and flattened. Plumose bristles gently curved ventrally and weakly plumose. Mesal setae of movable finger plumose except for a few at the distal end of the finger.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by one and one-half to two diameters. Propeltidium wider than long by a ratio of 1 to 1.6.

Metatarsus, tarsus, and tibia provided with

¹ Named for Nathan Banks.

many fine cylinder bristles, but there is no scopula on the metatarsus. Metatarsus of palpus about 2.5 times as long as tarsus.

First post-spiracular abdominal sternite provided with two straight, flattened, lanceolate ctenidia which do not extend the length of the succeeding segment.

FEMALES: Total length, 11.0 to 13.0 mm.

	LENGTH	WIDTH
Chelicerae	4.1- 4.8 mm.	1.6-1.8 mm.
Propeltidium	1.6- 2.0	2.7-3.1
Palpi	6.5- 8.0	—
1st legs	5.5- 7.0	—
4th legs	9.0-11.0	—

Coloration and markings in alcohol similar to those of male.

Dentition of chelicerae as shown in figures 190 and 191. Movable finger with large principal tooth, anterior tooth about half as large as principal tooth, a series of six or eight denticles in front of anterior tooth, and no mesal tooth. Fixed finger with principal, medial, and anterior teeth large and nearly equal in size, two intermediate teeth between principal and medial and medial and anterior teeth, and two or three denticles in front of anterior tooth. Supernumerary teeth are common. Fondal teeth same as in male.

Structure similar to that of male. Some specimens have two fine, hair-like, trace ctenidia on the first post-spiracular abdominal sternite which are scarcely distinguishable from setal clothing.

Opercula of genital segment shown in figure 192.

TYPE LOCALITY: Male type of *Hemerotrecha californica* (Banks) from Pacific Grove, California (Harold Heath), in the Museum of Comparative Zoölogy. Female allotype of *Hemerotrecha banksi*, new name, from Redwood City, California, May 18, 1924 (William Meehan), in the American Museum of Natural History. Female paratypes in the collections of Cornell University and the University of Utah.

RECORDS: California: San Francisco, one male; Carmel, October 8, 1944, one young female (Borys Malkin); Pacific Grove, one male (E. C. Starks); Palo Alto, September, 1931, four young females (Jellison), June 3, 1923, one male (Jack Gladstone); Stanford University, June 9, 1923, one female (B. C.

Cain), August, 1921, one female (H. Mason), May 17, one male (C. D. Duncan and B. C. Cain); San Mateo, May 19, 1918, one male (H. Van Duzee); Laguna Beach, July 22, 1931, one female (W. Ivie).

REMARKS: The material described here was compared with Banks' type.

*Hemerotrecha californica*¹ (Banks)

Figures 193-196

Cleobis californica BANKS, 1899, Proc. Ent. Soc. Washington, vol. 4, pp. 314-315 (female). (Not *Hemerotrecha californica* Banks, 1903.)

MALE: Total length, 8.5 mm.

	LENGTH	WIDTH
Chelicerae	3.0 mm.	1.3 mm.
Propeltidium	1.6	2.4
Palpi	6.0	—
1st legs	5.5	—
4th legs	8.5	—

Coloration and markings in alcohol similar to those of *Hemerotrecha banksi*, new name, except the propeltidium and chelicerae are dark, the palpi are light except that the metatarsi are dark in the middle, the first legs are light except the metatarsi and tarsi are faintly dusky, the second, third, and fourth legs are light below, the mesopeltidium, metapeltidium, and abdominal tergites are dark but somewhat lighter than the sides of the abdomen and prosomae, and the venter is light. Malleoli dark on distal margins.

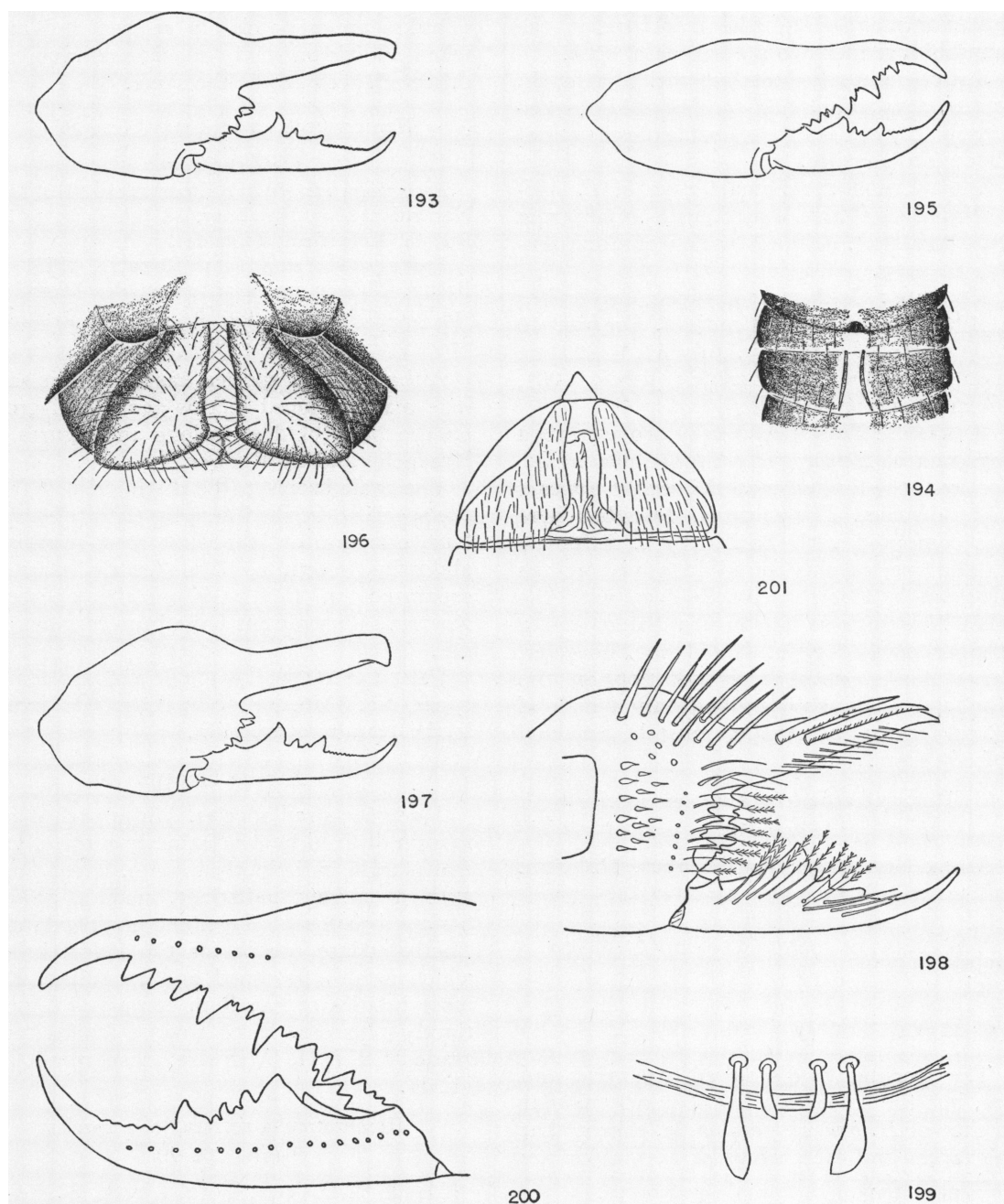
Structure almost identical with that of *banksi* except the fixed finger tends to be bulbous at tip, the anterior tooth of the movable finger is low and flattened, and the abdominal ctenidia are lightly curved and extend the length of the succeeding segment.

FEMALES: Total length, 12.0 to 14.0 mm.

	LENGTH	WIDTH
Chelicerae	3.8- 4.8 mm.	1.4-1.8 mm.
Propeltidium	1.6- 2.3	2.6-3.3
Palpi	6.5- 8.0	—
1st legs	5.5- 7.0	—
4th legs	9.5-11.5	—

Coloration and markings in alcohol similar to those of male. One female has the dusky markings on propeltidium reduced to a median stripe and a narrow band on the

¹ Latin, of or pertaining to California.



FIGS. 193-201. 193. *Hemerotrecha californica* (Banks), ectal view of right male chelicera. 194. *Hemerotrecha californica* (Banks), male abdominal ctenidia. 195. *Hemerotrecha californica* (Banks), ectal view of right female chelicera. 196. *Hemerotrecha californica* (Banks), ventral view of female genital opercula. 197. *Hemerotrecha truncata*, new species, ectal view of right male chelicera. 198. *Hemerotrecha marginata* (Kraepelin), mesal view of left male chelicera (redrawn from Roewer, 1934). 199. *Hemerotrecha marginata* (Kraepelin), male abdominal ctenidia (redrawn from Roewer, 1934). 200. *Hemerotrecha marginata* (Kraepelin), ectal view of left female chelicera (redrawn from Roewer, 1934). 201. *Hemerotrecha marginata* (Kraepelin), ventral view of female genital opercula (redrawn from Roewer, 1934).

posterior margin and the markings on the mandibles reduced to a dorsomesal spot.

Structure nearly identical with that of *H. banksi*, new name. The species is best separated on the basis of the opercula of the genital abdominal sternite.

TYPE LOCALITY: Female type of *C. californica* Banks from Los Angeles, California (A. Davidson), in the Museum of Comparative Zoölogy.

RECORDS: California: Lompoc, September 9, 1908, one female (Bradley). Oregon: 10 miles north of Gateway, July 31, 1922, one female. Washington: Starbuck, July 4, 1931, one male and one female.

REMARKS: This species may prove to be a variation of *Hemerotrecha banksi*, new name, but from the limited material seen it appears to be distinct. The material described here was compared with Banks' type. A female of this species was found in a vial at the Museum of Comparative Zoölogy with the label *Hemerotrecha californica* Banks and a stopper marked type. It did not, however, carry Banks' usual type notation on the label and as Banks described only a male of *H. californica* the stopper must be assumed to be in error.

***Hemerotrecha truncata*¹, new species**

Figure 197

MALE HOLOTYPE: Total length, 11.0 mm.

	LENGTH	WIDTH
Chelicerae	3.1 mm.	1.4 mm.
Propeltidium	2.1	2.8
Palpi	9.0	—
1st legs	7.0	—
4th legs	13.5	—

The specimen is discolored by drying and age, but the coloration is apparently similar to that of *H. banksi*, new name, except that the tarsus and metatarsus of the palpus are entirely dark.

Structure similar to that of *banksi* except the fixed finger is bluntly squared at the tip and the abdominal ctenidia extend the length of the succeeding segment.

TYPE LOCALITY: Male holotype from Exeter, Tulare County, California, May 16, 1909 (C. L. Fox), in the American Museum of Natural History.

REMARKS: This species and *H. californica*

¹ Latin, *truncatus*, cut off; refers to tip of fixed finger.

(Banks) are very closely related and may, when additional study specimens have been collected, prove to be the same.

***Hemerotrecha marginata*² (Kraepelin)**

Figures 198–201

Eremobates marginatus KRAEPELIN, 1910, Mitt. Naturhist. Mus. Hamburg, 28 Jahrgang, p. 103, figs. 4a, 4b (male and female).

Eremognatha marginata ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, pp. 567, 568, figs. 116c, 128, 324p, 327c (male and female).

Although this species has not been seen, it is readily placed in this genus and group on the basis of descriptions and figures by Kraepelin and by Roewer.

The male seems to be distinguished from the species described here by the presence of four ctenidia on the first post-spiracular abdominal sternite. The female may be separated on the basis of the opercula. Roewer's illustrations have been redrawn for use.

TYPE LOCALITY: Two male and two female types, No. 8376, from San Pedro, California, in the Hamburg museum.

***Serrata* GROUP**

Moderate-sized species. Males with dorsal margin of fixed finger distinctly serrate, ventral margin indistinctly serrate. Fixed finger with a narrow, indistinct, median groove. Striate bristles of flagellum complex indistinctly striate except for the apical bristle which is also flattened and spatulate. Plumose bristles of flagellum complex all indistinctly plumose. Ectal row of fondal teeth graded I, III, II, IV in size, mesal row I, III, IV, II.

***Hemerotrecha serrata*³, new species**

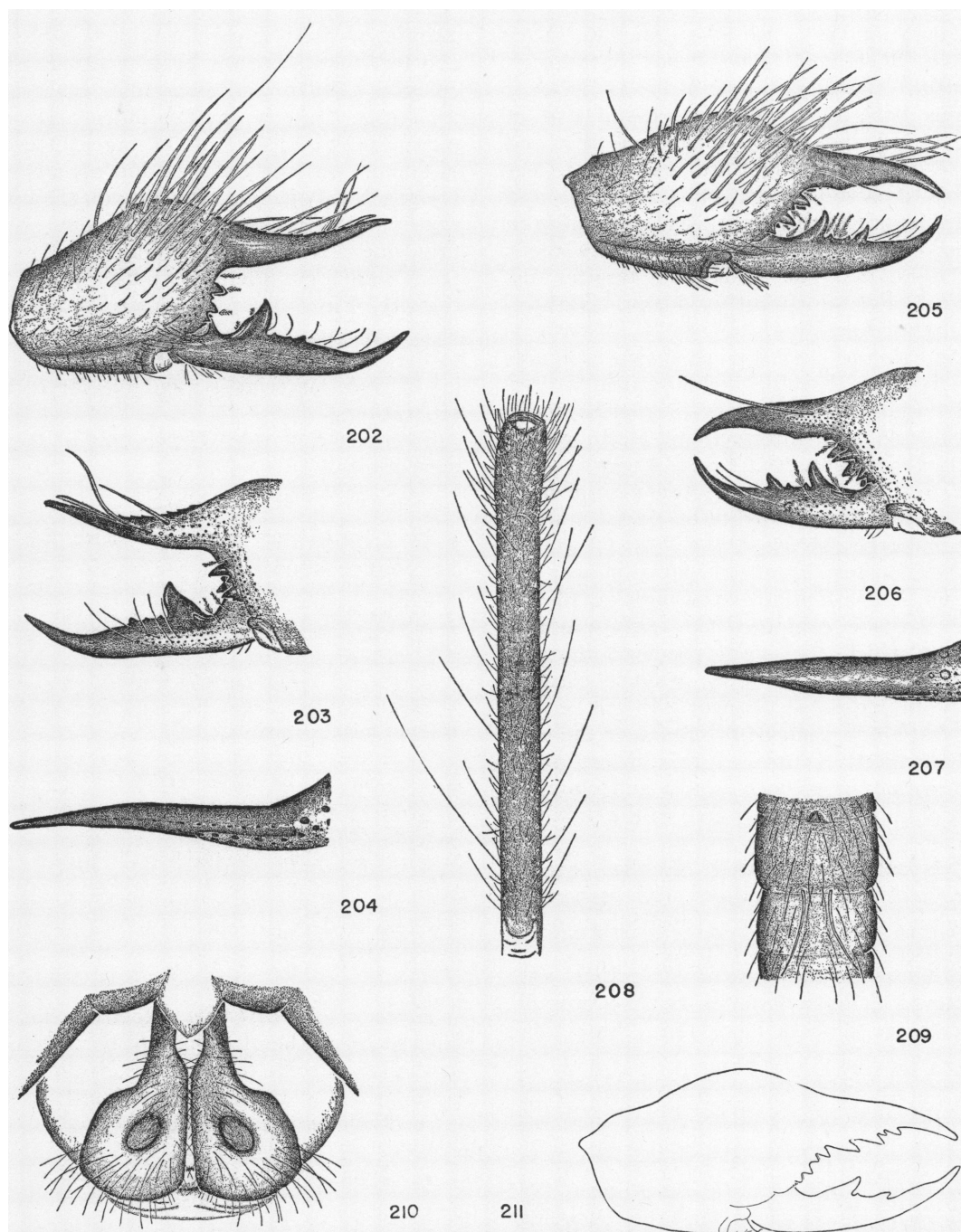
Figures 202–204

MALE HOLOTYPE: Total length, 22.0 mm.

	LENGTH	WIDTH
Chelicerae	5.3 mm.	2.2 mm.
Propeltidium	2.7	3.6
Palpus	23.2	—
1st legs	Both mangled	—
4th legs	28.0	—

² Latin, *marginatus*, to enclose with a border; possibly refers to color pattern of malleoli.

³ Latin, *serratus*, serrate; refers to dorsal edge of fixed finger.



FIGS. 202-211. 202. *Hemerotrecha serrata*, new species, ectal view of right male chelicera. 203. *Hemerotrecha serrata*, new species, mesal view of right male chelicera. 204. *Hemerotrecha serrata*, new species, dorsal view of fixed finger of right male chelicera. 205. *Hemerotrecha texana*, new species, ectal view of right male chelicera. 206. *Hemerotrecha texana*, new species, mesal view of right male chelicera. 207. *Hemerotrecha texana*, new species, dorsal view of fixed finger of right male chelicera. 208. *Hemerotrecha texana*, new species, mesoventral view of apical segments of left male palpus. 209. *Hemerotrecha texana*, new species, male abdominal ctenidia. 210. *Hemerotrecha bidepressa*, new species, ventral view of female genital opercula. 211. *Hemerotrecha denticulata*, new species, ectal view of right male chelicera.

Coloration in alcohol yellow to rusty yellow. Specimen dismembered but dusky, purplish markings apparently as follows: palpus dark on tarsus and distal end of metatarsus and faintly dusky on tibia and distal end of femur; third and fourth legs faintly dusky on distal ends of femur and entire length of tibia; propeltidium dusky on anterior margin and anterior half of its length on lateral margins. Abdominal tergites discolored but apparently dusky. Malleoli white to light yellow.

Dentition of chelicerae as shown in figures 202 to 204. Movable finger curved at tip, with principal tooth large, anterior tooth small, two tiny intermediate teeth, and a distinct mesal tooth. Fixed finger weakly sinuate, indistinctly serrate on ventral margin, and distinctly serrate on dorsal margin. Fondal notch obscure.

Fixed finger flattened ventrally near tip but without a distinct mesal groove. Flagellum complex composed of finely plumose bristles which are strongly curved dorsally near the tip of the finger, a single clavate, finely plumose bristle near the tip, and a few distinctly plumose bristles near the base and along the ventral margin. Mesal setae of movable finger both simple and plumose, with plumose setae restricted to the proximal half.

Eye tubercle situated on the anterior margin of the propeltidium. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.2.

Metatarsus and tarsus of palpus with scattered cylinder bristles but no scopula. Metatarsus slightly more than three times the length of the tarsus.

First post-spiracular abdominal sternite not provided with ctenidia on its posterior margin.

TYPE LOCALITY: Male holotype, Twenty-nine Palms, California, July to August, 1945 (Jefferson H. Branch), in the American Museum of Natural History.

REMARKS: This species is rather readily distinguished from the other members of the genus by the serrated upper margin of the fixed finger. The chelicerae are only 2.5 times as long as wide.

Texana GROUP

Moderate-sized species. Males with ventral

margin of fixed finger undulate or bearing aborted teeth. Striate bristles of flagellum complex tubular and sometimes with striae indistinct. Plumose bristles indistinctly plumose except at apical end of finger. Opercula of females variously shaped but always with spermathecal opening occurring on the posterior margin. Eyes separated by one or less than one diameter. The gradation of fondal teeth varies considerably in this group. As the size of fondal teeth seems to be constant within genera, this group will probably prove to be heterogeneous. At the present time insufficient material is available for further separation.

TYPICAL SPECIES: *Hemerotrecha texana*, new species.

KEY TO MALES

1. First post-spiracular abdominal sternite with six to eight ctenidia 2
First post-spiracular abdominal sternite with two to four ctenidia 3
2. Six abdominal ctenidia, metatarsus of palpus with scopula
 Hemerotrecha simplex, new species
Eight abdominal ctenidia, metatarsus of palpus without scopula
 Hemerotrecha werneri, new species
3. Two curved abdominal ctenidia.
 Hemerotrecha texana, new species
Four abdominal ctenidia. 4
4. Ctenidia long, metatarsus of palpus with scopula
 Hemerotrecha denticulata, new species
Ctenidia short, metatarsus of palpus without scopula
 Hemerotrecha fruitana, new species

Hemerotrecha insignita (Roewer) has not been seen and therefore has not been included in the key. From Roewer's description it can be identified by the presence of four flattened, curved, abdominal ctenidia.

Hemerotrecha texana,¹ new species

Figures 205-209

MALE HOLOTYPE: Total length, 20.0 mm.

	LENGTH	WIDTH
Chelicerae	4.5 mm.	1.9 mm.
Propeltidium	2.1	3.2
Palpus	20.0	—
1st legs	13.5	—
4th legs	26.0	—

¹ Of or pertaining to Texas.

Coloration in alcohol light to rusty yellow, with dusky purplish markings as follows: eye tubercle dark; propeltidium with two irregular, dusky, submarginal, lateral stripes, which arise on the anterior margin on each side of the eye tubercle and extend posteriorly for four-fifths of the length of the propeltidium; palpi dusky on tarsi, metatarsi, tibiae, and proximal ends of femora; first, second, and third legs dusky on distal ends of femora and proximal ends of tibiae; fourth legs dusky on distal ends of femora, all of tibiae, and proximal ends of metatarsi. Dusky markings deep purple. Malleoli white. Specimen appears to be newly molted.

Dentition as in figures 205 to 207. Movable finger with principal tooth large, anterior tooth small, two evenly spaced and equal-sized intermediate teeth, and a distinct mesal tooth. Fixed finger needle-like but hooked downward at tip, with four small, aborted teeth near the base. Fondal teeth occurring in two rows of four each which are graded I, III, II, IV in the mesal row and I, III, IV, II in the ectal row. Fondal notch obscure.

Flagellum complex typical of group. Striate bristles strong and angled upward over dorsal margin of fixed finger. Plumose setae curved downward and finely plumose except for the five distal setae which are distinctly plumose. Mesal setae of movable finger plumose on proximal half of articulation area and simple apically.

Eye tubercle situated on the anterior margin of propeltidium. Eyes separated by about one diameter.

Tarsus, metatarsus, and tibia of palpus provided with fine cylinder bristles below and moderately strong ones above, but there is no scopula on the mesoventral surface of the metatarsus. Metatarsus of palpus about 4.0 times as long as tarsus.

First post-spiracular abdominal sternite provided with two strong, tapering, outwardly curving ctenidia.

TYPE LOCALITY: Male holotype from 10 miles north of Hot Springs, Texas, on the Marathon Road, July 21, 1938 (Stanley Mulaik), in the American Museum of Natural History.

***Hemerotrecha bidepressa*,¹ new species**

Figure 210

FEMALES: Total length, 14.0 to 16.0 mm.

	LENGTH	WIDTH
Chelicerae	3.4- 3.6 mm.	1.1-1.2 mm.
Propeltidium	1.6- 1.7	2.2-2.3
Palpi	10.5-11.0	—
1st legs	7.5- 8.0	—
4th legs	14.0-15.0	—

Holotype, smaller measurements.

Coloration similar to that of *Hemerotrecha denticulata*, new species, except the prosomal and abdominal tergites are unmarked and the leg markings do not extend to the trochanters.

Dentition and structure nearly identical with those of *denticulata*. Specific differences occur in the opercula (fig. 210).

TYPE LOCALITY: Female holotype and paratype from Reno, Nevada, June 1, 1941, (Ira La Rivers), in the American Museum of Natural History.

***Hemerotrecha denticulata*,² new species**

Figures 211-216

MALES: Total length, 11.0 to 18.0 mm.

	LENGTH	WIDTH
Chelicerae	2.9- 4.2 mm.	1.3-1.9 mm.
Propeltidium	1.6- 2.2	2.3-3.2
Palpi	13.0-17.0	—
1st legs	10.0-14.0	—
4th legs	17.0-23.0	—

Male holotype, larger measurements.

Coloration in alcohol light to rusty yellow, with dusky purplish markings similar to those of *Hemerotrecha texana*, new species, except that the chelicerae have one dorsal and two lateral dusky stripes, the dusky markings on the legs extend proximally onto the trochanters, and the prosomal and abdominal tergites are dusky, interrupted longitudinally with light to form four dark stripes on each tergite. Malleoli white. Newly molted and old alcoholic specimens have the markings indistinct.

Dentition somewhat variable but following general pattern as shown in figure 211. Movable finger with principal tooth large, anterior tooth small, one intermediate tooth, and no mesal tooth. Fixed finger needle-like, curved downward at tip, and bearing several modified teeth, which are easily distinguished

¹ Latin, *bi* (combining form), two, plus *depressus*, depressed; refers to form of genital plates.

² Latin, *denticulatus*, furnished with small teeth; refers to fixed finger of male.

as rudiments of the primary and intermediate teeth of the female. Fondal teeth occurring in two rows of four each which are graded in size I, III, II, IV. Fondal notch obscure.

Flagellum complex typical of group. Striate bristles fine, weakly striate, and arched over the dorsal margin of the fixed finger. Plumose setae weakly plumose near their tips and more distinctly so near the distal end of the finger. Mesal setae of movable finger plumose on the basal half of the articulation area and simple distally.

Eye tubercle situated on the anterior margin of the propeltidium. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.5.

Tarsus, metatarsus, and tibia of palpus provided with fine cylinder bristles above and moderately heavy ones below; metatarsus also provided with a scopula of about 120 small conical papillae. Metatarsus of palpus about 3.2 times as long as tarsus.

First post-spiracular abdominal sternite provided with four long, thin, needle-like ctenidia which extend over the posterior margin of the succeeding sternite.

FEMALES: Total length, 17.0 to 23.0 mm.

	LENGTH	WIDTH
Chelicerae	4.7- 4.8 mm.	1.9-2.0 mm.
Propeltidium	2.1- 2.3	3.2-3.6
Palpi	13.0-14.5	—
1st legs	10.0-11.5	—
4th legs	19.0-21.0	—

Female allotype, larger measurements.

Coloration in alcohol same as in male except markings are paler.

Dentition variable but following general pattern shown in figures 214 and 215. Movable finger with principal tooth large, anterior tooth nearly as large as principal tooth, one intermediate tooth, five or more denticles in front of anterior tooth, and no mesal tooth. Fixed finger with the principal, medial, and anterior teeth large and nearly equal sized, two intermediate teeth between principal and medial and medial and anterior teeth, and two or more denticles in front of anterior tooth. Fondal teeth as in male. Supernumerary teeth and loss of teeth are common.

Structure similar to male. There is no

scopula on the metatarsus of the palpus and no ctenidium, or only four trace ctenidia, on the first post-spiracular abdominal sternite which are scarcely distinguishable from the setae clothing the abdomen.

Figure 216 shows the opercula of the genital segment of the abdomen.

TYPE LOCALITY: Male holotype, female allotype, and male and female paratypes from Reno, Nevada, October 12, 1941 (La Rivers), in the American Museum of Natural History. Male and female paratypes also in the Museum of Comparative Zoölogy and the United States National Museum.

RECORDS: Idaho: Wesleyan, October, 1929, one male (Hazel G. Robinson). Nevada: Pyramid Lake, dunes, September 7, 1941, one female (La Rivers); Reno, September 21, 1941, two males and two females (La Rivers), March 2, 1941, one female (La Rivers), October 12, 1941, six males and one female (La Rivers), March 9, 1941, one female (La Rivers). Utah: Salt Lake City, April 21, 1926, one female; shore of Great Salt Lake, northwest of Farmington, October 17, 1931, one female (W. Ivie); Price, 1937, two males (Ross Hardy); University of Utah campus, September 25, 1929, one male (A. M. Woodbury); Red Butte Hill, April 7, 1931, one female; Skull Valley, April 19, 1939, one female (D. L. Bischoff). Washington: White Bluffs, one male (H. E. Frizzell), April 26, 1933, one female and one male; Deep Creek, August 25, 1932, one female (Hatch); Steamboat Rock, Grand Coulee, April 30, 1939, three females (M. H. Hatch).

Hemerotrecha fruitana,¹ new species

Figures 217, 218

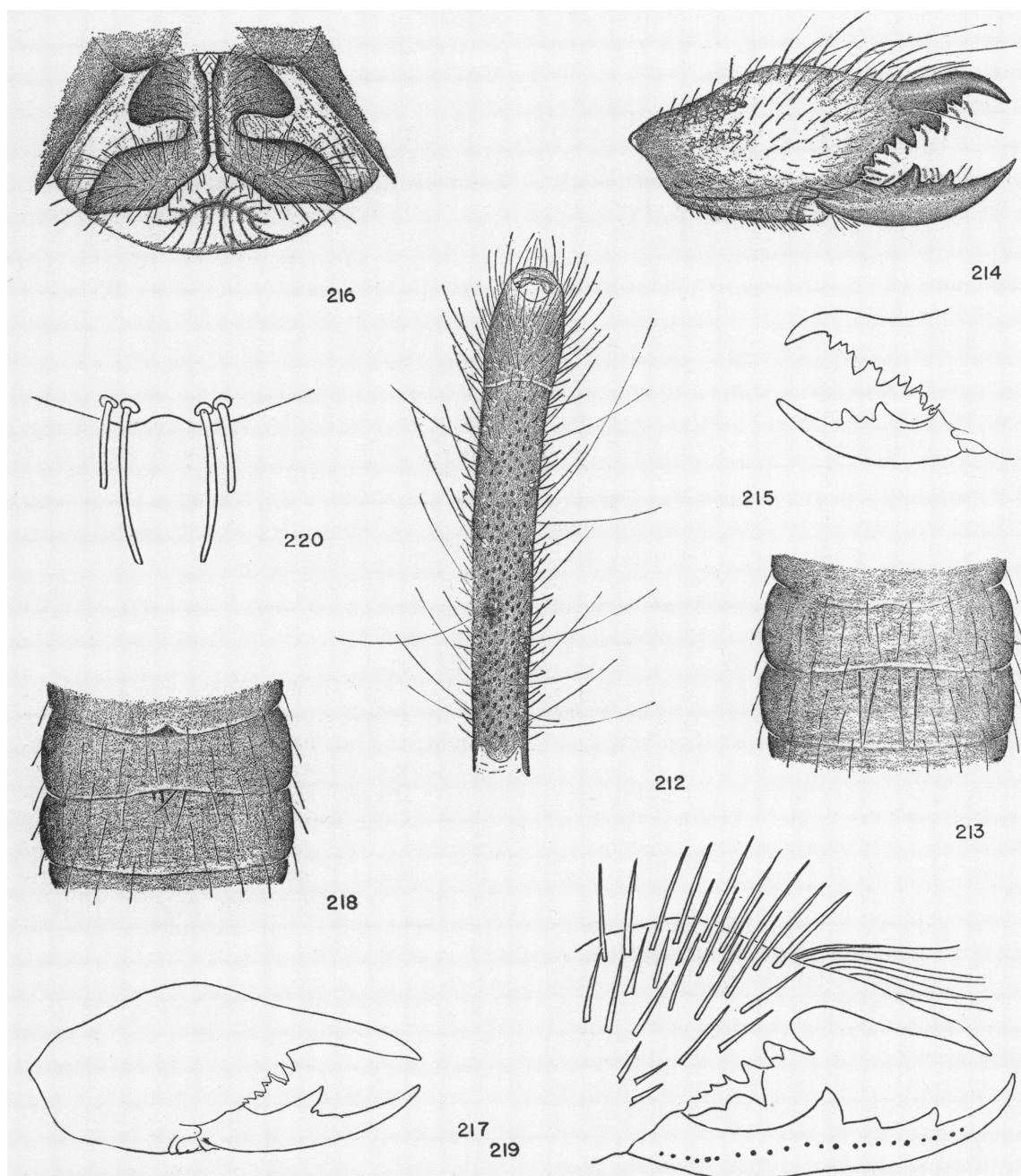
MALES: Total length, 12.0 to 15.0 mm.

	LENGTH	WIDTH
Chelicerae	2.7- 3.2 mm.	1.1-1.4 mm.
Propeltidium	1.6- 1.9	1.9-2.3
Palpi	12.0-13.0	—
1st legs	9.0-10.0	—
4th legs	16.0-17.0	—

Holotype, smaller measurements.

Color in alcohol same as for *Hemerotrecha texana*, new species, except there are faint dusky areas on the lateral margins of the

¹ Of or pertaining to Fruita, Utah.



FIGS. 212–220. 212. *Hemerotrecha denticulata*, new species, mesoventral view of apical segments of left male palpus. 213. *Hemerotrecha denticulata*, new species, male abdominal ctenidia. 214. *Hemerotrecha denticulata*, new species, ectal view of right female chelicera. 215. *Hemerotrecha denticulata*, new species, mesal view of right female chelicera. 216. *Hemerotrecha denticulata*, new species, ventral view of female genital opercula. 217. *Hemerotrecha fruitana*, new species, ectal view of right male chelicera. 218. *Hemerotrecha fruitana*, new species, male abdominal ctenidia. 219. *Hemerotrecha insignita* (Roewer), ectal view of right male chelicera (redrawn from Roewer, 1934). 220. *Hemerotrecha insignita* (Roewer), male abdominal ctenidia (redrawn from Roewer, 1934).

prosomal and abdominal tergites and dusky markings on the legs extend over a greater area of the darkened segments.

Dentition variable but following general pattern shown in figure 217. Movable finger with principal tooth large, anterior tooth an indistinct ridge, two intermediate teeth, of which the distal is often minute or missing, and no mesal tooth. Fixed finger needle-like, hooked downward at tip, and with two large and two or more minute aborted teeth at the base. Fondal teeth occurring in two rows of four each which are graded in size I, III, II, IV. Fourth fondal teeth scarcely distinguishable from dentate socket margin of movable finger. Fondal notch obscure but bearing two of the aborted teeth of the fixed finger.

Flagellum complex typical of group. Striate bristles fine, weakly striate, and extending nearly parallel with finger. Plumose setae weakly plumose except for the three most apical which are distinctly so. Mesal setae of movable finger plumose on basal half of articulation area, simple apically.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.2.

Tarsus, metatarsus, and tibia of palpus provided with fine cylinder bristles which are smaller on the dorsal surface; metatarsus without scopula. Metatarsus of palpus three times as long as tarsus.

First post-spiracular abdominal sternite provided with four short, stout, needle-like ctenidia of which the outer pair is longest.

TYPE LOCALITY: Male holotype from Fruita, Utah, July 17, 1931 (W. J. Gertsch), in the American Museum of Natural History. Paratypes in the United States National Museum and the Museum of Comparative Zoölogy.

RECORDS: California: San Francisco, one male. Wyoming: near Laramie, June 15, 1941, two males (Jellison and Svehld).

***Hemerotrecha insignita*¹ (Roewer)**

Figures 219–222

Eremochelis insignitus ROEWER, 1932, in Bronn,

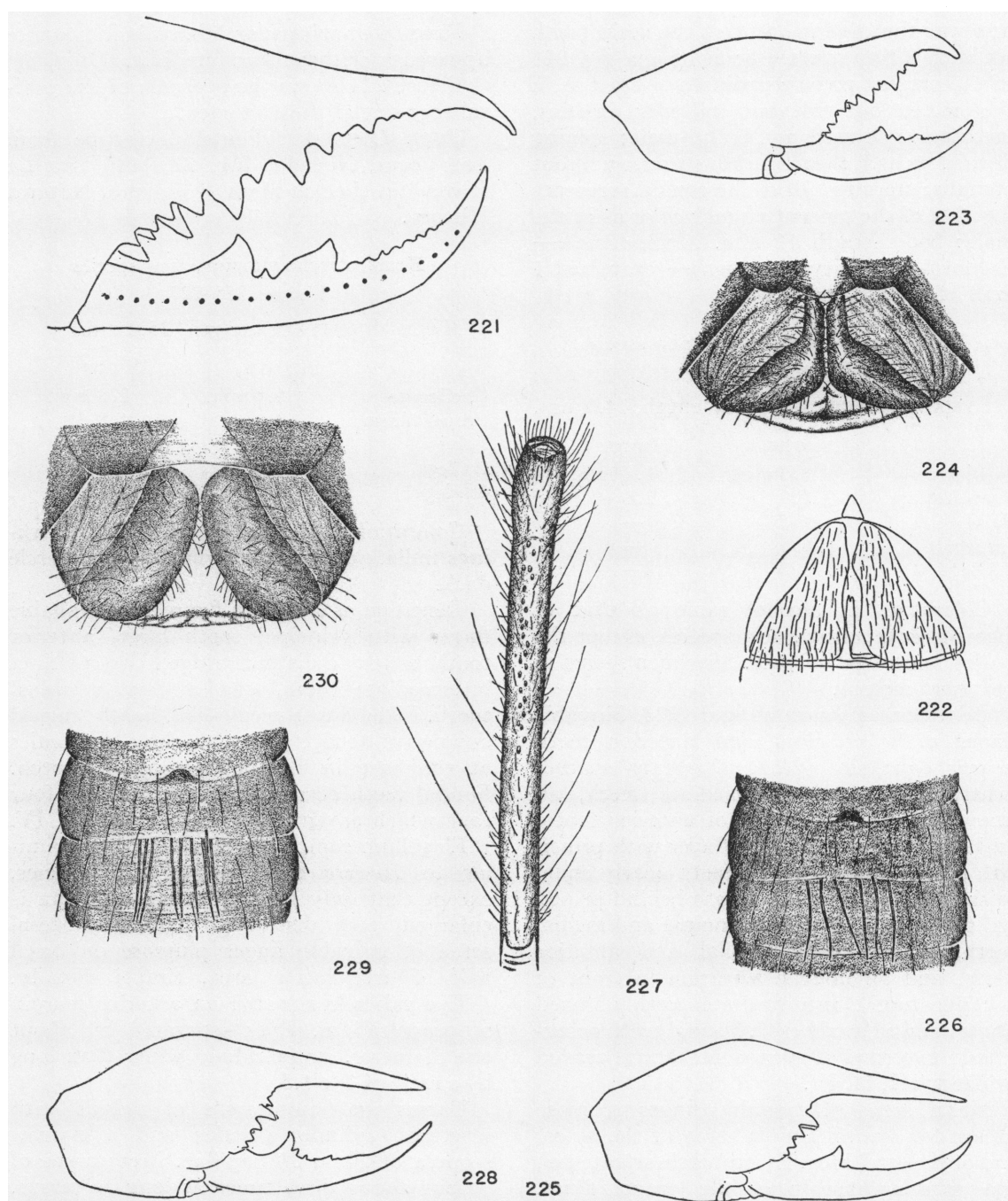
¹ Latin, *in*, without, plus *signum*, a mark, plus *itus* suffix meaning bearing; apparently refers to lack of markings on body.

Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 570, figs. 322k, 324r, 325c, 327d (male and female).

This species has not been studied but has been placed in this genus and group on the basis of Roewer's figures and description. It appears to be closely related to *Hemerotrecha fruitana*, new species, from which it can be separated by the fact that it has three modified teeth in the fondal notch (Roewer apparently mistook these for fondal teeth of the ectal row), abdominal ctenidia of a different form, and lacks dusky markings except on the tarsus and metatarsus of the palpus. It is possible that Roewer's male was a newly molted adult, as his illustration of the opercula of the female appears to be from a subadult, and additional markings may occur. The types, Nos. 8014/76, are in the Frankfurt Museum.

For the convenience of other workers, a translation of Roewer's description and copies of the original illustrations are included here.

"Male: Flagellum complex composed of a tuft of simple bristles; immovable finger straight, without basal hump, its edge somewhat curved (or wavy), with 6 lateral (the 1st the largest) and 3 medial (the 2d the largest) cheek teeth; movable finger with 1 front tooth, 1 intermediate tooth, 1 main tooth, without 1 medial cheek tooth (dentition [fig. 219 of the present paper]; pedipalp hairy only, tibia and metatarsus dorsally and ventrally with cylinder bristles, metatarsus without a scopula ventrally, strikingly thicker at the apex than at the base; 2d tibia dorso-apically with 1 spine and the 3d tibia with 2 spines here; 2d and 3d metatarsi dorsally with 6 spines in the main row and 2 spines in the lesser row, tarsal claws strikingly long and thin; 5th sternite with 2:2 ctenidia (form of which [fig. 220 of the present paper]); color entirely pale yellow, only the metatarsus and tarsus of the pedipalp dark brown, malleoli white; body length 10 mm.—Female: Immobile finger with 4 front teeth, in front of them on the edge a row of tiny saw teeth, behind them 1 intermediate, 1 main, 4 lateral and 3 medial cheek teeth; movable finger with 1 front, 1 intermediate, and 1 main tooth, without a medial cheek tooth,



FIGS. 221–230. 221. *Hemerotrecha insignita* (Roewer), ectal view of right female chelicera (redrawn from Roewer, 1934). 222. *Hemerotrecha insignita* (Roewer), ventral view of female genital opercula (redrawn from Roewer, 1934). 223. *Hemerotrecha nevadensis*, new species, ectal view of right female chelicera. 224. *Hemerotrecha nevadensis*, new species, ventral view of female genital opercula. 225. *Hemerotrecha simplex*, new species, ectal view of right male chelicera. 226. *Hemerotrecha simplex*, new species, male abdominal ctenidia. 227. *Hemerotrecha simplex*, new species, mesoventral view of apical segments of left male palpus. 228. *Hemerotrecha weneri*, new species, ectal view of right male chelicera. 229. *Hemerotrecha weneri*, new species, male abdominal ctenidia. 230. *Hemerotrecha steckleri*, new species, ventral view of female genital opercula.

however the edge in front of the main tooth set with 8 tiny saw teeth; dentition [fig. 221 of the present paper]; pedipalp bristled as in the male, but without cylinder bristles, metatarsus formed as in the male; spining of the legs as in the male; 5th sternite without ctenidia; sternite half of the genital segments [fig. 222 of the present paper]; color as in the male; body length 11 mm. Male, female—California (locality unknown)—(examined 1 male, 1 female, type)."

***Hemerotrecha nevadensis*,¹ new species**

Figures 223, 224

FEMALE HOLOTYPE: Total length, 14.0 mm.

	LENGTH	WIDTH
Chelicerae	3.3 mm.	1.4 mm.
Propeltidium	1.9	2.6
Palpi	9.5	—
1st legs	6.5	—
4th legs	13.0	—

Coloration in alcohol same as that of *Hemerotrecha texana*, new species, except the dusky markings are pale. Specimen seems to be newly molted.

Dentition as shown in figure 223. Movable finger with principal and anterior teeth nearly equal in size, two evenly spaced, nearly equal-sized intermediate teeth, an uneven serration in front of anterior tooth, and no mesal tooth. Fixed finger with principal, medial, and anterior teeth nearly equal in size, one intermediate tooth behind principal tooth, two between principal and medial teeth, two between medial and anterior teeth, and an uneven serration in front of anterior tooth. Intermediate teeth of fixed finger somewhat aborted. Fondal teeth occurring in two rows of four each that are graded in size I, III, II, IV.

Mesal setae of movable finger plumose except for several simple setae at the apical end of the setal area. Eye tubercle situated on the anterior margin of the propeltidium. Eyes separated by slightly more than one diameter. Propeltidium wider than long by a ratio of 1 to 1.4.

Tarsus, metatarsus, and tibia of palpus provided with cylinder bristles, but there is no scopula on the metatarsus.

¹ Of or pertaining to Nevada.

First post-spiracular abdominal sternite apparently without trace ctenidia.

Figure 224 shows the opercula of the genital segment of the abdomen.

TYPE LOCALITY: Female holotype from Las Vegas, Nevada, July 21, 1940 (Ira La Rivers), in the American Museum of Natural History.

***Hemerotrecha simplex*,² new species**

Figures 225–227

MALE HOLOTYPE: Length, 25.0 mm.

	LENGTH	WIDTH
Chelicerae	6.6 mm.	2.8 mm.
Propeltidium	3.1	4.8
Palpi	25.0	—
1st legs	19.0	—
4th legs	33.0	—

Coloration in alcohol rusty yellow, markings indistinct. Malleoli white. Eye tubercle dark.

Dentition as shown in figure 225. Movable finger with principal tooth large, anterior tooth a low indistinct ridge, two distinct intermediate teeth, and a distinct mesal tooth. Fixed finger needle-like, lightly curved downward at tip, and with three denticles at the base in the obscure fondal notch. Fondal teeth occurring in two rows of four each which are graded in size I, II, III, IV.

Flagellum complex typical of group. Similar to *Hemerotrecha texana*, new species, except that only the apical plumose seta is enlarged and distinctly plumose. Mesal setae of movable finger plumose on basal half of articulation area, simple distally.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.3.

Tarsus and metatarsus of palpus with scattered cylinder bristles and a narrow scopula of 20 to 30 papillae. Metatarsus of palpus about three times as long as tarsus.

First post-spiracular abdominal sternite provided with six long, flattened ctenidia which extend to the posterior margin of the succeeding sternite.

TYPE LOCALITY: Male holotype from Dry Lake Station, San Diego, California,

² Latin, *simplex*, simple; refers to fixed finger of male.

1. Striate bristles of flagellum complex broadened at base *Hemoretrema macra*, new species
Striate bristles of flagellum complex broadened near tip 2
2. Metatarsus of palpus with scopula *Hemoretrema branchi*, new species
Metatarsus of palpus without scopula 3
3. Fixed finger gradually broadened from tip to base. . . *Hemoretrema minima*, new species
Fixed finger abruptly broadened near tip *Hemoretrema xena*, new species

***Hemerotrecha branchi*¹**, new species

Figures 231-235

MALE HOLOTYPE: Total length, 11.0 mm.

	LENGTH	WIDTH
Chelicerae	2.6 mm.	1.1 mm.
Propeltidium	1.6	2.1
Palpi	10.5	—
1st legs	7.5	—
4th legs	13.5	—

Coloration in alcohol light yellow, with dusky purple markings as follows: eye tubercle dark; anterior margin of propeltidium with a wide dusky band that curves posteriorly in submarginal lateral stripes that unite on the median line, enclosing a light, central, ovate area; mesopeltidium, metapeltidium, and abdominal tergites lightly dusky on their lateral margins; legs and palpi dusky above on the tarsi, metatarsi, tibiae, and apical ends of the femora, on the metatarsi and tarsi of the palpi the dusky markings nearly encircle the segments. Malleoli white. Specimen apparently newly molted.

Dentition as in figure 231. Movable finger with principal and anterior teeth large and about equal in size, two nearly equal-sized intermediate teeth and no mesal tooth. Fixed finger typical of group, flattened, with three modified teeth and abruptly narrowed just behind apex on the ventral margin. Fondal teeth occurring in two rows of four each which are graded in size I, III, II, IV. Fondal notch obscure.

Flagellum complex typical of group, with dorsal striate bristles strongly broadened distally and moderately arched except for apical bristle which is weakly clavate, lightly curved, and hooked downward at the tip. Plumose bristles strong and curved ventrally except for apical bristle which is like the apical striate bristle. Mesal setae of movable finger plumose on basal half of finger and simple distally.

Eye tubercle situated on the anterior margin of the propeltidium. Eyes separated by slightly more than one diameter. Propeltidium wider than long by a ratio of 1 to 1.3.

Tarsus, metatarsus, and tibia of palpus provided with fine cylinder bristles below and

moderately heavy ones above; metatarsus also provided with a scopula of about 30 conical papillae on the mesoventral surface. Metatarsus of palpus about 2.5 times as long as tarsus.

First post-spiracular abdominal sternite provided with two strong tubular ctenidia which extend beyond the posterior edge of the succeeding sternite.

TYPE LOCALITY: Male holotype and several juveniles from Twentynine Palms, California, July 1 to 15, 1945 (Jefferson H. Branch), in the American Museum of Natural History. Male paratype and several young females from Pinaleno Mountains, Arizona, July 15, 1917, in the museum at Cornell University. Male paratype from Coachella, California, May 13, 1917 (E. P. Van Duzee), in the California Academy of Sciences.

RECORDS: New Mexico: 5 miles north of Tohatchi, McKinley County, August 14, 1948, one male (F. Werner and W. Nutting).

***Hemerotrecha xena*²**, new species

Figures 236, 237

MALE HOLOTYPE: Total length, 13.0 mm.

	LENGTH	WIDTH
Chelicerae	3.2 mm.	1.5 mm.
Propeltidium	1.7	2.6
Palpus	11.0	—
1st legs	8.0	—
4th legs	16.0	—

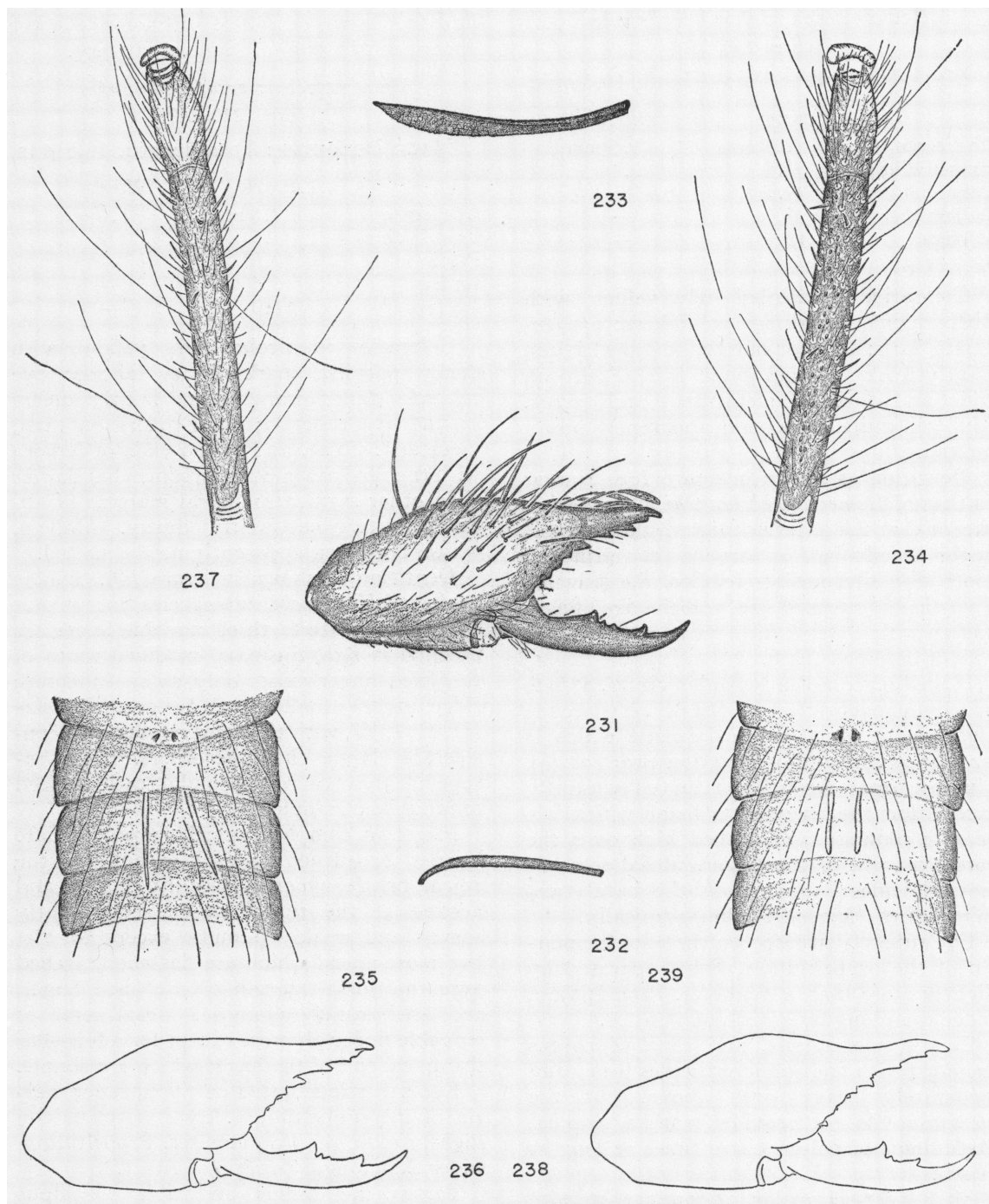
Coloration and structure almost identical with those of *Hemerotrecha branchi*, new species, except that the specimen described here has no scopula on the metatarsus of the palpus, and the propeltidium is wider than long by a ratio of 1 to 1.5.

TYPE LOCALITY: Male holotype from Coyote Wells, Colorado Desert, California, August 11, 1914 (Bradley), in the museum at Cornell University.

RECORDS: California: Yermo, San Bernardino County, June 17, 1949, one male (N. R. W. Leigh).

REMARKS: When this curious group of solpugids is better known this species may prove to be only a variety or subspecies of *Hemerotrecha branchi*, new species.

¹ Named for the collector, Jefferson H. Branch.² Greek, *xenos*, strange or unusual.



FIGS. 231-239. 231. *Hemerotrecha branchi*, new species, ectal view of right male chelicera. 232. *Hemerotrecha branchi*, new species, apical bristle of male flagellum complex. 233. *Hemerotrecha branchi*, new species, subapical bristle of male flagellum complex. 234. *Hemerotrecha branchi*, new species, mesoventral view of apical segments of left male palpus. 235. *Hemerotrecha branchi*, new species, male abdominal ctenidia. 236. *Hemerotrecha xena*, new species, ectal view of right male chelicera. 237. *Hemerotrecha xena*, new species, mesoventral view of apical segments of left male palpus. 238. *Hemerotrecha minima*, new species, ectal view of right male chelicera. 239. *Hemerotrecha minima*, new species, male abdominal ctenidia.

***Hemerotrecha minima*¹** new species

Figures 238, 239

MALE HOLOTYPE: Total length, 10.0 mm.

	LENGTH	WIDTH
Chelicerae	2.5 mm.	1.1 mm.
Propeltidium	1.9	2.1
Palpi	9.5	—
1st legs	5.5	—
4th legs	12.0	—

Coloration in alcohol light yellow, with dusky purple markings as follows: eye tubercle dark; anterior margin of propeltidium faintly dusky around eyes; palpi dusky on tibia and dark on metatarsus and tarsus. Malleoli white. Specimen apparently newly molted.

Dentition as shown in figure 238. Similar to that of *Hemerotrecha branchi*, new species, except that the anterior tooth of the movable finger is only half as large as the principal tooth, the intermediate teeth of the movable finger are of unequal size, and the fixed finger has two tiny denticles between the basal pair of modified teeth.

Flagellum complex typical of group. Striate bristles strongly clavate distally and arched high except for the apical bristle which is weakly clavate and hooked downward at tip. Plumose setae strong and curved ventrally except for the five most distal which are heavily plumose and arched high over the dorsal margin of the finger. Mesal setae of movable finger plumose on the basal two-thirds of the finger but simple apically.

Eye tubercle situated on the anterior margin of the propeltidium. Eyes separated by slightly more than a diameter. Propeltidium wider than long by a ratio of 1 to 1.1.

Tarsus, metatarsus, and tibia of palpus provided with fine cylinder bristles below and moderately heavy ones above, but the metatarsus is not provided with a scopula. Metatarsus of palpus three times as long as tarsus.

First post-spiracular abdominal sternite provided with two heavy, somewhat flattened ctenidia which extend nearly to the posterior margin of the succeeding sternite.

TYPE LOCALITY: Male holotype from

Laredo, Texas, fall, 1941 (Ekthomb), in the American Museum of Natural History.

***Hemerotrecha macra*²** new species

Figures 240–242

MALE HOLOTYPE: Total length, 10.5 mm.

	LENGTH	WIDTH
Chelicerae	2.8 mm.	1.0 mm.
Propeltidium	1.5	1.9
Palpi	9.0	—
1st legs	6.5	—
4th legs	11.0	—

Coloration in alcohol light yellow, with dusky purplish markings as follows: eye tubercle dark; propeltidium faintly dusky around eye tubercle; palpi dusky on tarsi, metatarsi, tibiae, and apical ends of femora with the tarsi and metatarsi somewhat darker than other segments; lateral margins of abdominal tergites faintly dusky. Malleoli white. Specimen apparently newly molted.

Dentition as shown in figure 240. Similar to that of *H. branchi*, new species, except that the intermediate teeth of movable finger are unequal in size, the basal modified tooth of the fixed finger exists only as an indefinite ridge, and the fondal teeth are graded in size III, II, I, IV, with the third mesal tooth considerably larger than the others. The paratype has the ectal row of fondal teeth reduced to indistinct granules.

Flagellum complex typical of group. Striate bristles broadened basally except for the apical bristle which is weakly clavate and hooked at the tip. Plumose setae lightly curved and weakly plumose except for the five most apical which are flattened, arched over the dorsal margin of the fixed finger, and are strongly plumose. Mesal setae of movable finger plumose except for a few near the apical end of the finger which are simple.

Eye tubercle situated on the anterior margin of the propeltidium. Eyes separated by slightly more than a diameter. Propeltidium wider than long by a ratio of 1 to 1.2.

Tarsus, metatarsus, and tibia of palpus provided with fine cylinder bristles below and moderately heavy ones above; metatarsus also provided with a scopula of about 20 conical papillae on the mesoventral sur-

¹ Latin, *minimus*, smallest.

² Latin, *macer*, thin; refers to bristles in flagellum complex.

face. Metatarsus of palpus about 2.5 times as long as tarsus.

First post-spiracular abdominal sternite provided with two robust, flattened ctenidia which extend beyond the margin of the succeeding sternite as in *Hemerotrecha branchi*, new species.

TYPE LOCALITY: Male holotype from Lugert, Oklahoma, June 11, 1937 (Standish-Kaiser), in the collection of the University of Utah.

REMARKS: The fondal teeth of this species are not graded in size as are the other species within this group of the genus. The species may prove to belong in another group or in a separate genus.

UNPLACED EREMOBATIDAE

For the sake of completeness all the species not identified are placed here. In all instances the types for one reason or another have been unavailable for study. Some of the species are readily identified as described from subadult specimens by existing descriptions and figures of the types. Other forms are obviously described from adult specimens, but the descriptions and figures are inadequate for placement by the systematic procedure used in this study.

The transcribed descriptions given under each species are not all originals; in two instances more recent description of the types are given and cited.

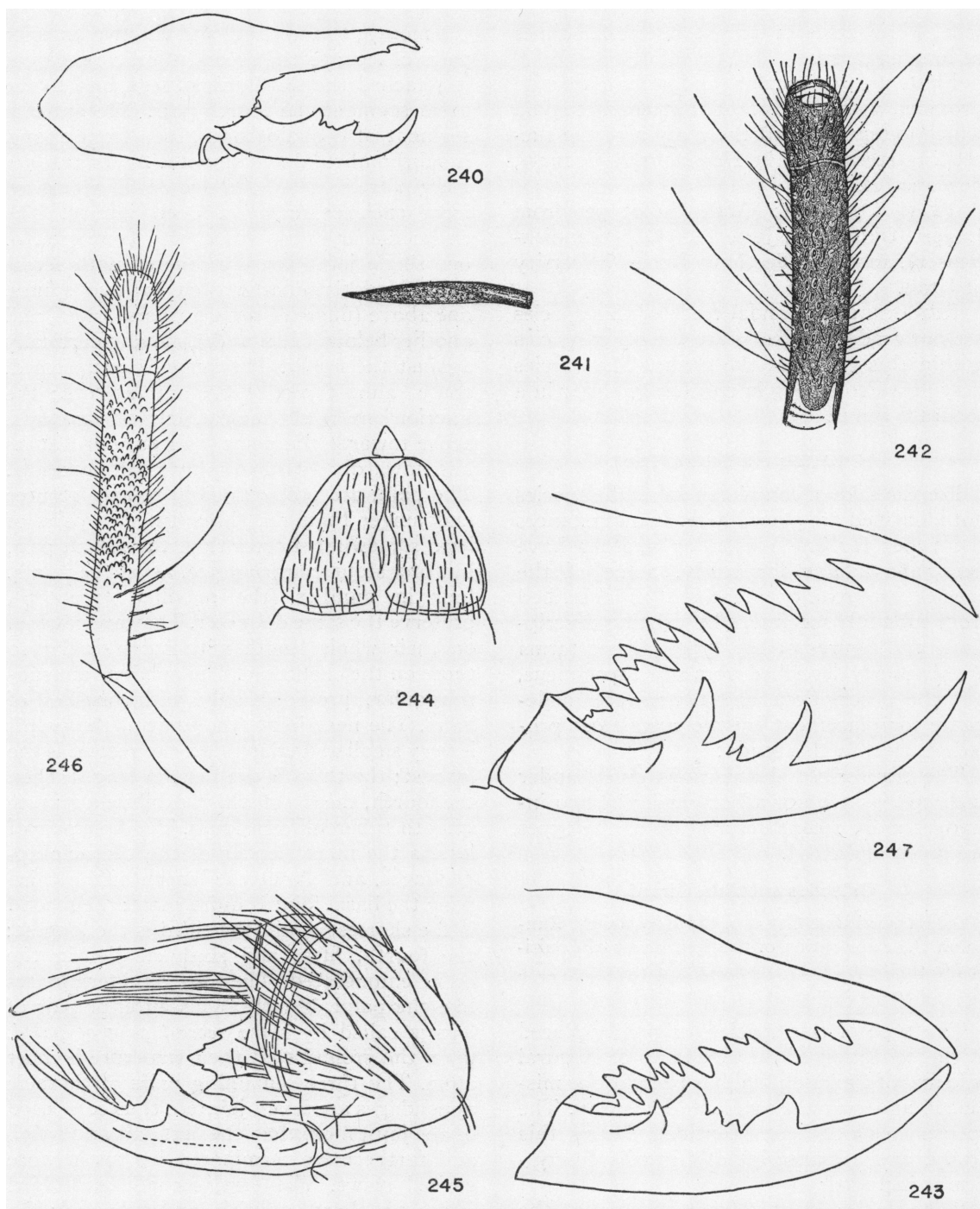
Galeodes subulata Girard

Galeodes subulata GIRARD, 1853, in Marcy, Randolph B., Exploration of the Red River of Louisiana in the year 1852, Appendix F, Zoology, p. 270. (Not *subulata* Say.)

The type of this species, originally placed in the collection of the Academy of Natural Sciences of Philadelphia, has been lost or misplaced and was not available for study. The species has not been identified during this study, and a transcript of Girard's description is included:

"The entire length, from the tip of the chelicerae to the end of the abdomen, is one inch and a quarter, the abdomen itself forming about one-half of that length. The cephalothorax is composed of three distinct segments; the anterior one much the largest, giving points of attachment to the parts of

the mouth, to the palpi, and the two anterior pairs of legs; to the second thoracic segment is attached the third pair of legs, and to the third segment the fourth pair. The anterior segment of cephalothorax, seen from above, is subrhomboidal and smooth. At its anterior margin are situated the two ocelli, separated from each other by a deep groove. The chelicerae are very stout, and composed of one single joint densely covered with setose hairs, and terminated each by two spines, one above (finger of some authors), rigid, and another below (the thumb), moving vertically against the upper. The latter is compressed, acute, almost rectilinear, and smooth; the inferior one is subconical, curved upwards, acute towards the point, and provided at its base inwardly with two spiny small processes. The palpi are proportionally robust, stouter and longer than the three anterior pairs of legs; somewhat shorter than the fourth pair, but of a stouter appearance, as all the joints, four in number (the maxillae excepted), preserve the same diameter. They are covered on their whole length with hairs similar to those on the chelicerae. The maxillae are subtriangular, provided only with brushes of hairs. The next joint (the joint of the palpi) is very small and triangular; the second is the longest; the third is the next in length; then the fourth, the tip of which exhibits a minute smooth tuberculiform knob. The first pair of legs is the most slender of the thoracic appendages, and about the length of the third pair; the basal joint is quite short; the second is the shortest of all; the third is the longest; the fourth, fifth, and sixth smaller in the order enumerated. The last joint terminates like the palpi, bluntly. This anterior pair of legs is called by some *second pair of palpi*, upon the ground that their structure is most alike. The three remaining pairs of thoracic appendages are seven-jointed, thus composed of one joint more than the first pair and palpi, and furthermore terminated by two minute curved claws. The first, second, and third joints are short, stoutish, and subequal; the remaining are longer and slenderer, the fourth being the longest, and the other diminishing gradually. They are covered upon their whole length with hairs similar to those which cover the palpi, but perhaps less densely so. The abdomen is subovoid, being a little de-



FIGS. 240–247. 240. *Hemerotrecha macra*, new species, ectal view of right male chelicera. 241. *Hemerotrecha macra*, new species, apical bristle of male flagellum complex. 242. *Hemerotrecha macra*, new species, mesoventral view of apical segments of left male palpus. 243. *Datames carolinianus* Kraepelin, mesal view of left young female chelicera (redrawn from Roewer, 1934). 244. *Datames carolinianus* Kraepelin, ventral view of young female genital opercula (redrawn from Roewer, 1934). 245. *Datames constricta* Putnam, ectal view of left male chelicera (redrawn from Putnam, 1883). 246. *Datames constricta* Putnam, ventral view of apical segments of male palpus (redrawn from Putnam, 1883). 247. *Datames sulfureus* Simon, mesal view of left female (penultimate male) chelicera (redrawn from Roewer, 1934).

pressed; it is densely hairy above and below, and composed, as usual, of nine segments or annuli."

***Datames carolinanus* Kraepelin**

Figures 243, 244

Datames carolinanus KRAEPELIN, 1899, Mitt. Naturhist. Mus. Hamburg, 16 Jahrgang, p. 244 (female).

Eremostata carolinana ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 573, figs. 324v, 327g (female).

The type of this species, No. 8330, is deposited in the Berlin Museum and was unavailable for study. Roewer's figure of the opercula of the type indicates that the specimen is subadult. Adult female Eremobatidae have a distinct transverse genital opening that is situated between or just posterior to the genital opercula. Females in the penultimate or subpenultimate instar often have a longitudinal structure on the genital sternite, which is similar in appearance to the genital opening of the male but is not present on sexually mature females.

The type locality for this species is given as North Carolina, but this is believed to be an error. Although a large number of Eremobatidae have been examined, none has been taken farther east than Arkansas.

A translation of Roewer's redescription of the type and copies of his drawings are given here for reference use.

"Metatarsus of the pedipalps with ventral scopula of weak papillae. Edge of the movable finger in front of the front teeth without saw teeth. The teeth of the dentition of normal shape [fig. 243 of the present paper]; immovable finger with three medial cheek teeth; pedipalps not spined, their metatarsus ventrally with cylinder bristles and 20 to 30 pointed papillae in an apical scopula; second tibia dorso-apically with two spines and third tibia with three spines here; second and third metatarsus with five spines in the main row and four spines in the auxiliary row; sternite half of the genital segment [fig. 244 of the present paper]; color rusty yellow, abdominal tergites browned; malleoli whitish; body length 16 mm.; North Carolina. (Examined one female, type.)"

***Datames constricta* Putnam**

Figures 245, 246

Datames constricta PUTNAM, 1883, Proc. Davenport Acad. Nat. Sci., vol. 3, p. 258, pl. 1, fig. 2, pl. 2, figs. 13, 13a, 14 (male).

The type vial of this species is in the collection at the Academy of Natural Sciences of Philadelphia, but it contains a specimen of *Eremorhax magnus* (Hancock) that does not conform in size, coloration, or structure with Putnam's description and figures. Labels or specimens have apparently been accidentally shifted, and the type must be considered invalid.

From Putnam's description and figures several placements of the species could be made. The size of the specimen indicates that it is not a species of *Eremorhax*, although the figure of the chelicerae is suggestive of *Eremorhax magnus* (Hancock). The description of the coloration of the species indicates that it could belong in either the *pallipes* or *palpisetulosus* group of *Eremobates*. While the figure of the chelicerae would seem to place it in the *palpisetulosus* group, the figure of the entire body is more suggestive of either the *pallipes* or *scaber* group. The figure of the palpus showing a distinct scopula seems to limit the placement to the genus *Eremobates* as none of the species of *Eremorhax* has this structure. Certain species of *Therobates* and *Hemerotrecha* are provided with a scopula, and the chelical drawing could be an illustration of *Therobates bilobatus*, new species, made under low magnification.

Confusion of the type and an inability to arrive at a placement of the original description and figures cause the placement of this species here. A transcript of Putnam's description and copies of his illustrations are included for the use of other workers:

"♂ Length, twenty mm.; colors, top of head and base of mandibles reddish ochre yellow, limbs same color, but paler, becoming still lighter at the extremities, abdomen above, dark olive brown, posterior border of each segment grayish; also gray specks all over; jaws of mandibles dark red, changing to black at the points; under side of abdomen like upper, but more yellowish, especially towards the posterior; eye prominence, and

front border of head black; tips of claws brown; eyes gray; mandibles with stout spiny bristles; a brush of long hairs inside of the upper fingers; contracted very suddenly at the fingers, which are slender and spine-like.

"Head seven mm. wide, five mm. long, without median stria; hairs irregular, mostly fine, but some of them spiny, especially at the sides and in front; eye prominence, moderately large, projecting over the margin where it is prolonged into an acute point furnished with a number of hairs, two of which on the front are larger than the others; eyes rather large, their interval greater than their diameter; mandibles, base three and a half mm.; upper finger five mm. long; base only moderately convex, suddenly constricted at the upper finger, furnished with numerous spines and spiny hairs, and a few fine hairs; upper finger subulate, slightly arched, directed obliquely downward and slightly outward, unarmed; furnished on the inside with the usual brush of stiff hairs directed forwards; no flagellum. ('Fond') of the jaw prolonged anteriorly into a conical projection supporting the teeth. Teeth commencing above with two minute teeth on the median line, then dividing into two series with a cavity between; the outer row consists of four teeth of which the first (uppermost) is largest and projects farthest to the front. The second is very small, the third is a little smaller than the first, and the fourth is about the same size as the second. The inner row consists of three good sized teeth, the first largest, third next, second next. Lower finger regularly curved without constriction; a large tooth near the base concave behind convex in front; a small tooth near its base projecting forwards; a carina outside extending towards the point; a rather heavy brush of feathered hairs inside. Maxillary palpus; femur eight mm.; tibia eight and a half mm.; metatarsus six mm.; tarsus two mm.; femur with a number of large spines on the inside, especially on the ultimate third; tibia with very few spines, but a good many fine hairs, mostly short, some very long, irregular. Metatarsus, with some fine spines near the base inside, fine hairs elsewhere, mostly short, some long, on the inside a cluster of oval or round scales or pustules, beginning two mm. from the base, and extending not

quite to the tip; tarsus with numerous fine, short hairs, some of them long.

"Fourth legs; femur, nine mm.; tibia eight and a half mm.; metatarsus five and a half mm.; tarsus four mm.; claws 1.8 mm.; femur with fine hairs, two spines inside, near the extremity; metatarsus with a row of nine spines on the lower inside; a row of three spines on the lower outside, besides numerous fine hairs; tarsus with a row of five spines outside and three inside, besides the usual terminal spines, and fine hairs. Claws, hairs, etc., as usual in the genus *Datames*; abdomen oval, elongated, comparatively small, ordinary form of ♂ genital opening underside of first segment; not as large or well developed as usually seen; spiracles of usual form on second and third segments.

"One ♂ Museum Acad. Nat. Sci., Phila. No locality. (Description written October 22, 1880.)"

Datames sulfureus Simon

Figures 247, 248

Datames sulfureus SIMON, 1879, Ann. Ent. Soc. France, ser. 5, vol. 9, p. 142 (female).

Eremostata sulfurea ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book, 4, p. 572, figs. 324u, 327h (female).

The type of this species is No. 9136 in Simon's collection in the Paris Museum and was unavailable for study. Simon described the specimen as a female, and Roewer in his redescription of the type also considered it a female. An analysis of Roewer's figures of the type indicates, however, that the specimen is probably a newly molted male in the penultimate instar.

All early instars or juvenile specimens of solpugids of the family Eremobatidae have normally developed teeth on the fixed finger that make separation of the sexes impossible. In the penultimate instar the teeth of the fixed finger of the male become quite slender and acute and tend to project more forward than down. Penultimate instar males also have a variously developed scopula on the metatarsus of the palpus, a nearly fully developed genital opening on the first abdominal sternite, and, if the adult males are provided with ctenidia, the first post-spiracular abdominal sternite will bear distinct trace or fully developed ctenidia.

Roewer's illustration of the ventral surface of the first abdominal segment of *sulfureus* is clearly that of a male, and his drawing of the chelicerae suggests a penultimate instar specimen. It is probable that *sulfureus* is a penultimate male of *Eremobates pallipes* (Say) or *Eremobates californicus* (Simon), but as exact determination requires a sexually mature specimen no placement can be made.

A translation of Roewer's redescription of the type is given here, with copies of his drawings.

"Metatarsus of the pedipalps with ventral scopula of weak papillae. Edge of the movable finger in front of the front tooth without saw teeth. The teeth of the dentition very slender and sharp; immovable finger with four medial cheek teeth; dentition [fig. 247 of the present paper]; pedipalps with hair only, their metatarsus with cylinder bristles ventrally and a scopula of very numerous, sharp, conical papillae; second tibia with one spine dorso-apically and third tibia with two spines here; second and third metatarsus dorsally with five spines in the main row and three spines in the auxiliary row; sternite half of the genital segment [fig. 248 of the present paper]; color rusty yellow, abdominal tergites browned; malleoli whitish; body length 15 mm.; Colorado. (Examined one female, type.)"

***Eremacantha robusta* Roewer**

Figure 249

Eremacantha robusta ROEWER, 1934, in BRONN, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 571, figs. 320d, 320p, 324s (female).

The type of this species is No. 8338 in the Berlin Museum and was unavailable for study. Roewer's figure of the opercula of the type indicates that the specimen is young.

A translation of Roewer's description and copies of his illustrations are included here for reference.

"Immovable finger with three front, two intermediate, one main, four lateral and four medial cheek teeth; movable finger with one front tooth (in front of it the edge not saw toothed), two intermediate, one main and medial to it one cheek tooth; pedipalps with hair only, their metatarsi with scopula ven-

trally and without cylinder bristles; second tibia dorso-apically with two and third tibia three spines; second and third metatarsi dorsally with five spines in the main row and four in the auxiliary row; fifth abdominal sternite without ctenidia, sternite half of the genital segment [fig. 249 of the present paper]; color rusty yellow, abdominal tergites darkened a little, malleoli whitish; body length 30 mm.—California ('Santiago')—(examined two females, type)."

***Eremopus dorsalis* Roewer**

Figures 250, 251

Eremopus dorsalis ROEWER, 1934, in BRONN, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 564, figs. 324l, 326c (female).

The type of this species is No. 3016/76 in the Frankfurt Museum and was unavailable for study. Roewer's figure of the genital sternite of the abdomen indicates that the type is a subadult, probably a penultimate instar female.

A translation of Roewer's description and copies of his illustrations are included here for reference.

"Movable finger without a medial cheek tooth. Immovable finger with four lateral and two medial cheek teeth; dentition [fig. 250 of the present paper]; pedipalps only hairy, their metatarsi ventrally without scopula or cylinder bristles; second tibia dorso-apically with one spine and third tibia with two; second and third metatarsi dorsally with five spines in the main row and four in the auxiliary row; fifth abdominal sternite without ctenidia; sternite halves of the genital segment [fig. 251 of the present paper]; coloration of the chelicerae rusty yellow with two dark longitudinal stripes, propeltidium brownish laterally, prosomal and abdominal tergites black, sternite gray, all parts of the limbs and malleoli pale yellow; body length 15 mm. California."

***Eremoseta titschacki* Roewer**

Figure 252

Eremoseta titschacki ROEWER, 1934, in BRONN, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 569, fig. 322g (male).

The type of this species is No. 8485 in the Hamburg Museum and was unavailable for study. None of the specimens seen could be adequately placed in this species. Roewer's figure of the chelicerae is reminiscent of the *palpisetulosus* complex of the genus *Eremobates*, and his description approximates that of *Eremobates palpisetulosus* Fichter. He does not, however, indicate the presence of a dorso-ectal process of the fixed finger or ctenidia on the first post-spiracular abdominal sternite. Although both of these characters tend to be obscure on *palpisetulosus*, a study of the type should be made before the species is placed.

A translation of Roewer's description and a copy of his illustration are included here for reference.

"Out of the tuft of bristles of the flagellum complex two broadened, feathered bristles are prominent; immovable finger with four lateral and three medial cheek teeth, movable finger with one medial cheek tooth beside the large main tooth, on whose anterior edge stand two tiny intermediate teeth, without a front tooth; dentition and flagellum complex [fig. 252 of the present paper]; pedipalps unspined, with many cylinder bristles around the tibia and metatarsus, metatarsus without scopula; second and third tibia unspined dorso-apically, second and third metatarsi dorsally with five spines in the main row and three in the auxiliary row; fifth sternite of the abdomen without ctenidia; coloration rusty-yellow, abdominal tergites with blackish middle band, malleoli uniformly white; body length 15 mm.—California (exact locality unknown)—(examined one male, type)."

Eremostata californica Roewer

Figure 253

Eremostata californica ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 573, fig. 324x (female).

The type of this species is No. 9132 in the Paris Museum and was unavailable for study. Although the genital plates illustrated by Roewer appear to be those of an adult female, it is not possible to place the species systematically. The number of claws on the tarsus of the first leg must be known before

the species can be placed in a subfamily, and the proportional size of the fondal teeth of both the ectal and mesal rows must be known before the species can be placed in a genus or group. A determination of these characters must depend upon an examination of the type.

There is some confusion in the placement of this species and *Eremobates californicus* (Simon) in Roewer's 1934 monograph of the order. In the illustrations of the genital plates the latter is referred to Simon, while this species is labeled as new. In the citations both species are referred to Simon. Although some inconsistency occurs in the citation of types it seems safe to assume that Roewer's statement of having seen Simon's type of *Eremobates californicus*, coupled with the designation of the genital plates, fixed that species, and this one may be referred to as *Eremostata californica* Roewer.

A translation of Roewer's description and a copy of his illustration are given here for reference.

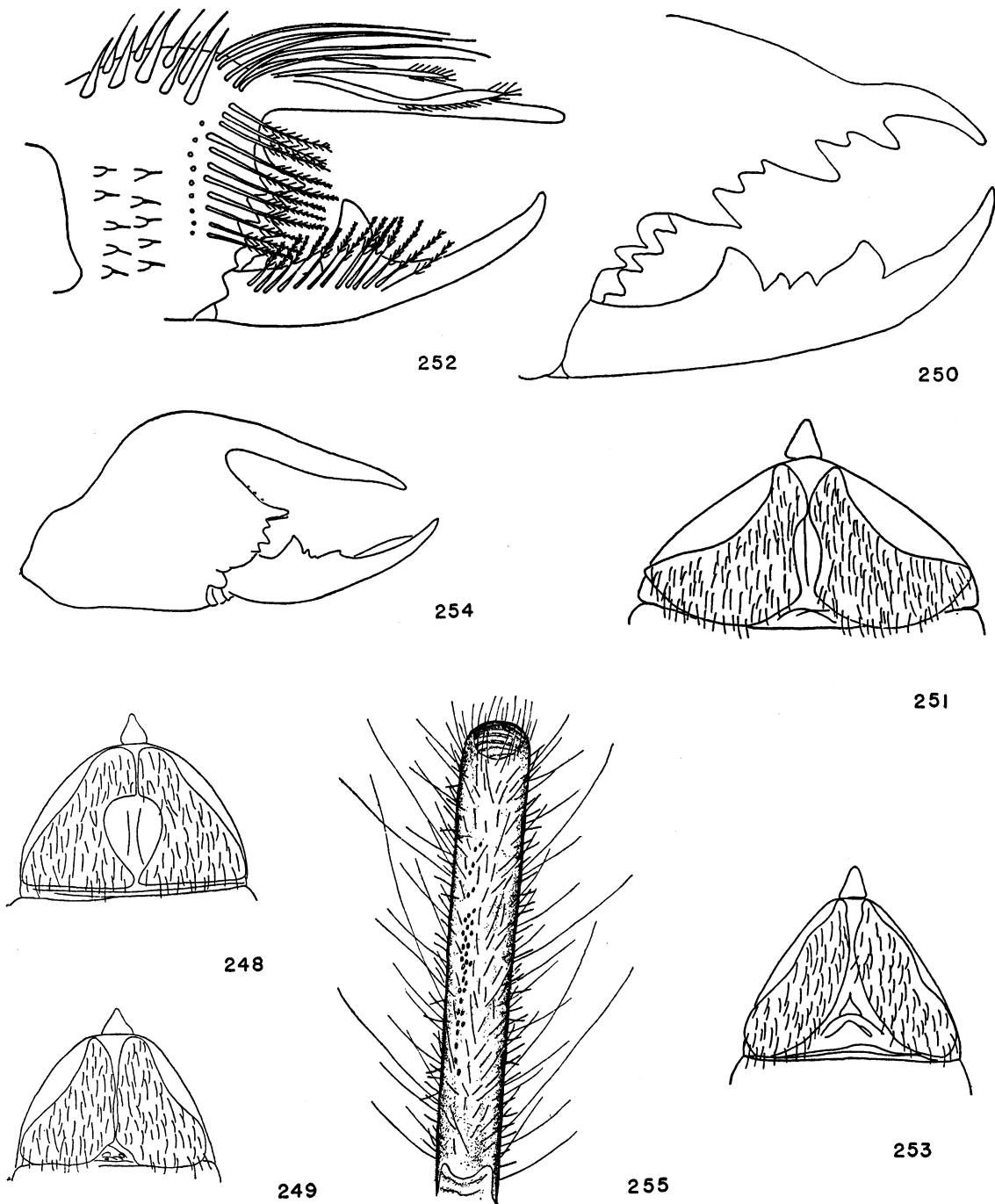
"Movable finger with two intermediate teeth and with one tooth medial to the main tooth, likewise the edge in front of the main tooth with fine saw teeth; immovable finger with four lateral and four medial cheek-teeth; pedipalps with hair only, their metatarsus with cylinder bristles; second and third tibia always with three spines dorso-apically, second and third metatarsus with five spines in the main row and four spines in the auxiliary row; sternite half of the genital segment [fig. 253 of the present paper]; color as in *E. carolinana* Kraepelin, malleoli whitish; body length 15 mm., California (San Diego), Colorado, New Mexico. (Examined three females, including type.)"

Gluvia formicarius Koch

Gluvia formicarius KOCH, 1842, Arch. Naturgesch., vol. 1, p. 355 (female).

Eremopus formicarius ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 564, figs. 324m, 326b (female).

Roewer's figure of the opercula of this species appears to be of a juvenile specimen. Both Roewer's and Koch's descriptions are inadequate for a systematic placement of the species by the procedure used in this paper; it



FIGS. 248-255. 248. *Datames sulfureus* Simon, ventral view of female (penultimate male) genital opercula (redrawn from Roewer, 1934). 249. *Eremacantha robusta* Roewer, ventral view of young female genital opercula (redrawn from Roewer, 1934). 250. *Eremopus dorsalis* Roewer, ectal view of right young female chelicera (redrawn from Roewer, 1934). 251. *Eremopus dorsalis* Roewer, ventral view of young female genital opercula (redrawn from Roewer, 1934). 252. *Eremoseta titschacki* Roewer, mesal view of left male chelicera (redrawn from Roewer, 1934). 253. *Eremostata californica* Roewer, ventral view of female genital opercula (redrawn from Roewer, 1934). 254. *Eremobates cruzi*, new species, ectal view of right male chelicera. 255. *Eremobates cruzi*, new species, mesoventral view of apical segments of left male palpus.

is included because Roewer states that he had a specimen from Texas.

Dr. Roewer in personal correspondence stated that a lectotype of this species is under No. 8335 at the Berlin Museum.

FAMILY **AMMOTRECHIDAE** ROEWER,
1934

Solpugida with exterior lobes of propeltidium partially separated from the peltidium. Propeltidium with anterior margin recurved. Median plagula of peltidium indistinctly separated from anterior arci. Posterior arci of parapeltidium short and diverging posteriorly. Propeltidium, peltidium, parapeltidium, mesopeltidium, metapeltidium, anterior abdominal tergite, and dorsal surfaces of the chelicerae often covered with spines. Paired spiracles of the abdomen distinct and not protected. The first postspiracular abdominal sternite of the males does not bear true ctenidia. Genital sternite of females not distinctly, specifically differential.

Cheliceral dentition similar in males and females but often exhibiting sexual dimorphism in a modification of the fixed finger and teeth of the male. The fixed finger bears three primary teeth that may or may not be separated by a variable number of intermediate teeth. The movable finger bears two primary teeth, a variable number of intermediate teeth, and often a mesal tooth just mesad of the basal primary tooth. A mesal and ectal row of fonal teeth occurs between the fingers of the chelicerae. The male flagellum consists of an immovable, transparent, elliptical membrane of which the dorsal and ventral margins are frequently finely fringed and bent or curled mesally. The anterior end of the flagellum is usually attenuated, and the flagellum is attached to the fixed finger by an elliptical chitinized ring at or about the vertical level of the fonal teeth.

Palpus with an immovable tarsus; metatarsus and tibia often bear a series of short or long paired spines in addition to the usual hairs and cylinder bristles. There is no scopula on the palpus.

Walking legs normal. Tarsi of first legs

unsegmented and without claws or spines. Tarsi of second and third legs usually unsegmented, rarely with two segments and bearing a generically variable series of ventral spines. There is no dorsal terminal spine on the tarsi of the second or third legs. Tarsi of fourth legs with one to four segments and bearing a generically variable series of ventral spines. Leg spination otherwise variable.

The descriptive method employed in the study of this family is much the same as that used for the Eremobatidae. All measurements and proportions were determined in the same manner, except that cheliceral widths were taken at the base of the movable finger. As the legs and palpi of these solpugids are very fragile, specimens are rarely collected without the loss or breakage of one or more of the appendages. Measurements of broken or mangled appendages are not dependable and are not, therefore, given. The space occupied by the dental group of the movable finger was measured from the apex of the principal tooth to the apex of the anterior tooth.

Only five species of this family have previously been described or recorded from the United States. Two of these species have been identified and systematically placed under the family; one, doubtfully recorded, has proved to be erroneous; one has been relegated to synonymy; and one proved to be a homonym in the family Eremobatidae. One previously described species is recorded here for the first time, and nine new species have been described. Altogether 12 species of Ammotrechidae are recorded from the United States.

Roewer (1934) proposed the separation of the Ammotrechidae into subfamilies on the basis of segmentation of the tarsi of the legs. He further demonstrated the validity of ventral spination of the tarsi and the presence or absence of a mesal tooth of the movable finger for the separation of genera. These characters, although necessitating great magnification, seem to be distinct and constant in this family, and Roewer's system has been adopted without modification.

Two of the five known subfamilies have been recorded from the United States. They can be separated by the following key:

KEY TO THE SUBFAMILIES

- Tarsi of fourth legs with a single segment Saronominae

 Tarsi of fourth legs with three segments
 Ammotrechinae

SUBFAMILY **AMMOTRECHINAE** ROEWER, 1934

Figures 256–260, 263–269

Ammotrechinae ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 590, fig. 335.

Ammotrechidae in which the tarsi of the second and third legs have a single segment, and those of the fourth leg are three-segmented.

Three of the 11 previously described genera of this subfamily are recorded from the United States. The following key can be used to separate these genera:

KEY TO GENERA

1. Distal segment of posterior tarsi with one pair of spines *Ammotrechella* ROEWER
 Distal segment of posterior tarsi with more than one pair of spines 2
2. Distal segment of posterior tarsi with two pairs of ventral spines *Ammotrechula* Roewer
 Distal segment of posterior tarsi with one pair of spines and one single ventral spine
 *Ammotrecha* Banks

GENUS **AMMOTRECHA**¹ BANKS

Figures 264, 265

Ammotrecha BANKS, 1900, Amer. Nat., vol. 24, p. 426 (in part).

Ammotrecha ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 596, figs. 335b, 335h (*sensu stricto*).

Ammotrechinae in which the ventral spines on the tarsi of the second and third legs are arranged 1, 2, 2, 1, and those on the tarsi of the fourth legs 2, 2-2-2, 1. There are a mesal tooth on the movable finger and two adjacent primary teeth distad of the principal tooth of the fixed finger.

GENOTYPE: *Ammotrecha limbata* (Lucas).

Ammotrecha stollii² (Pocock)

Figures 272–276

Cleobis stollii Pocock, 1895, Ann. Mag. Nat. Hist., ser. 6, vol. 16, p. 97 (male and female).

¹ Greek, *ammos*, sand, plus *trechō*, to run.

² Named for Stoll.

Ammotrecha stollii KRAEPELIN, 1901, Das Tierreich, no. 12, p. 115 (male and female).

Ammotrecha stollii Pocock, 1902, Biologia Centrali-Americana, Arachnida, vol. 3, p. 65, pl. 12, figs. 8, 8a, 8b (male and female).

Ammotrecha picta Pocock, 1902, *op. cit.*, vol. 3, p. 65, pl. 12, figs. 9, 9a (male and female).

Ammotrecha stollii ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, pp. 597, 598, figs. 337e, 338b (male and female).

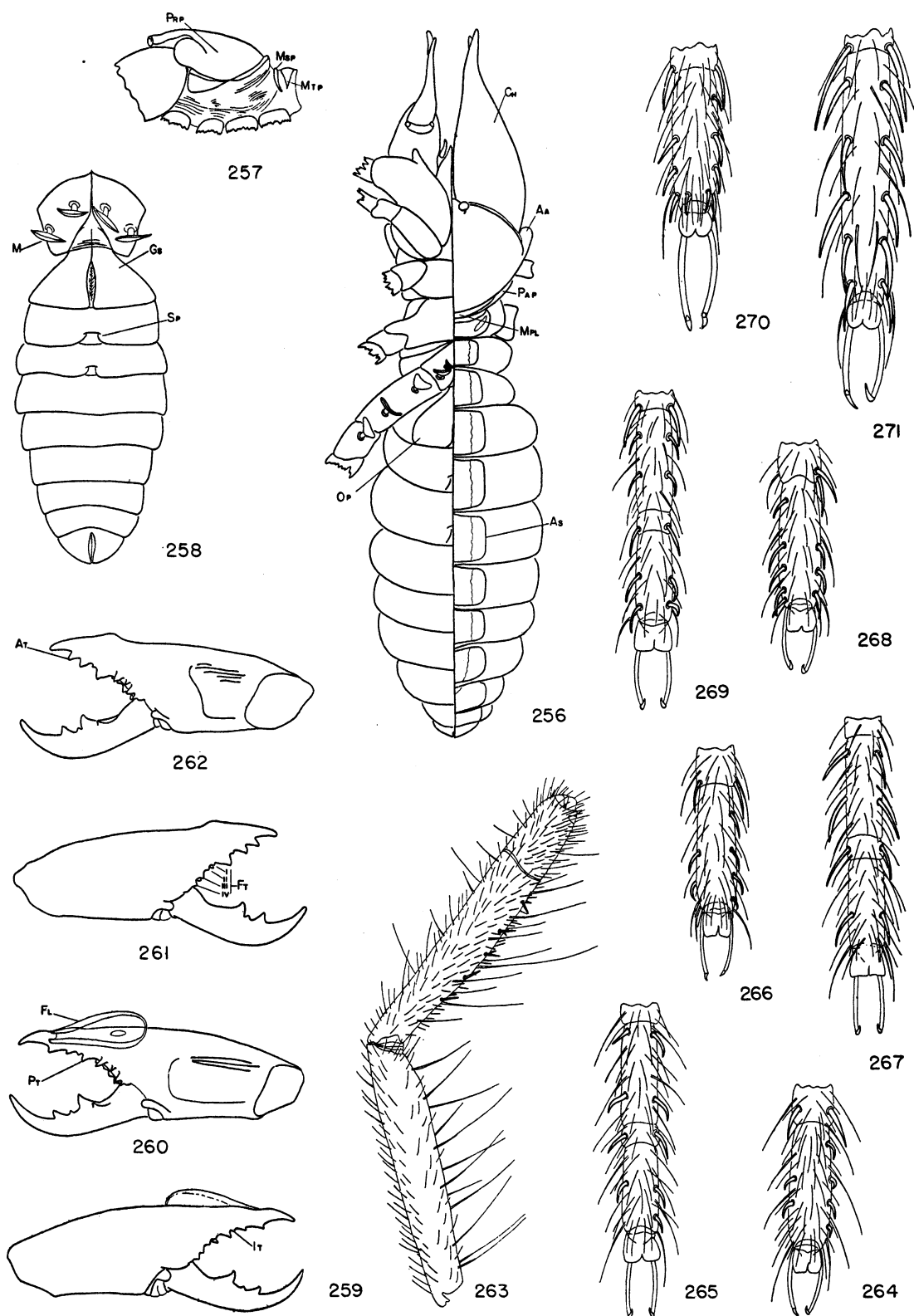
MALES: Males of this species have not been seen. A translation of Roewer's redescription of the type and a copy of his drawing of the chelicerae are included for reference.

"Flagellum with dorsal and ventral edges but slightly turned under, medial surface consequently exposed to view, the elliptical anchoring ring lying in the middle of the posterior longitudinal third of the flagellum; dentition and flagellum [fig. 272 of the present paper]; palpi hairy, with short cylinder bristles ventrally on tibia and metatarsus, metatarsus with five pairs of rather long spines; second and third metatarsus dorsally with a longitudinal row of three spines and ventrally, as also the fourth metatarsus, with 1, 1, 2 spines; coloration of the mandibles and propeltidium rusty yellow, abdominal tergites with a broad blackish brown longitudinal band that has a narrower whitish mid-band, pleura, sternites, coxae and malleoli whitish yellow, palpi dark brown except on the basal half of the femora and tarsi, legs browned; body length 14–18 mm."

FEMALES: Total length, 16.0 to 22.0 mm. Chelicerae, 1.4 to 2.1 mm. wide and 4.4 to 6.4 mm. long. Propeltidium, 3.2 to 4.6 mm. wide and 2.5 to 3.6 mm. long.

Coloration in alcohol somewhat faded but apparently as follows: chelicerae, propeltidium, coxae, and tarsi of walking legs and coxae of first legs and palpi light rusty yellow; abdomen and remaining segments of legs and palpi dusky purple; abdomen also with a broad dark band that contains a wide, light central stripe; dusky areas on legs darker on dorsal surface; eye tubercle dark; malleoli light.

Dentition typical of the Ammotrechinae as shown in figures 273 and 274. Movable finger with principal and anterior teeth separated



FIGS. 256-271. Descriptive figures for the family Ammotrechidae. (See opposite page.)

by one intermediate tooth, anterior tooth slightly smaller than principal tooth, and a distinct mesal tooth. Dental group of the movable finger occupies one-fourth of the length of the finger and lies approximately in the middle of the length of the finger. Fixed finger with large principal tooth, one intermediate tooth between principal and medial teeth, and medial and anterior teeth subequal in size. Fondal teeth occurring in two rows of four each, the ectal row graded in size III, I, IV, II, the mesal row I, III, IV, II. The peak of the dorsal carina of the fixed finger occurs directly over the first fondal tooth of the ectal row.

Palpi clothed ventrally with long slender hairs, short, fine, cylinder bristles, and a series of five pairs of short stout spines on the metatarsus. There is no series of spines on the tibia, and there are fewer cylinder bristles.

Chelicerae three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.3. Eyes slightly more than one diameter apart. Genital plate typical of family; it is wider than long by a ratio of 1 to 1.2.

TYPE LOCALITY: Male and female types, No. 8605, from Guatemala in the British Museum (Natural History).

RECORDS: Louisiana: Lake Ponchartrain, one female (Marx). Texas: San Antonio, July 29, 1929, one female (M. Valeris).

GENUS *AMMOTRECHELLA*¹ ROEWER

Figures 266, 267

Ammotrechella ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 595, figs. 335b, 335g.

¹ Greek, *ammos*, sand, plus *trechō*, to run, plus Latin diminutive suffix, *ell*.

Ammotrechinae in which the ventral spines on the tarsi of the second and third legs are arranged 1, 2, 2, 1, and those on the tarsi of the fourth leg, 2, 2-2-2. There are a distinct mesal tooth on the movable finger and two adjacent primary teeth distad of the principal tooth of the fixed finger.

GENOTYPE: *Ammotrechella geniculata* (Koch).

Ammotrechella setulosa,² new species

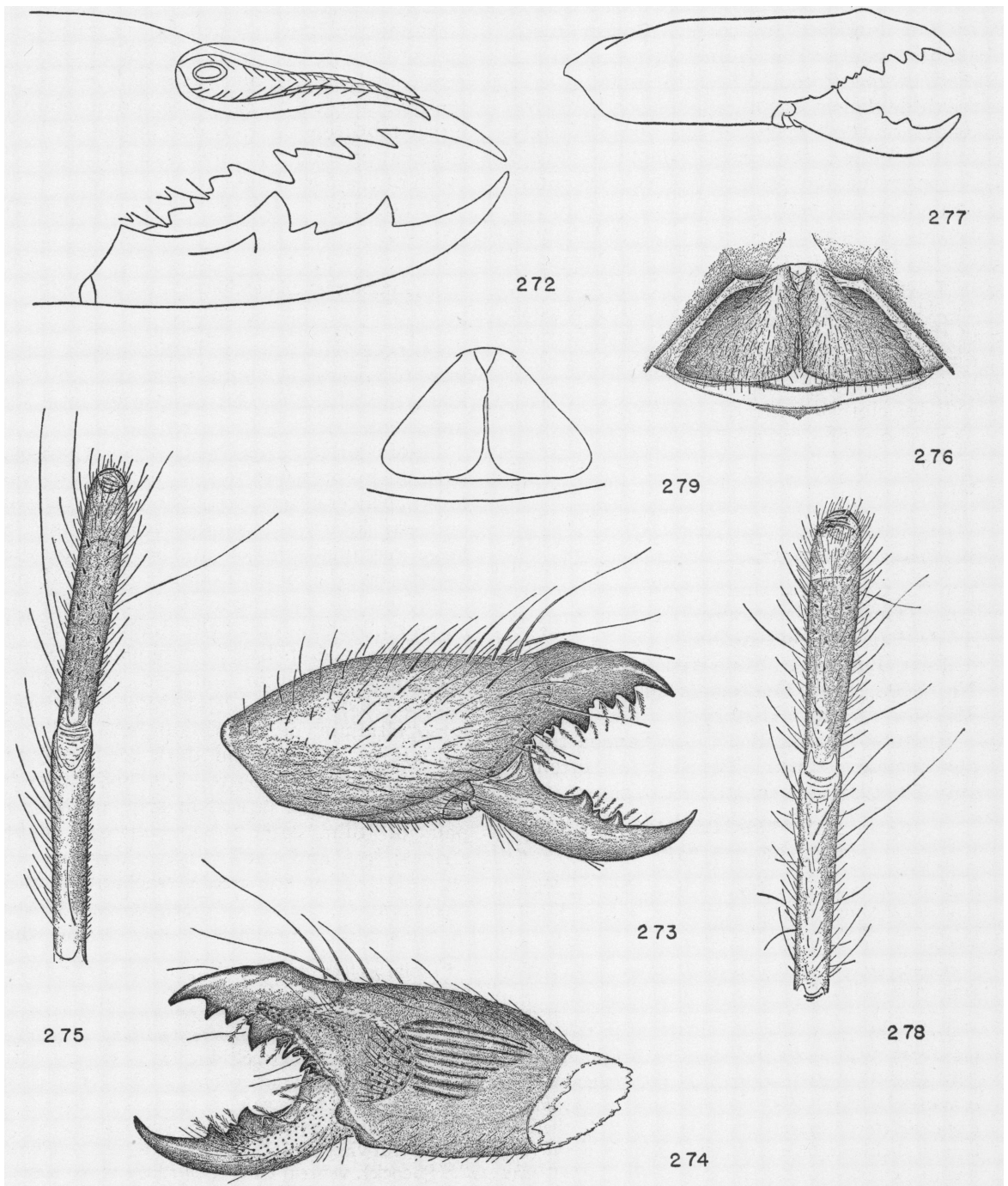
Figures 277-279

FEMALE HOLOTYPE: Total length, 20.0 mm. Chelicerae, 1.2 mm. wide and 3.6 mm. long. Propeltidium, 2.6 mm. wide and 2.1 mm. long.

Coloration in alcohol white to light yellow, with dusky brownish purple markings as follows: chelicerae with two thin dorsal stripes and one lateral stripe that coalesce into a large rectangular spot at the base of the fingers on the ectal margin; propeltidium dusky on the anterior and lateral margins, leaving a longitudinal, light, diamond-shaped area, two medial, light, triangular areas on the posterior margin and two small, oval, light areas on either side of the eye tubercle; mesopeltidium, metapeltidium, and abdominal tergites with a broad, dark, median band which contains an elongate light spot on each segment near the lateral margin, forming a pair of thin, lateral, intermittent, light stripes; legs and palpi dusky above on all segments except the coxae, trochanters, and basal femora, the dusky markings are darker in the middle of each segment, causing the

² Latin, *saetula*, small bristle, plus *osus*, suffix meaning full of.

FIGS. 256-271 (OPPOSITE PAGE). 256. *Ammotrechella stimpsoni* (Putnam), dorsoventral view of female body. 257. *Ammotrechella stimpsoni* (Putnam), lateral view of anterior female peltidia. 258. *Ammotrechella stimpsoni* (Putnam), ventral view of male abdomen. 259. *Ammotrechula peninsulana* (Banks), ectal view of male chelicera. 260. *Ammotrechula peninsulana* (Banks), mesal view of male chelicera. 261. *Branchia angustus*, new species, ectal view of female chelicera. 262. *Branchia angustus*, new species, mesal view of female chelicera. 263. *Ammotrechella stimpsoni* (Putnam), lateral view of tibia, metatarsus, and tarsus of female palpus, showing spination. 264. *Ammotrecha stoll*i (Pocock), ventral view of third leg tarsal spination. 265. *Ammotrecha stoll*i (Pocock), ventral view of fourth leg tarsal spination. 266. *Ammotrechella stimpsoni* (Putnam), ventral view of third leg tarsal spination. 267. *Ammotrechella stimpsoni* (Putnam), ventral view of fourth leg tarsal spination. 268. *Ammotrechula peninsulana* (Banks), ventral view of third leg tarsal spination. 269. *Ammotrechula peninsulana* (Banks), ventral view of fourth leg tarsal spination. 270. *Branchia angustus*, new species, ventral view of third leg tarsal spination. 271. *Branchia angustus*, new species, ventral view of fourth leg tarsal spination. *Abbreviations*: Aa, anterior arch; As, abdominal sclerite; At, anterior tooth; Ch, chelicera; Fl, flagellum; Ft, fondal teeth; Gs, genital sternite; It, intermediate teeth; M, malleolus; Mpl, median plagula; Msp, mesopeltidium; Mtp, metapeltidium; Op, operculum; P, peltidium; Pap, parapeltidium; Prp, propeltidium; Pt, principal tooth; Sp, spiracle.



FIGS. 272-279. 272. *Ammotrecha stoll*i (Pocock), mesal view of left male chelicera (redrawn from Roewer, 1934). 273. *Ammotrecha stoll*i (Pocock), ectal view of right female chelicera. 274. *Ammotrecha stoll*i (Pocock), mesal view of right female chelicera. 275. *Ammotrecha stoll*i (Pocock), ventral view of apical segments of right female palpus. 276. *Ammotrecha stoll*i (Pocock), ventral view of female genital opercula. 277. *Ammotrechella setulosa*, new species, ectal view of right female chelicera. 278. *Ammotrechella setulosa*, new species, ventral view of apical segments of right female palpus. 279. *Ammotrechella setulosa*, new species, ventral view of female genital opercula.

legs and palpi to appear annulate; eye tubercle dark; malleoli light yellow except for a narrow dark stripe on the margins.

Dentition typical of the Ammotrechinae as shown in figure 277. The peak of the dorsal carina occurs over the space between the principal tooth and first fondal tooth of the ectal row.

Palpi clothed ventrally with long and short hairs, a few scattered cylinder bristles, and two pairs of, and one or two unpaired, very small, cylindrical spines situated near the apical ends of the metatarsi. There is no series of spines on the tibiae.

Chelicerae three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.2. Eyes about one diameter apart. Genital plate typical of family; it is wider than long by a ratio of 1 to 1.4.

TYPE LOCALITY: Female holotype from Eagle Pass, Texas, 1940, in the United States National Museum.

***Ammotrechella stimpsoni*¹ (Putnam)**

Figures 280–284

Galeodes (Cleobis) Stimpsoni PUTNAM, 1883, Proc. Davenport Acad. Nat. Sci., vol. 3, pp. 261–266, pl. 1, fig. 5, pl. 3, figs. 19–31 (female).

Ammotrecha cubae BANKS, 1900, Amer. Nat., vol. 34, p. 427 (sex?). [Not *Ammotrechona cubae* (Lucas).]

MALES: Total length, 12.0 to 18.0 mm. Chelicerae, 0.8 to 1.4 mm. wide and 3.3 to 5.0 mm. long. Propeltidium, 2.4 to 3.6 mm. wide and 2.2 to 3.1 mm. long.

Coloration and markings in alcohol somewhat variable as follows: chelicerae light to rusty yellow; propeltidium light yellow to light brown, darkening on the anterior margin; mesopeltidium, metapeltidium, and abdominal tergites light to dark yellow, with a pair of light purple to dark purplish brown lateral stripes on each sclerite, which occupy one-fourth to one-third of the width of the sclerite, these stripes uniting on the posterior one to three abdominal segments; legs light yellow, with light dusky purple to dark brown above on the apical two-thirds of the femora and all of the tibiae and metatarsi, the dusky areas tending to fade at the joints,

causing annuli on some specimens; palpi dusky purple to dark brown on apical ends of femora and all of tibiae, metatarsi, and tarsi, darkening on the terminal segments; eye tubercle dark, somewhat lighter between eyes; malleoli white to light yellow.

Dentition typical of the Ammotrechinae as shown in figures 280 and 281. Flagellum attached to the fixed finger directly over the first fondal tooth of the mesal row. Fixed finger lightly indented dorsally just in front of the flagellar attachment disc. Flagellum obovate, tapering at anterior end, margins finely fringed, curled mesally except at the ventrobasal angle, and extending anteriorly along the fixed finger to midway between the anterior tooth and the tip of the finger.

Palpi clothed ventrally on the metatarsi with long and short hairs, many strong cylinder bristles, and a series of five pairs of short, stout spines. Tibiae clothed ventrally with long and short hairs and a few cylinder bristles but no series of spines.

Chelicerae about four times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.1. Eyes slightly less than one diameter apart.

FEMALES: Total length, 14.0 to 22.0 mm. Chelicerae, 1.2 to 1.8 mm. wide and 3.8 to 5.6 mm. long. Propeltidium, 2.7 to 4.9 mm. wide and 2.2 to 3.5 mm. long.

Coloration and markings in alcohol same as in male except the markings are generally lighter, causing the legs on many specimens to be annulate.

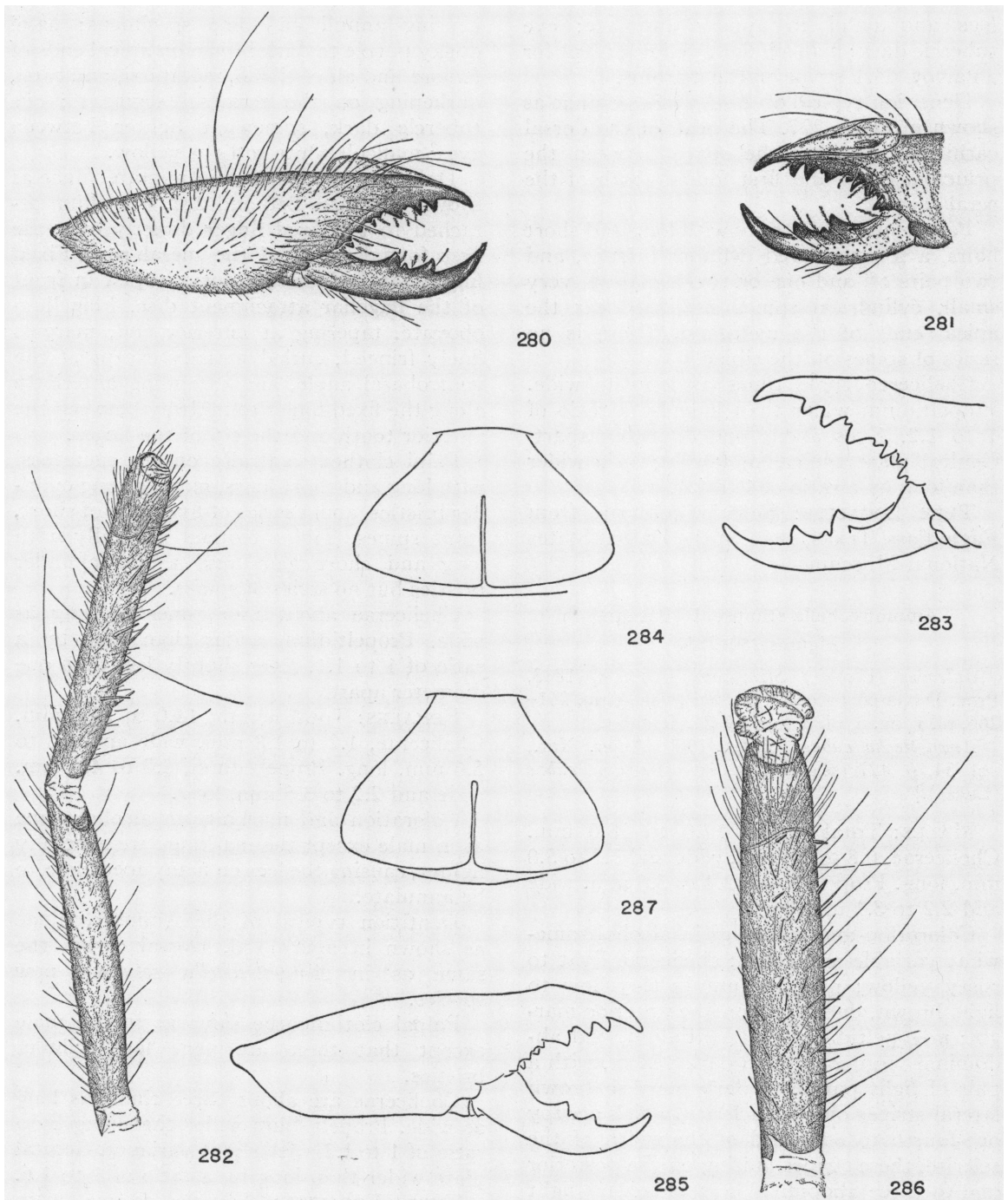
Dentition typical of the Ammotrechinae as shown in figure 283. Dorsal carina the same as in *Ammotrechella setulosa*, new species.

Palpal clothing the same as in the male except that there are very few cylinder bristles.

Chelicerae are about three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.3, with slight variance. Genital plate wider than long by a ratio of 1 to 1.6.

TYPE LOCALITY: Female cotype from Florida (Mr. Wurdeman), in the Museum of Comparative Zoölogy. The Stimpson specimen described originally by Putnam from the Museum of Comparative Zoölogy has apparently been lost or destroyed.

¹ Named for the collector, William Stimpson.



FIGS. 280-287. 280. *Ammotrechella stimpsoni* (Putnam), ectal view of right male chelicera. 281. *Ammotrechella stimpsoni* (Putnam), mesal view of right male chelicera. 282. *Ammotrechella stimpsoni* (Putnam), mesoventral view of apical segments of left male palpus. 283. *Ammotrechella stimpsoni* (Putnam), mesal view of right female chelicera. 284. *Ammotrechella stimpsoni* (Putnam), ventral view of female genital opercula. 285. *Ammotrechella sexspicata*, new species, ectal view of right female chelicera. 286. *Ammotrechella sexspicata*, new species, mesoventral view of apical segments of left female palpus. 287. *Ammotrechella sexspicata*, new species, ventral view of female genital opercula.

RECORDS: Florida: Marquesas (Large Key), June 23, 1938, one male (George Van Hyning); Miami, February-March, 1903, two males (J. H. Comstock), June, one male (Fairchild); Casa Ybel, Sanibel Island, February 27, 1930, one female (K. Palmer); Sanibel Island, July 11, 1939, one female (Clench); Palm Beach, April, 1920, one female (Thomas Barbour), one female; Tortugas, Garden Key, June 18, one female (Russell); Palmetto Key, June, 1942, four males, three females (C. M. Breder, Jr.); Sebastian, April 29, 1919, one male; Coral Gables, November, January, 1927, one male (H. B. Bailey); Key West, one male, one female (Marx); Key Largo, March 1, 1906, one female (Dr. S. A. Binion); Indian River, 1880, two females (Hubbard and Schwarz); Osprey, 1939, one female (C. W. Webb); Tarpon Springs, Pinellas County, March 21, 1943, young female (Borys Malkin); Bottle Point Key, one female (R. P. Allen); Marion County, March 18, 1939, one male.

REMARKS: This species has been recorded as *Ammotrecha cubae* (Lucas) from Florida by Banks and recorded with doubt by Kraepelin as *A. cubae* (Lucas) and by Roewer as *Ammotrechona cubae* (Lucas), apparently on the basis of Banks' record. It does not agree in ventral tarsal spination with Roewer's genus *Ammotrechona*. Specifically the male flagellar type and forward extension differ from Roewer's illustration of the male type of *cubae*, and the female has five distinguishable pairs of ventral spines on the metatarsus of the palpus, while Roewer found only four pairs of ventral spines on the metatarsus of the palpus on the female type of *cubae*. Otherwise the species apparently agrees well in coloration with *cubae*.

This species also seems to be closely related to *Ammotrecha tabogana* Chamberlin, the type of which has not been studied.

Putnam's description of this species was made under the name "Stimpson Specimen" with the statement that the Wurdeman specimen was the same except for sharpness of the teeth. The name *Galeodes* (*Cleobis*) *Stimpsoni* Putnam is indicated (apparently by H. Osborn) in the discussion as available for use.

Ammotrechella sexspicata,¹ new species

Figures 285-287

FEMALE HOLOTYPE: Total length, 14.0 mm. Chelicerae, 1.3 mm. wide and 3.9 mm. long. Propeltidium, 2.6 mm. wide and 2.1 mm. long.

Specimen stained and bleached by alcohol. Coloration of legs, palpi, chelicerae, and propeltidium not determinable. Mesopeltidium, metapeltidium, and abdominal tergites darkened on the lateral margins. Eye tubercle dark. Malleoli light.

Dentition typical of Ammotrechinae as shown by figure 285. Dorsal carina with peak over the space between the principal tooth and the first fondal tooth of the ectal row.

Palpi clothed ventrally with long and short hairs, scattered cylinder bristles, and three pairs of short, stout spines on the metatarsi. Tibiae not provided with a series of stout spines.

Chelicerae three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.2. Eyes separated by slightly more than one diameter. Genital plate wider than long by a ratio of 1 to 1.7.

TYPE LOCALITY: Female holotype from Clermont, California, in the collection of the University of Utah.

REMARKS: This species agrees with *Ammotrechella geniculata* (Koch) in the number of pairs of stout spines on the ventral surface of the metatarsus of the palpus and apparently in abdominal coloration. It can be separated from that species by the strikingly different dorsal carina of the fixed finger of the chelicerae.

GENUS AMMOTRECHULA² ROEWER

Figures 268, 269

Ammotrechula ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 600, figs. 335e, 335i.

Ammotrechinae in which the ventral spines on the tarsi of the second and third legs are arranged 1, 2, 2, 2, 1, and those on the tarsi

¹ Latin, *sex*, six, plus *spicatus*, spiked; refers to spination of palpus.

² Greek, *ammos*, sand, plus *trechō*, to run, plus Latin diminutive suffix, *ule*.

of the fourth leg, 2, 2-2-2, 2. There are a distinct mesal tooth on the movable finger and two adjacent primary teeth distad of the principal tooth of the fixed finger.

GENOTYPE: *Ammotrechula saltatrix* (Simon).

KEY TO MALES

1. Fixed finger constricted dorsally. Metatarsus and tibia of palpus each with eight pairs of ventral spines
 *Ammotrechula peninsulana* (Banks)
 Fixed finger not constricted dorsally. Metatarsus and tibia of palpus each with less than eight pairs of ventral spines 2
2. Fixed finger elongate and linear. Only metatarsus of palpus with four pairs of ventral spines
 *Ammotrechula mulaiki*, new species
 Fixed finger nearly normal. Metatarsus and tibia of palpus each with seven pairs of spines
 *Ammotrechula venusta*, new species

Ammotrechula mulaiki,¹ new species

Figures 291-293

MALE HOLOTYPE: Total length, 14.0 mm. Chelicerae, 1.1 mm. wide and 3.5 mm. long. Propeltidium, 2.6 mm. wide and 2.4 mm. long.

Coloration in alcohol light yellow, with dusky purplish markings as follows: a dusky crescent behind and beside each eye partially enclosing clear, ovate areas beside the eyes; mesopeltidium, metapeltidium, and abdominal tergites with a faint, broad, longitudinal dusky band which is divided into four bands by three narrow light stripes, fourth legs dusky on apical half of femora and faintly so on anterior faces of tibiae; palpi dusky on apical half of femora, all of tibiae and metatarsi, and basal ends of tarsi; eye tubercle dark, with a light stripe between the eyes; malleoli light.

Dentition of chelicerae slightly atypical as shown in figures 291 and 292. Fixed finger linear, bent slightly ventrad, with anterior and medial teeth modified into flat spurs. Intermediate tooth of movable finger closer to the anterior tooth than the principal tooth. Dental group of movable finger occupies one-third of the length of the finger. Flagellum spatulate, not distinctly fringed on margins, margins curled mesally to cover nearly all but the attachment disc, anterior extension a

narrow, parallel-sided arm that extends just beyond the anterior tooth of the fixed finger. Flagellum attached to the finger directly over the first fondal tooth of the mesal row.

Palpi clothed with long and short hairs and scattered cylinder bristles on the tarsi, metatarsi, and tibiae. Metatarsi also provided ventrally with four pairs of strong, cylindrical spines. Tibiae not provided with a series of spines.

Chelicerae three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.1. Eyes separated by about three-fourths of one diameter.

TYPE LOCALITY: Male holotype from Edinburg, Texas, 1934 (S. Mulaik), in the American Museum of Natural History.

*Ammotrechula peninsulana*² (Banks)

Figures 294-298

Cleobis peninsulanus BANKS, 1898, Proc. California Acad. Sci., vol. 1, p. 290, pl. 17, fig. 30 (female).

Cleobis hirsuta BANKS, 1898, Proc. California Acad. Sci., vol. 1, p. 291, pl. 17, fig. 31 (male).

Cleobis texana KRAEPELIN, 1899, Mitt. Naturhist. Mus. Hamburg, 16 Jahrgang, p. 239, pl. 2, figs. 17a, 17b (female).

Ammotrecha texana KRAEPELIN, 1901, Das Tierreich, no. 12, p. 112, fig. 83 (female).

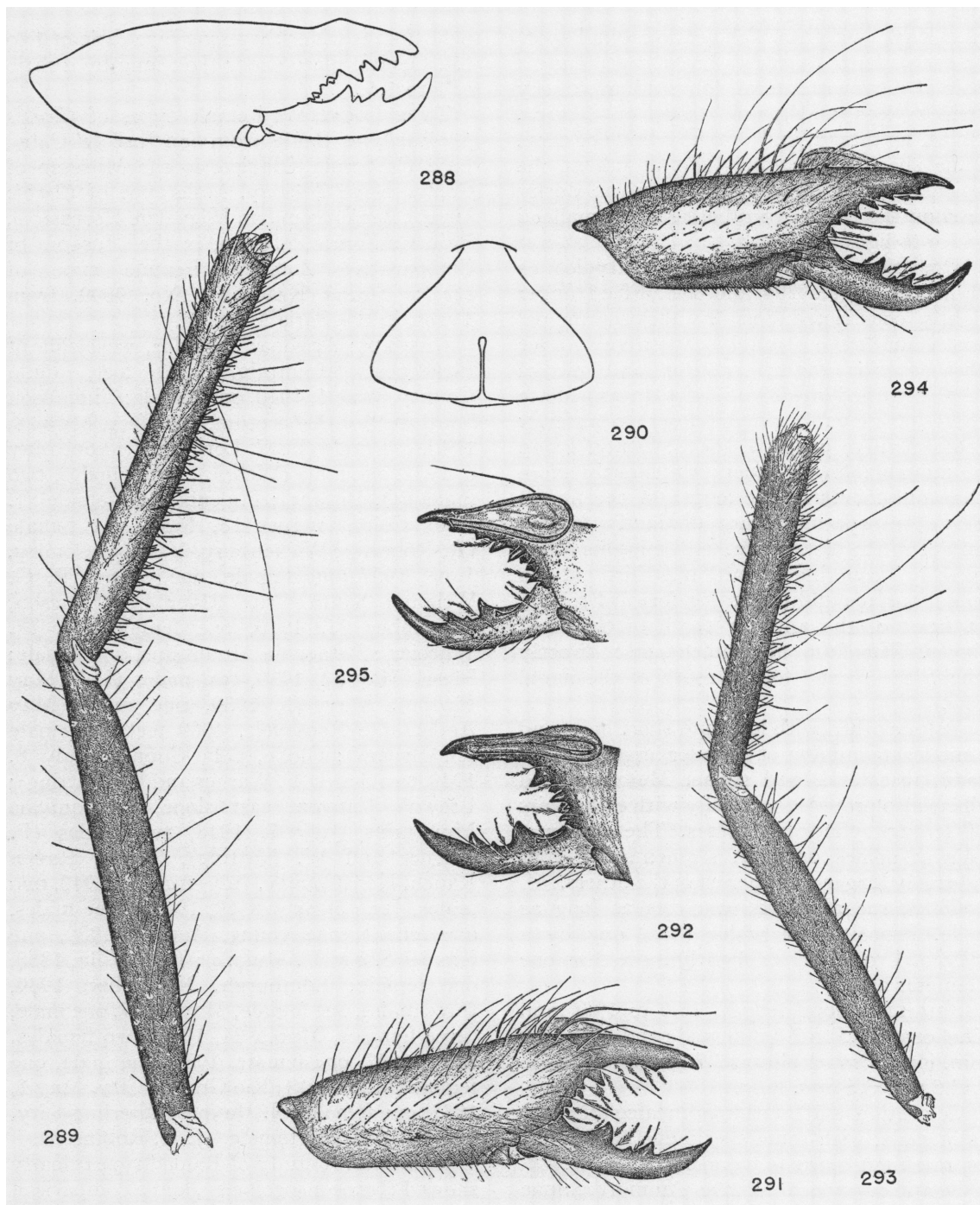
Ammotrechula texana ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreichs, vol. 5, div. 4, book 4, p. 601, fig. 338b (female).

MALES: Total length, 11.0 to 17.0 mm. Chelicerae, 1.0 to 1.3 mm. wide and 3.0 to 3.7 mm. long. Propeltidium, 2.3 to 3.1 mm. wide and 2.0 to 2.6 mm. long.

Coloration and markings in alcohol variable. Base color light to dark yellow, with dusky brown to brownish purple markings as follows: mandibles with two dorsal and one lateral dusky stripe which unite in an irregular dusky area at the base of the fondal teeth of the ectal row, these stripes being very faint or missing on some specimens; propeltidium light to dark brown and darker on the margins, with a light oval area on each side of the ocular tubercle, a light narrow medial stripe, and a light spot at the base of each spine, giving a stippled effect; mesopeltidium, metapeltidium, and abdominal ter-

¹ Named for the collector, Stanley Mulaik.

² Of or pertaining to the peninsula of Baja California.



FIGS. 288-295. 288. *Ammotrechula pilosa*, new species, ectal view of right female chelicera. 289. *Ammotrechula pilosa*, new species, mesal view of apical segments of left female palpus. 290. *Ammotrechula pilosa*, new species, ventral view of female genital opercula. 291. *Ammotrechula mulaiki*, new species, ectal view of right male chelicera. 292. *Ammotrechula mulaiki*, new species, mesal view of right male chelicera. 293. *Ammotrechula mulaiki*, new species, mesal view of apical segments of left male palpus. 294. *Ammotrechula peninsulana* (Banks), ectal view of right male chelicera. 295. *Ammotrechula peninsulana* (Banks), mesal view of right male chelicera.

gites dark, with two light submarginal spots on each sclerite forming a broad central and a pair of narrower lateral, longitudinal, dusky stripes; legs and palpi dusky on femora, tibiae, metatarsi, and proximal ends of tarsi, some specimens having light annuli at the apical ends of the metatarsi and no dusky area on the tarsi; eye tubercle dark; malleoli white to light yellow.

Dentition of chelicerae slightly atypical as shown in figures 294 and 295. Fixed finger lightly constricted dorsally above principal tooth and more strongly constricted above the anterior tooth, anterior and medial teeth modified into blunt spurs. Intermediate tooth of movable finger closer to anterior tooth than to principal tooth. Dental group of movable finger occupying slightly more than one-fourth of the length of the finger. Flagellum spatulate, not distinctly fringed except at the distal ends, with margins rolled mesally, covering about one-third of its mesal surface and extending forward to just in front of the anterior tooth of the fixed finger. Flagellum attachment disc directly above the second fondal tooth of the mesal row.

Palpi clothed with long and short hairs and a moderate number of cylinder bristles on the tarsi, metatarsi, and tibiae. Metatarsi and tibiae also provided ventrally with eight pairs of strong cylindrical spines. The proximal pair of spines on both segments are considerably longer and finer than the others.

Chelicerae about three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.2. Eyes slightly more than one diameter apart.

FEMALES: Total length, 13.0 to 19.0 mm. Chelicerae, 1.5 to 2.0 mm. wide and 4.3 to 6.0 mm. long. Propeltidium, 3.7 to 4.6 mm. wide and 2.6 to 3.5 mm. long.

Coloration and markings in alcohol same as in male, with some specimens having the leg markings extremely dark.

Dentition typical of the *Ammotrechinae* as shown in figure 297. Dorsal carina of fixed finger with peak over the second fondal tooth of the ectal row.

Palpal clothing same as in male.

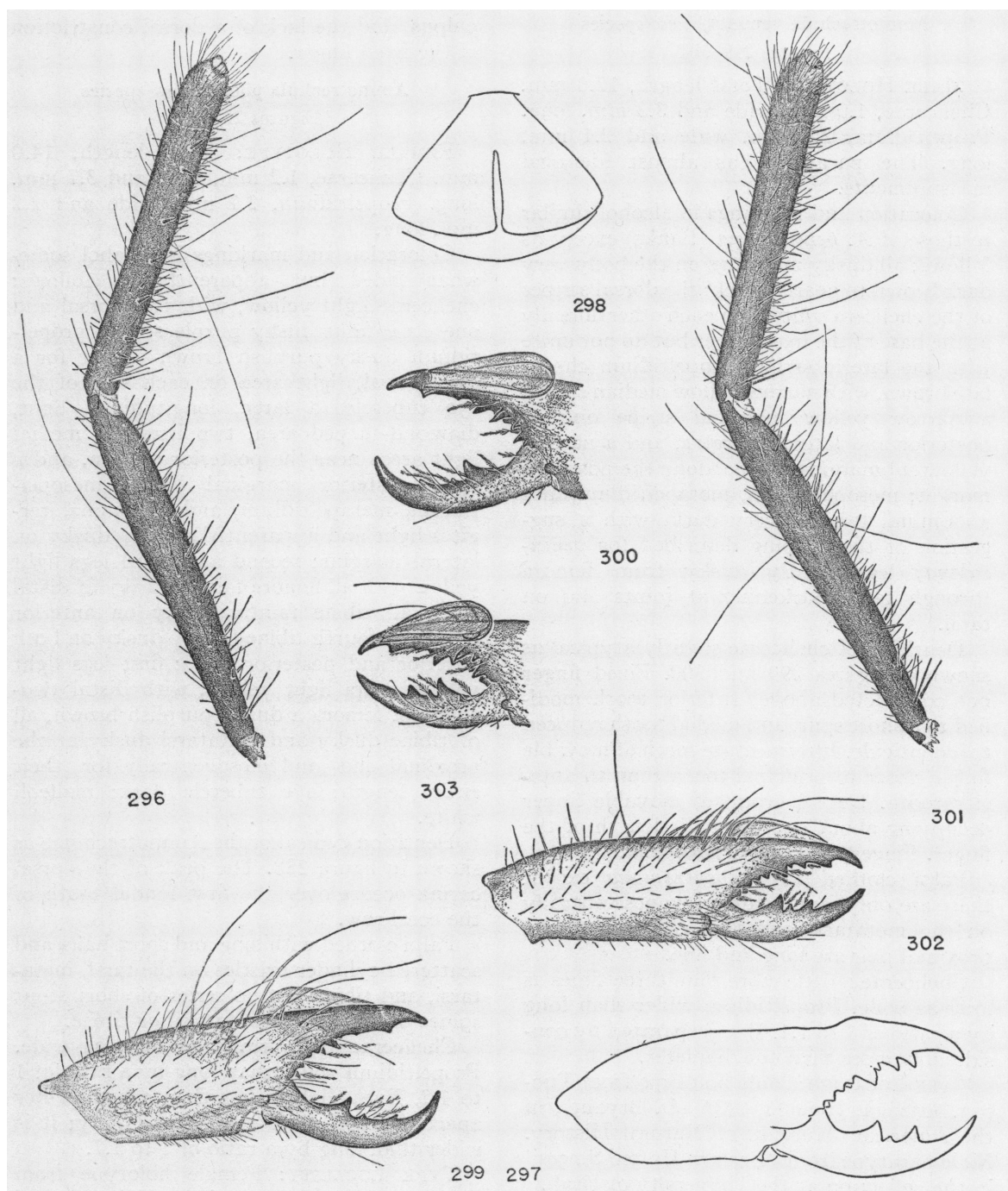
Structure same as in male except the pro-

peltidium is wider than long by a ratio of 1 to 1.4. Genital plate wider than long by a ratio of 1 to 1.5.

TYPE LOCALITY: Female types of *Cleobis peninsulanus* Banks from San José del Cabo, Baja California, Mexico, in the Museum of Comparative Zoölogy. Male type of *Cleobis hirsuta* Banks from San Miguel de Horcasitas, Baja California, Mexico, in the Museum of Comparative Zoölogy. Female type of *Cleobis texana* Kraepelin, No. 9099, from Texas, in the Paris Museum.

RECORDS: Arizona: Superior, west side of Picketpost Mountain, 2500 feet, Pinal County, June 1, 1940, one female; Thompson Southwestern Arboretum, 2300 feet, May 18, 1940, one male (D. C. Lowrie); Tucson, May 6, 1931, one male (Wehrle), two females, two males (O. Bryant); Phoenix, one female (J. Eliot Coit), August 18, 1939, one female (R. Roberts); Wickenburg, Yavapai County, June, 1937, one female, one young (E. G. Wright); Santa Cruz River bed, Tucson, November 23, 1910, one female (W. M. Wheeler); Patagonia Mountains, one female; Mesa, May 22, 1939, two males (Lola May Pearce), May 21, 1939, one male (May Anderson); Roosevelt, 4000 feet, one male (O. Bryant); Globe, Gila County, July 8, 1949, two males (F. Werner and W. Nutting); Brown's Canyon, east slope, Baboquivari Mountains, July 7, 1948, two males (F. Werner and W. Nutting). Texas: Raven Ranch, Kerr County, July–August, 1940, two males, June 5–August 19, 1940, three males, one female, one young, August, 1939, one female (S. and D. Mulaik); Tiger Villa, 1880, one female; Edinburgh, November, 1939, three males, one female, May, 1937, one male, three females, March 24, 1936, two females, May, 1937, one female, 1935, one male, one female (S. Mulaik); Rio Grande City, May 1, 1937, one female (N. Haynes); Sterling City, July 1, 1948, one female, (J. H. Robinson).

REMARKS: A study of Banks' types clearly showed their conspecificity, and a comparison of them with Roewer's redescription of Kraepelin's species indicated the synonymy. The species seems to be quite highly variable in color, as are *Ammotrecha stolléi* Pocock and *Ammotrechella stimpsoni* (Putnam).



FIGS. 296-303. 296. *Ammotrechula peninsulana* (Banks), mesal view of apical segments of left male palpus. 297. *Ammotrechula peninsulana* (Banks), ectal view of right female chelicera. 298. *Ammotrechula peninsulana* (Banks), ventral view of female genital opercula. 299. *Ammotrechula venusta*, new species, ectal view of right male chelicera. 300. *Ammotrechula venusta*, new species, mesal view of right male chelicera. 301. *Ammotrechula venusta*, new species, mesal view of apical segments of left male palpus. 302. *Ammotrechula cobinensis*, new species, ectal view of right male chelicera. 303. *Ammotrechula cobinensis*, new species, mesal view of right male chelicera.

Ammotrechula venusta,¹ new species

Figures 299–301

MALE HOLOTYPE: Total length, 12.0 mm. Chelicerae, 1.0 mm. wide and 3.3 mm. long. Propeltidium, 2.4 mm. wide and 2.1 mm. long. The paratype has almost identical measurements.

Coloration and markings in alcohol similar to those of *A. peninsulana* (Banks) except as follows: all dusky markings on the body very dark brown to nearly black; the dorsal stripes of the chelicera unite with each other dorsally at the base of the fixed finger but do not unite with the lateral stripe; propeltidium chocolate brown, with narrow yellow median stripe, a narrow yellow marginal stripe on the posterior and lateral margins, and a narrow yellow submarginal stripe along the posterior margin; mesopeltidium, metapeltidium, and abdominal tergites very dark, with a suggestion of the striping described for *peninsulana*; legs faintly dusky from femora through tarsi, darkening at joints and on tarsi.

Dentition of chelicerae slightly atypical as shown in figures 299 and 300. Fixed finger not constricted above, anterior tooth modified to a short spur, and medial tooth reduced to a denticule. Intermediate tooth of movable finger closer to principal tooth than to anterior tooth. Dental group of movable finger occupying about one-third the length of the finger. Flagellum as in *peninsulana*.

Palpi clothed as in *peninsulana* except there are only seven pairs of spines ventrally on the metatarsi and tibiae, of which the proximal pair are long and fine.

Chelicerae a little more than three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.1. Eyes separated by considerably more than one diameter.

TYPE LOCALITY: Male holotype from Tucson, Arizona, June 15, 1936 (O. Bryant), in the American Museum of Natural History. Male paratype from "Eastern United States" in the collection at the University of Utah.

REMARKS: This beautiful little species is very closely related to *A. peninsulana* (Banks). It can be separated by its color, the reduced number of spines on the ventral surface of the metatarsus and tibia of the

palpus, and the lack of a dorsal constriction of the fixed finger.

Ammotrechula pilosa,² new species

Figures 288–290

FEMALE HOLOTYPE: Total length, 14.0 mm. Chelicerae, 1.2 mm. wide and 3.7 mm. long. Propeltidium, 2.7 mm. wide and 2.2 mm. long.

Coloration and markings in alcohol somewhat faded but apparently as follows: chelicerae light yellow, with two dorsal and one ectal faint dusky purple stripe; propeltidium dusky purplish brown except for a small, oval, light area on each side of the eye tubercle, a large, longitudinal, light, diamond-shaped area, two irregular medial light areas near the posterior margin, and a light posterior marginal band; mesopeltidium, metapeltidium, and abdominal tergites light and apparently slightly dusky on lateral margins; second and third legs light yellow with all femora faintly dusky at distal ends, all tibiae faintly dusky on anterior faces and fourth tibiae faintly dusky on both anterior and posterior faces; first legs light yellow, palpi light yellow, with distal two-thirds of femora a dusky purplish brown, all of tibiae dusky and metatarsi dusky at the proximal end and mesoventrally for their entire length; eye tubercle dark; malleoli white.

Dentition typical of the Ammotrechinae as shown in figure 288. The peak of the dorsal carina occurs over the first fondal tooth of the ectal row.

Palpi clothed with long and short hairs and scattered cylinder bristles on the tarsi, metatarsi, and tibiae but no series of short stout spines on either the metatarsi or tibiae.

Chelicerae three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.2. Eyes slightly less than one diameter apart. Genital plate typical of family; it is wider than long by a ratio of 1 to 1.7.

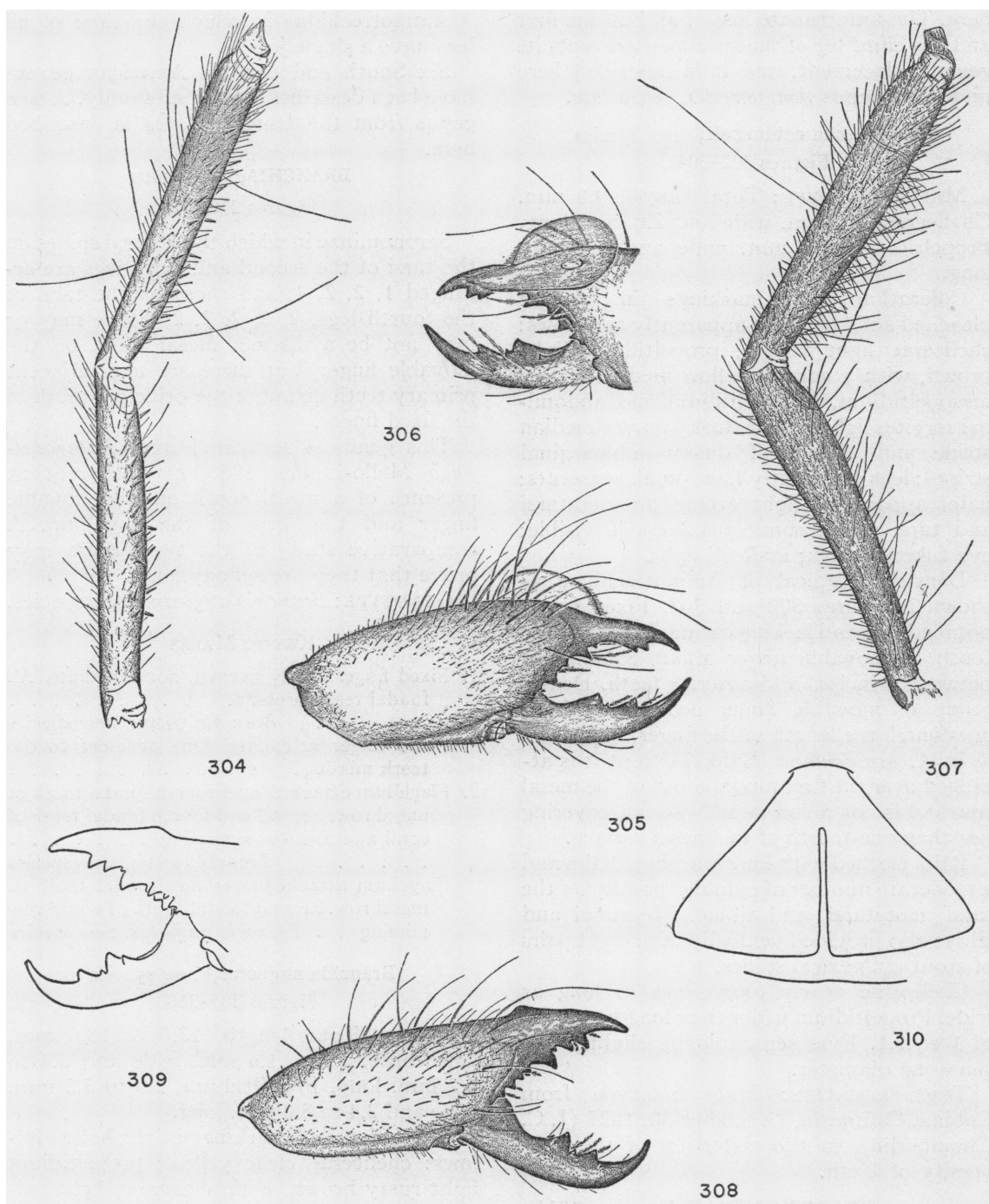
TYPE LOCALITY: Female holotype from Texas in the collection of the University of Utah.

UNPLACED AMMOTRECHINAE

A single male of a species that appears to be undescribed was studied and described

¹ Latin, *venustus*, elegant.

² Latin, *pilosus*, hairy; refers to the palpus.



FIGS. 304-310. 304. *Ammotrecha cobinensis*, new species, mesal view of apical segments of left male palpus. 305. *Branchia angustus*, new species, ectal view of right male chelicera. 306. *Branchia angustus*, new species, mesal view of right male chelicera. 307. *Branchia angustus*, new species, mesal view of apical segments of left male palpus. 308. *Branchia angustus*, new species, ectal view of right female chelicera. 309. *Branchia angustus*, new species, mesal view of right female chelicera. 310. *Branchia angustus*, new species, ventral view of female genital opercula.

elongate, light area on the posterior margin on each side of the medial yellow stripe; mesopeltidium, metapeltidium, and abdominal tergites light dusky purple, with a narrow light medial spot and a pair of light submarginal spots on each sclerite which form four longitudinal dusky stripes, these stripes being distinct on the peltidia but indistinct on the abdominal tergites; legs light, with dusky purple on apical three-fourths of femora, all of tibiae, and apical ends of metatarsi; palpi dusky on femora, tibiae, metatarsi, and tarsi, darkening on apical segments; eye tubercle dusky, with a light stripe between the eyes; malleoli light.

Dentition of chelicerae as shown in figures 305 and 306. Fixed finger attenuated between medial and principal teeth, anterior and medial teeth subequal in size, intermediate tooth small and situated near the base of the large principal tooth. Space between principal and medial teeth nearly twice that between anterior tooth and tip of finger. Intermediate tooth nearly equidistant from principal and anterior tooth. Dental group of movable finger occupying slightly less than one-third of the length of the finger. Ectal row of fondal teeth four in number and graded III, I, IV, II in size. Second fondal tooth of mesal row missing, remaining teeth graded I, III, IV in size. Flagellum subquadrate, with the forward projection abruptly narrowed, distinctly fringed at the margins on the distal half, with only the ventral margin regularly curled mesally and extending forward to the lateral level of the anterior tooth of the fixed finger. Flagellum attached to the finger directly over the first fondal tooth of the mesal row.

Palpi clothed with long and short hairs, a moderate number of cylinder bristles and irregularly scattered slender spines on the tarsi, metatarsi, and tibiae. There is no regular series of ventral spines on the metatarsi and tibiae.

Chelicerae about three times longer than wide. Propeltidium wider than long by a ratio of 1 to 1.1. Eyes separated by slightly less than one diameter.

FEMALE ALLOTYPE: Total length, 17.0 mm. Chelicerae, 1.5 mm. wide and 4.4 mm. long. Propeltidium, 3.0 mm. wide and 2.7 mm. long.

Coloration and markings same as in male except the abdominal markings are distinct.

Dentition typical of the Saronominae as shown in figures 308 and 309. Dorsal carina of fixed finger with peak over the second fondal tooth of the ectal row.

Both palpi missing.

Chelicerae about three times longer than wide. Propeltidium wider than long by a ratio of 1 to 1.1. Eyes about one diameter apart. Genital plate wider than long by a ratio of 1 to 1.1.

TYPE LOCALITY: Male holotype and three male paratypes from Twentynine Palms, California, July 1 to 15, 1945 (Jefferson H. Branch), in the American Museum of Natural History. Female allotype from Mesa, Arizona, May 21, 1939 (May Anderson), in the American Museum of Natural History. Male paratypes in the United States National Museum, the Museum of Comparative Zoölogy, the California Academy of Sciences, and the collection of the University of Nebraska.

RECORDS: California: Twentynine Palms, July 1 to 15, four males (Jefferson H. Branch).

REMARKS: Although the female described here was not collected with the males its coloration and structure are strikingly similar to those of the males. Rather than erect a separate species from a single female, I have assigned the specimen here.

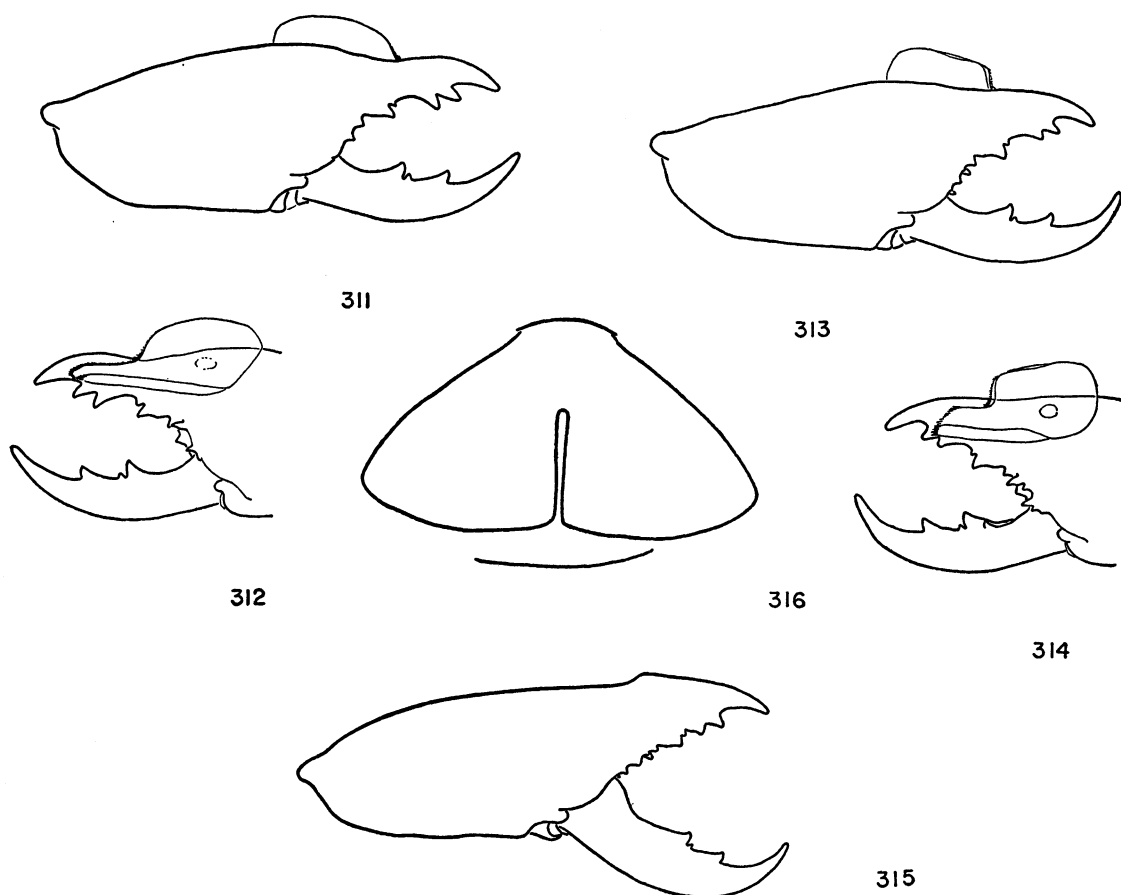
***Branchia brevis*,¹ new species**

Figures 311, 312

MALES: Total length, 11.0 to 13.0 mm. Chelicerae, 0.9 to 1.1 mm. wide and 2.6 to 3.0 mm. long. Propeltidium, 1.9 to 2.2 mm. wide and 1.4 to 1.8 mm. long.

Coloration and markings in alcohol much as in *Branchia angustus*, new species, except the dusky markings on the propeltidium are reduced to a faintly dusky submarginal spot at each postero-lateral corner, the dusky areas on the legs extend onto the proximal ends of the tarsi of the first and fourth legs and to the tarsi of the second and third legs, and the striping on the abdominal tergites may be obscure owing to a fading of the duskiess on the lateral margins.

¹Latin, *brevis*, short; refers to fixed finger of chelicerae.



FIGS. 311-316. 311. *Branchia brevis*, new species, ectal view of right male chelicera. 312. *Branchia brevis*, new species, mesal view of right male chelicera. 313. *Branchia potens*, new species, ectal view of right male chelicera. 314. *Branchia potens*, new species, mesal view of right male chelicera. 315. *Branchia potens*, new species, ectal view of right female chelicera. 316. *Branchia potens*, new species, ventral view of female genital opercula.

Dentition as shown in figures 311 and 312. Similar to that of *angustus* except the fixed finger is considerably shorter, with space between the principal tooth and the medial tooth equal to nearly equal to that between the anterior tooth and the tip of the finger. Second and fourth fonal teeth of both mesal and ectal rows missing. Flagellum as in *angustus* except it is attached over fourth fonal tooth of mesal row.

Palpi clothed as in *angustus*.

Chelicerae about three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.2. Eyes separated by slightly less than one diameter.

TYPE LOCALITY: Male holotype from Edinburg, Texas, March 15, 1939 (Stanley

Mulaik), in the American Museum of Natural History. Male paratype from Dallas County, Texas, July 10, 1938 (J. H. Robinson), in the American Museum of Natural History. Male paratype from Del Rio, Texas, July, 1947, in the Museum of Comparative Zoölogy.

RECORDS: Texas: Big Spring, May 22, 1948, one male (G. W. Chowns and B. B. Badger), May 10, 1948, one male (G. W. Chowns).

***Branchia potens*,¹ new species**
Figures 313-316

MALE HOLOTYPE: Total length, 12.0 mm. Chelicerae, 1.1 mm. wide and 3.1 mm. long.

Propeltidium, 2.4 mm. wide and 2.1 mm. long.

Coloration and markings in alcohol nearly identical with those of *B. angustus*, new species. Dusky markings light. Abdominal tergites darker on margins. Dusky markings on legs extend to tarsi; on the palpi onto the proximal ends of the tarsi.

Dentition as shown in figures 313 and 314. Fixed finger not narrowed or elongated between principal and medial tooth as in *angustus*, new species, or *brevis*, new species. There is no mesal tooth on the movable finger. Fondal teeth all present, ectal row graded in size III, I, IV, II, mesal row I, III, II, IV. Flagellum as in *angustus* except it is attached over third fondal tooth of mesal row.

Palpal clothing and structure as in *angustus*.

FEMALE ALLOTYPE: Total length, 2.0 mm. Chelicerae, 1.5 mm. wide and 3.7 mm. long. Propeltidium, 3.3 mm. wide and 2.4 mm. long.

Coloration and markings same as in male except the markings are more distinct.

Dentition similar to that of *angustus*, new species, as shown in figure 315. Fixed finger heavier than in that species and the primary teeth of the fixed finger are nearly equal in size. The peak of the dorsal carina occurs over the space between the third and fourth teeth of the ectal row.

Palpi clothed with long and short hairs, a few cylinder bristles, and scattered, moderately long spines. There are no series of spines on the ventral surfaces of the metatarsi and tibiae.

Chelicerae about 2.5 times longer than wide. Propeltidium wider than long by a ratio of 1 to 1.3. Eyes separated by slightly less than one diameter. Genital plate wider than long by a ratio of 1 to 1.6.

TYPE LOCALITY: Male holotype from Twentynine Palms, California, July 1 to 15, 1945 (Jefferson H. Branch), in the American Museum of Natural History. Female allotype from Dixie Desert, Utah, August 8, 1935 (A. M. Woodbury), in the collection of the University of Utah.

REMARKS: Although the male and female described under this species were collected at widely separated points, their strikingly similar coloration and structure indicate that they belong to the same species.

¹ Latin, *potens*, powerful; refers to fixed finger of chelicerae.

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