

The Great Basin Naturalist

VOLUME XII, 1952

VASCO M. TANNER, *Editor*



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TABLE OF CONTENTS

VOLUME XII

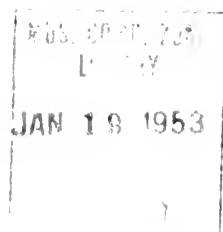
NUMBERS 1-4 — DECEMBER 24, 1952

Pacific Islands Herpetology No. VI. Tahiti and Marquesas Islands, New Guinea and Australia, Illustrations, Vasco M. Tamer	1
Further Records and Descriptions of American Millipeds, Illustrations, Ralph V. Chamberlin	13
Genus <i>Trepobates</i> Herrich-Schaeffer (Hemiptera; Gerriidae), C. J. Drake and F. C. Hottes	35
Some Heterosphyronid Pseudoscorpions From New Mexico, Illustrations, C. Clayton Hoff	39
Water-Striders From Territorio Amazonas of Venezuela (Hemiptera: Hydrometridae, Veliidae), Illustrations, Carl J. Drake	47
Notes on Two Little Known Aphid Papers Published by Luigi Macchiati, F. C. Hottes	55
Two New Species of Lachmini (Aphididae) From Colorado, F. C. Hottes,	57
A Land Planarian Collected in Utah, D E. Beck	62
<i>Diadophis Regalis Regalis</i> (B. & G.) Found in Nevada, Wilmer W. Tanner	63
A Record of the Occurrence of the Tick <i>Ixodes Muris</i> Bishipp and Smith on Muskrats in Utah, Glen M. Kohls	65
Plague Important Fleas and Mammals in Utah and the Western United States, Dorald M. Allred	67
Index to Volume XII	77

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Water-Striders From Territorio Amazonas of Venezuela (Hemiptera: Hydrometridae, Veliidae), Illustrations, Carl J. Drake	47
Notes on Two Little Known Aphid Papers Published by Luigi Macchiati, F. C. Hottes	55
Two New Species of Lachnini (Aphididae) From Colorado, F. C. Hottes,	57
A Land Planarian Collected in Utah, D E. Beck	62
<i>Diadophis Regalis Regalis</i> (B. & G.) Found in Nevada, Wilmer W. Tamer	63
A Record of the Occurrence of the Tick <i>Ixodes Muris</i> Bishipp and Smith on Muskrats in Utah, Glen M. Kohls	65
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The Great Basin Naturalist

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VOLUME XII

DECEMBER 24, 1952

Nos. I-IV

PACIFIC ISLANDS HERPETOLOGY NO. VI TAHITI AND MARQUESAS ISLANDS, NEW GUINEA AND AUSTRALIA. (1)

VASCO M. TANNER

Professor of Zoology and Entomology
Brigham Young University
Provo, Utah

Since the first paper in this series appeared (2) considerable additional material has been sent to the writer for study, and deposition in the University Herpetological Collections. In 1950, a small collection of lizards was made on the Marquesas and Society (Tahiti) Islands by George E. Magnesson and Phillip K. Humphreys. These two Zoology students of Prof. W. W. Tanner's were engaged in a shipping adventure which took them to these islands for a period of about six weeks. Six of the eight species reported by Schmidt and Necker, 1933, are represented in this collection. *H. leucostictus* Stej. and *Ablepharus b. poecilopleus* (Wieg.) were not collected.

LIZARDS FROM MARQUESAS AND SOCIETY ISLANDS

Family GEKKONIDAE

LEPIDODACTYLUS LUGUBRIS (Dum. & Bibr.)

Dumeril and Bibron, Erpet. Gen. III, p. 304, 1836.

BYU 10095-96	Takaroa Island Tuamotu Group, Society Islands	(George E. Magnesson, Phillip K. Humphreys)	April, 1950
BYU 10067-68	Nukahiva Island Taiohae Bay, Marquesas Islands	(Geo. E. Magnesson, Phillip K. Humphreys)	April, 1950
BYU 10070-72	Pueu, Tahiti (East District)	(Geo. E. Magnesson, Phillip K. Humphries)	April 8, 1950
BYU 10076-78 10080	Punaauia, Tahiti (West District)	(Geo. E. Magnesson, Phillip K. Humphreys)	May 2, 1950

(1) Contribution No. 129 from the Department of Zoology and Entomology, Brigham Young University.

(2) The Great Basin Naturalist, Vol. IX, nos. 1-2, Dec., 1948.

This common and wide spread house-gecko agrees in the main with specimens which have been studied from Mariara, Dutch East Indias, and Solomon Islands. The scale count and measurements of seven specimens is as follows: lamellae fourth toe 4 (13), 3 (12); supralabial 2 (11), 4 (12), 1 (13); infralabial 1 (9), 3 (10), 3 (11); length average 82 mm. In coloration the specimens agree with the Morotai and Solomon Island ones. One specimen has a regenerated tail which is 7 mm. wide and with two short forks. It looks very much like the fasciation of some plant leaves.

Fifteen eggs were collected at Punaauia, Tahiti, attached to plant leaves. Some eggs were just about ready to hatch. The shell was removed from two perfectly formed specimens. The lamellae and the head scales of these immature forms, agree with adults of this species. The eggs are white, almost perfectly round, and 8 mm. in diameter.

HEMIDACTYLUS GARNETHII (Dum. & Bibr.)

Dumeril and Bibron, Erpet. Gen. III, p. 368, 1836.

BYU 10080 Nukahiva Island (Geo. E. Magnesson, April, 1950
Taiohae Bay, Phillip K. Humphreys)
Marquesas Islands

Rostral quadrangular, with a median groove; nostril surrounded by the rostral and three nasals; twelve supralabials; ten infralabials; mental large; a pair of chin shields, the posterior pair separated from the labials; lamellae under the fourth toe fourteen; tail missing.

Color light grey above, with some brown spots; ventral surface white. Taken along the sea shore in Taiohae Bay.

GEHYRA MUTILATA (Wiegmann)

Wiegmann, Nova. Acla. Ac. Leop. Carol. XVII, p. 238, 1836.

BYU 10069 Nukahiva Island, (Geo. E. Magnesson, April 1, 1950
Marquesas Islands Phillip K. Humphreys)
BYU 10079 Punaauia (Geo. E. Magnesson, May 2, 1950
Tahiti Phillip K. Humphreys)

Rostral wider than high, nostril surrounded by three nasals, the first labial and the rostral; supralabials nine; infralabials eight; chin shields three pair, the inner pair large and elongate; lamellae divided, six pair.

Color, whitish with dark brown spots on the back.

GEHYRA OCEANICA (Lesson)

Lesson, Voyage Coquille, Zool. II, I, p. 42, 1830

BYU 10065-66 Nukahiva Island, (Geo. E. Magnesson, April 1, 1950
Marquesas Islands Phillip K. Humphreys)
BYU 10075 Punaauia (Geo. E. Magnesson, May 2, 1950
Tahiti Phillip K. Humphreys)

A common species throughout the south Pacific Islands. These specimens agree with specimens studied from Morotai and Solomon Islands.

Family SCINCIDAE

LYGOSOMA (LEIOLOPISMA) NOCTUA NOCTUA (Lesson)

Lesson, Voyage Coquille Zool. II, p. 48, 1830

- | | | | |
|--------------|--|--|----------------|
| BYU 10073-74 | Pueu, Tahiti | (Geo. E. Magnesson,
Phillip K. Humphreys) | April 15, 1950 |
| BYU 10082-84 | Nukahiva Island
Taiohae Bay,
Marquesas Islands | (Geo. E. Magnesson,
Phillip K. Humphreys) | April, 1950 |

Rostral broader than high, in contact with the frontonasal by a broad suture; nostril in the nasal. Ear opening oval and smaller than the lower eyelid disk, no lobules, seven supralabials: six infralabials: midbody scales 26 rows: lamellae under the fourth toe 18-21. It should be noted that there are fewer lamellae on the fourth toe in these and the Guadalcanal specimens than the ones from Morotai. This along with size and color pattern may justify recognizing it as a distinct race.

EMOIA CYANURA (Lesson)

Lesson, Voy. Coquille Zool. II, p. 49, 1830.

- | | | | |
|--------------|---|--|----------------|
| BYU 10062-64 | Nukahiva Islands
Taiohae Bay,
Marquesas Islands | (Geo. E. Magnesson,
Phillip K. Humphreys) | April 1, 1950 |
| BYU 10097 | Takaroa, Tuamotu
(Coral atoll
Archipelago) | (Geo. E. Magnesson,
Phillip K. Humphreys) | April 5, 1950 |
| BYU 10098 | Papeete, Tahiti | (Geo. E. Magnesson,
Phillip K. Humphreys) | April 27, 1950 |
| BYU 10099 | Pueu, Tahiti
(Sea shore) | (Geo. E. Magnesson,
Phillip K. Humphreys) | April, 1950 |

Similar in scalation and color to the Guadalcanal specimens which were reported on in a previous study. There are twenty-six to thirty scale rows around the middle of the body. Seven supralabials: six infralabials, sixty-three to seventy smooth lamellae under the fourth toe and six to seven compressed lamellae distad of the smooth ones. The length of the largest specimen No. 10063, is 127 (52 + 75) mm.

Color is dark brown to black with three dorsal stripes, one medium and two lateral; each stripe involves parts of two rows of scales. Under color greenish-blue to white. These specimens are well preserved.

SOME LIZARDS FROM NEW GUINEA

The specimens for this report, collected by Mr. Ernest Reim-schiüssel, were taken at Hollandia, Dutch New Guinea in 1945. Mr. Wm. (Max) Weston was stationed at Lae, just north of Salamaua in western British New Guinea.

Family SCINCIDAE

LYGOSOMA (SPHENOMORPHUS) VARIEGATUM

STICKELI Loveridge Fig. 1

Loveridge, Bull. Mus. Comp. Zool. Vol. 101. (2) p. 345, 1948.

BYU 7882-83 Hollandia, New Guinea (E. Reimschiüssel) Jan. 16, 1945

Rostral more than twice as wide as high; frontonasal undivided; single nasal; no supranasal; supraoculars six; supralabials eight; infralabials seven; submental much larger than the mentals; scale rows at middle of body forty; dorsal scales not larger at sides and under surface; lamellae under fourth toe twenty-five to twenty-six; length of body 44 and 41 mm. Tails in both specimens damaged.

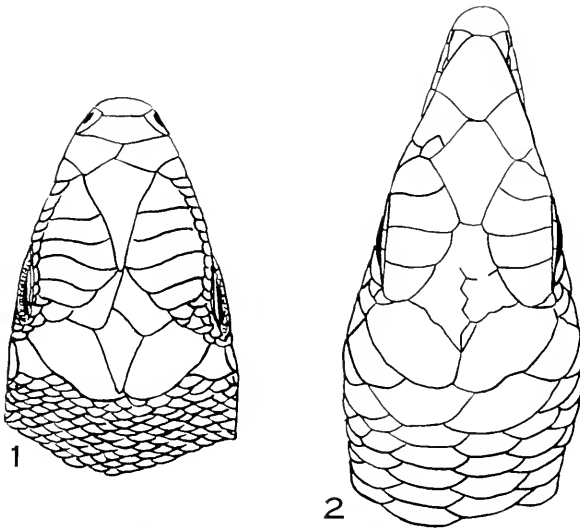


Fig. 1 *Lygosoma (Sphenomorphus) variegatum stickeli*
Loveridge. 5x. (Original)

Fig. 2. *Emoia kordoana* (Meyer). 5x. (Original)

Color light brown above with dark and white blotches; sides with dark spots, which forms a faint streak which extends back on to the proximal part of the tail. Under surface of body and tail pinkish.

LYGOSOMA (LYGOSOMA) SOLOMONIS SCHODEI Vogt

Vogt, Sitzb. Ges. Naturf. Freunde, Berlin, p. 6, 1912.

BYU 7875, Hollandia, New Guinea (E. Reimschiessel) Jan. 30, 1945
7877,
7893

Rostral a little higher than wide. Nasal entire, supraoculars four: supralabials seven to eight; infralabials six to seven; mental, submental and three pair of chin-shields large; scale rows at middle of body twenty-six to twenty-nine; lamellae under fourth toe fifteen to sixteen. Length of specimen No. 7877, 122 mm.

Color brown with small black blotches on back, sides and tail; under surface pinkish to brownish.

LYGOSOMA (LEIOLOPISMA) MIOTIS Boulenger

Boulenger, Ann. Mag. Nat. Hist. (6) XVI, p. 29, 1895.

BYU 7862 Lae, British New Guinea (Wm. (Max) Weston) Dec., 1944

Rostral two times as wide as high; nostril in single scale; fronto-nasal as broad as long; supraoculars four, the two anterior ones in contact with the frontal; frontoparietal single; interparietal and parietals large; lower eyelid with transparent disk; supralabials seven; infralabials seven; lamellae under fourth toe seventeen and nineteen; midbody scale rows twenty-six. Length of body thirty-nine mm.; tail missing.

Color dorsal and ventral light, with lateral and mid dorsal rows of brown spots.

LYGOSOMA (LEIOLOPISMA) FUSCUM LUCTUOSUM (P. & D.)

Peters and Doria, Ann. Mus. Civ. Stor. Nat. Genova, 13, p. 364, 1878.

BYU 7886 Hollandia, New Guinea (E. Reimschiessel) Jan. 16, 1945

Rostral twice as broad as high; nostril surrounded by the inter-nasal, postnasal and first supralabial; frontal in contact with the frontonasal, longer than the frontoparietal and very small interparietal; lower eyelid with transparent disk; supraoculars four; supralabials seven, fifth large and in contact with lower eyelid. Mid-body scale rows thirty-seven; lamellae under fourth toe thirty-two. Length 146 (61 + 85) mm.

Color, dark brown above; gray and pinkish on venter and under tail.

EMOIA CAERULEOCAUDA de Vis

de Vis, Ann. Queensland Mus. No. 2, p. 12, 1892.

BYU 8884 Dutch, New Guinea (S. G. Jewett, Jr.) April, 1945

Rostral wider than high; frontonasal in contact with the rostral; prefrontals small, separated; frontal in contact with the frontonasal;

frontoparietal fused with the interparietal; four supraoculars; seven supralabials; seven infralabials; lower eyelid with transparent disk; ear opening oval with anterior lobules as guards; lamellae under the fourth toe forty-five; scale rows around the middle of the body thirty; preanal scales enlarged. Length 124 (44 + 80) mm.

Color, dorsal black with three longitudinal bluish green stripes and a lateral stripe extending from the ear opening to the hind leg. Under color whitish.

EMOIA BAUDINI BAUDINI (D. & B.)

Dumeril and Bibron, Erpet. Gen. V, p. 653, 1839.

BYU 7892, Hollandia, New Guinea (E. Reimschiessel) Jan. 16, 1945
7894

Rostral one and one half times as wide as high; prefrontals shorter than the frontal; frontoparietal as long as broad, fused with the small interparietal; four supraoculars; eight supraciliaries; seven supralabials, six infralabials; lamellae under fourth toe. 38-40; midbody scale thirty-eight. Length 105 (40 + 65) mm.

Color, six rows of mid dorsal scales light brown, bordered by five lateral rows of dark scales. A light band which involves two rows of scales borders the ventral light colored scales.

EMOIA TROPIDOLEPIS (Boulenger)

Boulenger, Trans. Zool. Soc. London, 20, p. 260, 1914.

BYU 7864 Lae, British (Wm. (Max) Weston) March, 1945
New Guinea

Rostral twice as wide as high, in contact with the first supralabial, nasal, internasal, and frontonasal; prefrontal and frontonasal fused; frontal, frontoparietals and interparietal fused; four large supraoculars; supralabials eight; infralabials seven; mental, submental and two pair of chin-shields large; lower eyelid with transparent disk. Ear opening round with three small anterior lobules; midbody scale rows thirty-eight, strongly keeled; lamellae on underside of fourth toe forty-nine; body length thirty-seven mm.; tail missing.

Color dark brown above, under-surface light brownish.

The lamellae are higher in number than reported by Loveridge, otherwise it agrees very closely with the description of this species.

EMOIA KORDOANA (Meyer) Fig. 2

Meyer, Monatsb. Berlin Akad. Wiss., p. 133, 1874.

BYU 7865, Lae, British New Guinea (Wm. (Max) Weston) 1944
7866

Rostral twice as wide as high; nostril in a nasal scale which is closely bordered above by the supranasal; frontonasals in broad contact with the rostral, broader than long; four supraoculars; ear opening oval, with three short anterior lobules; lower eyelid with a transparent disk; eight supralabials; seven infralabials; mental and submental large. Scale rows around the middle of the body, twenty-four and twenty-eight; lamellae on the underside of the fourth toe sixty-nine proximal smooth ones, and nine sharp edged distal ones.

Length of specimen No. 7866, 148 (55 + 93) mm. No. 7865, 116 (55 + 61) mm.

Color above uniformly blackish with an iridescent sheen; below a suffusion of black on the light scales. No trace of color lines or band.

Dr. W. C. Brown suggests that Meyer's *kordoana* from Kordo, near Mysore Island, coast of New Guinea, be recognized and that the specimens above be considered as belonging to this species. Burt and Burt, 1932, follows Schuz in considering "*kordoanus*" as a synonym of *Emoia cyanura*. The specimens under consideration differ some in scale structure and color from the Solomon Islands specimens with which I have compared them.

NOTES ON SOME AUSTRALIAN REPTILES

Family TYPHLOPIIDAE

TYPHLOPS DIVERSUS Waite

Waite, Rec. South Austr. Mus., I, p. 31, 1918.

BYU 7832 Guambi, Queensland (J. H. Williams January, 1945
Australia Mackay, Australia
Gift to E. Reimschiissel)

This specimen was given to Mr. Reimschiissel by J. H. Williams who has an interesting small museum in Mackay. I reported in detail on this species in 1948.

Family GEKKONIDAE

HETERONOTA BINOEI Gray

Gray, Cat. Lizards, Brit. Mus. p. 174, 1845.

BYU 7834 Guambi, Queensland (J. H. Williams January 24, 1945
Australia presented to
E. Reimschiissel)

Rostral twice as wide as high; supralabials seven; infralabials seven; mental large; two submental scales; eyes prominent; dorsal tubercles fourteen; lamellae under fourth toe nineteen; length 100 (41 + 59) mm.

Mr. Reimschiissel visited Australia for ten days in 1945 on a "rest leave" from Morotai. At Mackay, Australia, he visited Mr. Williams and his museum collections. This was a great help and stimulus for Mr. Reimschiissel, as a result of which he made a number of interesting collections and learned considerable about that area of Australia.

According to Loveridge (1934) this species is fairly wide spread over Australia. Mr. Edgar R. Waite (1929, p. 76) makes the following observations which are applicable to the specimen before me: "It is the last of our simple-toed geckoes, that is, those in which the fingers and toes are not dilated and have non-retractile claws."

OEDURA LESUEURII (D. and B.)

Dumeril and Bibron, Erpet, Gen. 3, p. 392, 1836.

BYU 7888 Mackay, Queensland (E. Reimschiissel) Jan. 24, 1945
Australia

This specimen with a length of 107 mm. (65 + 42); thirteen supralabials; eleven infralabials; dorsal scales small and glandular; no preanal pores; tail roundish, with a diameter the same as the body at the groin and anal regions, is a perfect one. The color is brown above with spots of lighter ground color, under surface colorless. Mr. Reimschiissel collected this specimen under the bark of a dead tree.

Family PYGOPODIDAE

LIALIS BURTONIS (Gray)

Gray, Proc. Zool. Soc., p. 134, 1834.

BYU 7833 Queensland, Australia (J. H. Williams)

This snake-lizard which is legless has a light grey dorsal and a dark brown ventral color on the body, but with a dark brown streak extending from the nostrils back through the eyes on the anterior part of the body. This streak is bordered ventrally by a few rows of white scales. The head is long, pointed and covered with scales. This species is wide-spread throughout Australia. This family of lizards is endemic to the Australian region.

Family AGAMIDAE

AMPHIBOLURUS BARBATUS (Cuvier)

Cuvier, Regne Animal, 2 ed., II, p. 35, 1829.

BYU 7908 Brisbane, Queensland (E. Reimschiissel) Feb. 22, 1945
7858 Australia

Mr. Reimschiissel collected this small bearded lizard in the grass near a road. It was not easily frightened. The body and tail length is 123 (49 + 74) mm.

Family SCINCIDAE

TRACHYSAURUS RUGOSUS Gray

Gray, King's Voy. Australia, II, p. 430, 1827.

BYU 11108 (20) Australia A mounted specimen. A gift from Dr. Karl P. Schmidt and the Chicago Natural History Museum.

This is a valued specimen in the reptile collection of the University. It represents a distinctive endemic Australian Scincid.

LYGOSOMA (SPHENOMORPHUS) F. FASCIOLATUS (Gunther)

Gunther, Ann. Mag. Nat. Hist. (3), 20, p. 47, 1867.

BYU 7858 Mackay, Queensland (E. Reimchiessel) Jan. 24, 1945
Australia

Rostrum just a little broader than high, frontonasal in contact with the rostral and prefrontals; frontal longer than the combined frontoparietals and interparietal; fifth supralabial in contact with the lower eyelid. Infralabials eight; lamellae beneath the fourth toe twenty-two. Midbody scale rows, No. 7845, 38; No. 7858, 35; total length 127 (43 + 84) mm.

Color dark brown with two faint lateral whitish bands; throat streaked with blackish lines; belly pinkish.

The two specimens reported here have the prefrontals in contact thus separating the frontal from the frontonasal, otherwise they are in perfect agreement with description and specimens of *fasciolatus* I have studied.

LYGOSOMA (SPHENOMORPHUS) TENUIS BRACHYSOMA

(Lonnberg and Anderson)

Lonnberg and Anderson, Svenska Velensk. Akad. Handl. Stockholm, 52, No. 7, p. 5, 1915.

BYU 7855 Mackay, Queensland (E. Reimschiessel) Jan. 24, 1945
Australia

Rostral one and one half times as broad as high; frontonasal forming a suture with the rostral and with the frontal; frontoparietals two; interparietal large, almost separating the parietals; supralabials seven; infralabials seven; ear opening large; lamellae under the fourth toe nineteen. Body length 33 mm. tail damaged.

Color, back and tail with transverse light and dark bands. ventral surface whitish.

This single specimen was taken along with specimens of *Ablepharus b. metallicus*.

LYGOSOMA (LEIOLOPISMA) FUSCUM (D. and B.)

Dumeril and Bibron, Erpet. Gen. 5, p. 759, 1839.

BYU 7881 Mackay, Queensland (E. Reimschiessel) Jan. 17, 1945
Australia

Rostral twice as broad as high; frontonasal in contact with the rostral and the frontal; frontoparietal single; interparietal small; fifth supralabial large and in contact with the lower eyelid; transparent disk as large as ear opening; digets four; toes five; lamellae under the fourth toe thirty-one; midbody scale rows thirty-three; total length 129 (50 + 79) mm.

Color dark uniform brown above, grayish and pinkish below.

LYGOSOMA (LEIOLOPISMA) PERONNII (D. and B.)

Dumeril and Bibron, Erpet. Gen. V., p. 760, 1839.

BYU 7836 Mackay, Queensland (E. Reimschiessel) Jan. 22, 1945
11025 Australia

Rostral two and one-half mm. wide and one mm. high; supralabials seven; infralabials seven; frontoparietal single; interparietal small; transparent disk of lower eyelid larger than the ear opening; four digits; five toes; lamellae under the fourth toe twenty-five; midbody scales thirty, strongly bicarinate dorsally and tricarinate laterally. Length 113 (42 + 71) mm.

Color, dark brown above, white below.

LYGOSOMA (LEIOLOPISMA) TRILINEATA (Gray)

Gray, Ann. Nat. Hist., 2, p. 291, 1839.

BYU 7856 Mackay, Queensland (E. Reimschiessel) Jan. 24, 1945
7890 Australia

Rostral one and one half times as broad as high; frontonasal in contact with the rostral and frontal; interparietal small; frontoparietal single, large, as long as the frontal; supralabials seven; infralabials seven; transparent disk in lower eyelid a little larger than the ear opening; pentadactyle; lamellae beneath the fourth toe twenty-three; submental large in contact with the first and second infralabials, preanal scales enlarged; twenty-four rows of smooth midbody scales. Length 77 (35 + 42) mm.

Color dark brown above; brownish to whitish below.

The adressed limbs do not meet; the lamellae are 23 and 24 beneath the fourth toe and there are no body streaks on either of the specimens. These may represent another species or race, but I am reluctant to assign them to other than the above species.

ABLEPHARUS BOUTONII METALLICUS Blgr.

Boulenger, Cat. Liz. Brit. Mus., 3, p. 347, 1887.

BYU 7838, Mackay, Queensland (E. Reimschiüssel) Jan. 24, 1945
7841, Australia
7844,
7846-52,
7854,
7857,
7859-60,
7889,
11107.

Rostral one and one half times as broad as high; nostril in a single large scale; frontonasal in narrow contact with the rostral; prefrontals large with a wide medium suture; in some of the specimens one of the prefrontals is divided into two scales; frontal small, making a very narrow contact with the large single frontoparietal; the second pair of supraoculars almost meet on the medium line; parietals large, in contact with a single pair of nuchals; fifth supralabial large and in contact with the lower ocular scale row; ear opening small; pentadactyle. Average length 95 mm.

Color. all adult specimens blackish brown, some small young specimens with faint white lateral lines.

Corporal Reimschiüssel reports taking these specimens near water and moist situations.

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FURTHER RECORDS AND DESCRIPTIONS
OF AMERICAN MILLIPEDS

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In this paper are given some records and descriptions of millipeds pertaining to several widely separated families as represented in the cabinets of the Chicago Natural History Museum. Other families have been reported upon elsewhere. This material has been studied through the courtesy of Dr. Karl P. Schmidt, director of that museum. Most of this material was collected by Dr. Schmidt himself and Henry S. Dybas, and much appreciation is due these men for their interest in the group.

Order CHORDEUMIDA
Family CLEIDOGONIDAE

CLEIDOGONA **MANDELI** Chamberlin, new species

Dorsum black each side of a median dorsal pale line; within the black area on each metatergite there are on each side two small light dots and a larger light spot adjacent to a black spot on upper part of the side, these larger light spots more or less confluent into a longitudinal stripe; the sides below the black spots light orange in color; head dusky, with antennae black or nearly so; legs dusky yellow, with the tarsus darkest, being black or nearly so.

Head clothed in front with rather numerous short setae, these sparse above.

Eyes subsemicircular in outline, the caudal side being truncate and the anterior convex; ocelli arranged in 5 or 6 series, e.g., 6, 6, 5, 4, 3, 1.

Ninth legs of male as represented in fig. 4. Coxae of tenth and eleventh legs as shown in figs. 5 and 6.

The gonopods of the male as represented in fig. 7.

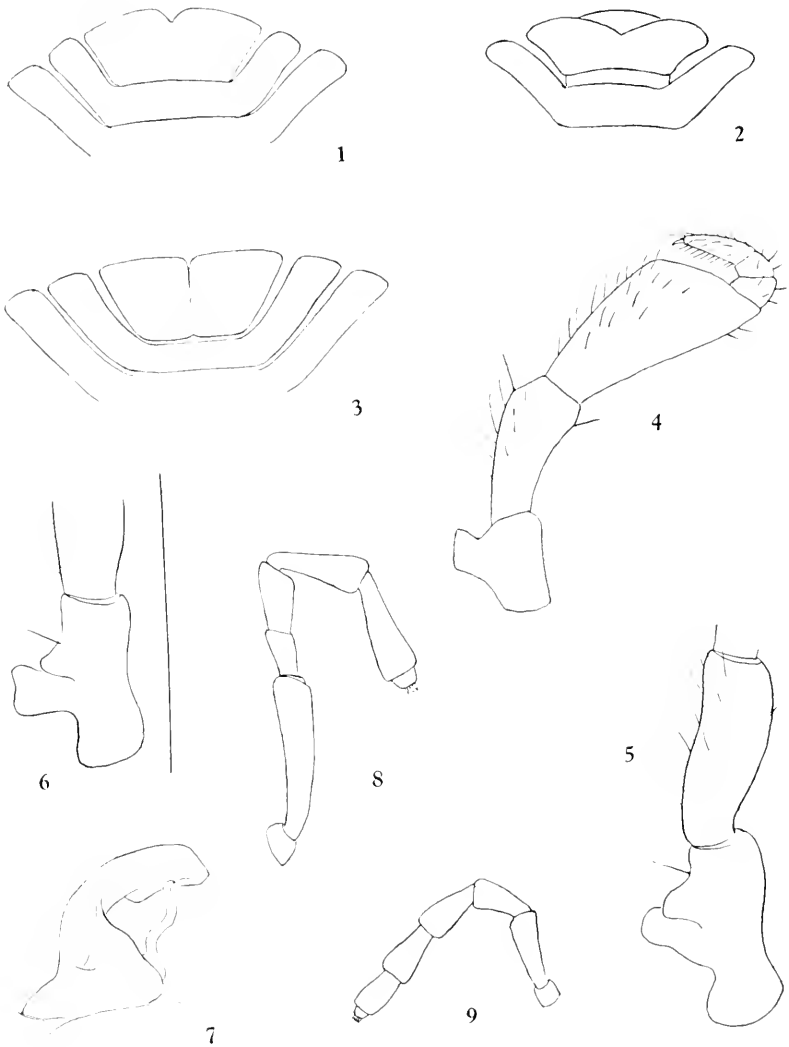
Length. 10-12 mm.

LOCALITY: Guatemala: Volcan Tajumulco. The male holotype and two females were collected at an elevation of between 8,000 and 12,000 feet "under logs and bark," by K. P. Schmidt, on Feb. 13, 1934. (Leon Mandel Expedition.)

CLEIDOGONA **PUNCTIFER** Chamberlin, new species

A larger species than either of the other two here named.

The dorsum is dark brown or nearly black, without a median



EXPLANATION OF FIGURES

I

- Fig. 1. *Platydesmus crucis* n. sp. Anterior end, dorsal view.
 Fig. 2. *Platydesmus excisus* n. sp. Anterior end, dorsal view.
 Fig. 3. *Platydesmus perditus* n. sp. Anterior end, dorsal view.
 Fig. 4. *Cleidogona mandeli* n. sp. Ninth leg of male.
 Fig. 5. The same. Basal portion of tenth leg of male.
 Fig. 6. The same. Basal portion of eleventh leg of male.
 Fig. 7. The same Gonopod of male (same scale as for figs 4-6.)
 Fig. 8. *Prostemmiulus atypus* n. sp. Antenna.
 Fig. 9. *Prostemmiulus obscurus* n. sp. Antenna.

dorsal light line or stripe and with the dark color extending down on each side to the middle of the latter; on each side of each metazorite three small light dots about the bases of the setae and between the median and ventral of these a light area marked with a network of dark lines; lower part of sides from light to dull yellow; head dusky over the vertex, light in front and below; antennae black; legs dusky over yellow.

Eyes with ocelli arranged thus: 7, 6, 5, 4, 3, 1.

Length, 18 to 21 mm.

LOCALITY: Guatemala: Chichivac. Three females taken by Dr. Schmidt, Feb. 4-7, 1934. (Mandel Expedition).

CLEIDOGONA TAJUMULCO Chamberlin, new species

A larger, more robust, form than *mandeli* but smaller than *punctifer*.

The black area on each side of the middorsal line on each metatergite encloses two small light dots; the sides entirely light colored, without a series of black dots over the glands, these areas only slightly darkened; the upper part of sides pale orange, the lower part and the venter clear yellow; head yellow on the sides and lower part of face, more orange above; antennae dusky except the last two articles which, in the type, are yellow; legs yellow.

Penult article of antennae only slightly thickened, clavate. Ocelli in six series, these, counting from above downward, being as follows: 7, 6, 5, 3, 2, 1. Length, about 15 mm.

LOCALITY: Guatemala: Volcan Tajumulco. One female taken by K. P. Schmidt, Feb. 13, 1934. (Mandel Expedition).

Family LYSIOPETALIDAE

SPIROSTREPHON LACTARIUM (Say)

Julus lactarius Say, 1821, Journ. Acad. Nat. Sci. Phila., Vol. 2, p. 104.

Spirostrephon lactarium Brandt, 1840, Recueil, p. 90.

LOCALITY: Tennessee: Great Smokey Mt. Nat. Park. Gatlinburg. Two specimens taken June 6-13, 1842, by H. Dybas.

Order STEMMIULIDA

Family STEMMIULIDAE

PROSTEMMIULUS **ATYPUS** Chamberlin, new species

Differing from *P. cooki* Chamb., the only other species thus far reported from Guatemala, in wholly lacking the conspicuous mid-dorsal yellow stripe and the other yellow markings of the latter

species. The general color above is bluish brown, with pale mottlings, the color grading into the yellow of the lower sides and the venter; collum and vertex of head brown mottled with paler spots, the color on the collum solid over the borders; antennae blackish, and the legs yellow.

Ocelli 2 on each side as usual, with the upper one about twice the diameter of the lower one. Antennae as shown in fig. 8.

Collum margined below and up the front as typical, with three sulci above the lower end on each side.

Differing from *cooki* in having oblique striae not only up the sides but in the middorsal area as well.

Number of segments, 51. Width, 2.4 mm.

LOCALITY: Guatemala: Escobas, opposite Point Barrios. One female taken by K. P. Schmidt. Nov. 27, 1933. (Mandel Expedition).

PROSTEMMIULUS OBSCURUS Chamberlin, new species

Color of dorsum and sides nearly black, some segments showing a lighter annulus about metazonites, yellow ventrally; collum with a network of blackish lines and solid black borders; vertex of head similarly areolated; a solid black band between the antenna and eye of each side and those of the other; antennae black; legs yellow.

The upper ocellus on each side much larger than the lower one as usual. Antennae with articles proportioned as shown in fig. 9.

The collum with but two striae above the margining sulcus on each side, these fine.

The series of oblique striae on the tergites extends up the side but none occur in the middorsal area.

Number of segments, 38. Width, 1.8 mm.

LOCALITY: Haiti: Kenshoff at El. 4,500 ft. One female taken by K. P. Schmidt. (Crane Field Museum Pacific Expedition).

Order JULIDA

Family JULIDAE

BRACHYIULUS PUSILLUS (Leach)

Julus pusillus Leach, 1814, Trans. Linn. Soc. London, Vol. 11, p. 379.

Julius exiguus Brandt, 1841, Recueil, p. 85.

Julius virgatus Wood, 1864, Proc. Acad. Nat. Sci. Phila., p. 14.

Julus stuxbergi Fanzaro, 1875, Atti Soc. Veneto-Trent., Vol. 4, p. 150.

Brachyiulus littoralis Verhoeff, 1898, Archiv. Naturg., p. 154, pl. 6, fig. 29.

Microbrachyiulus littoralis Jawlowski, 1939, Frag. Fauna Mus. Zool. Polonici, Vol. 4, p. 154.

LOCALITY: Illinois: Chicago. Several specimens taken by H. Dybas, Mar. 20, 1942.

DIPLOIULUS CAERULEOCINCTUS (Wood)

- Julus caeruleocinctus* Wood, 1864, Proc. Acad. Nat. Sci. Phila., p. 14.
Julus multistriatus Walsh, 1866, Practical Entomologist, pp. 34, 70.
Julus londinensis Porat Bidrag. t. yan. Sver., Dipl. p. 28.
Julus teutonicus Pocock, 1900, Ann. Mag. Nat. Hist. p. 206.
Cylindroiulus londinensis teutonicus Jackson, 1915, Lanc. and Ches. Nat., p. 433.
Diploiulus londinensis caeruleocinctus Chamberlin, 1922, Proc. Biol. Soc. Wash., Vol. 35, p. 8.

LOCALITY: Illinois: Plano, two specimens taken by H. Dybas.
 New York: Rose, several taken Sept. 22, 1926, by A. C. Weed.

DIPLOIULUS HORTENSIS (Wood)

- Julus hortensis* Wood, 1864, Proc. Acad. Nat. Sci. Phila., p. 14.
Julus luscus Meinert, 1868, Naturh. Tidsskr., Vol. 8, p. 9.
Julus oweni Bollman, 1887, Entom. Amer., Vol. 2, p. 228.
Julus frisius Verhoeff, 1891, Berlin Ent. Zeitschr., Vol. 36, p. 133.
Diploiulus luscus Chamberlin, 1921, Proc. Biol. Soc. Wash., p. 81.
Diploiulus hortensis Chamberlin, 1947, Proc. Acad. Nat. Sci. Phila., Vol. 99, p. 35.

LOCALITIES: Illinois: Along the Desplaines, near River Forest; three specimens taken by A. C. Weed, Nov. 26, 1922.

California: Balboa Park, San Diego, numerous specimens taken by Morton Moran, Aug. 25, 1940, these immature.

Los Angeles, a male and female taken by Gordon Grant, Mar. 29, 1936.

JULUS MORELETI Lucas

Julus moreleti Lucas.

LOCALITIES: Bermudas: Hamilton, one taken by K. P. Schmidt on Nov. 22, 1928 (Crane Mus. Pacif. Exped.), and one taken Aug. 28, 1905 (Bean no. 1045); Seamount, Smith's Parish, one, Oct. 18, 1905 (Bean no. 628).

OPHYIULUS PILOSUS (Newport)

- Julus pilosus* Newport, 1842, Proc. Ent. Soc. London, Vol. , p. .
Julus longabo Koch, 1847, Syst. der Myr., p. 113.
Julus canaliculatus Wood, 1864, Proc. Acad. Nat. Sci. Phila., 12.
Julus laqueatus Wood, 1864, Proc. Acad. Nat. Sci. Phila., p. 13.
Julus fallax Meinert, 1868, Naturh. Tidsskr., Vol. 5, p. 15.
Ophyiulus fallax Jawlowski, 1939, Frag. faun. Mus. Zool. Polonicie, Vol. 4, p. 153.

LOCALITY: England: one taken by Henry Field in Oct., 1936.

Family NEMASOMIDAE

BLANIULUS GUTTULATUS (Bosc)

- Julus guttulatus* Bosc, 1792, Bull. d. I. Soc. Philom. Paris, p. 12.
Julus pulchellus Leach, 1814, Trans. Linn. Soc. London, Vol. 11, p. 379.
Blaniulus guttulatus Garvais, 1836, L'Institut, p. 435.

LOCALITIES: Illinois: Chicago; one taken by H. Dybas, Oct., 1940.

California: San Diego, Balboa Park; one taken by Morton Moran, Sept. 22, 1940.

NOPOIULUS MINUTUS (Brandt)

Julus minutus Brandt, 1841, Recueil, p. 89.

Julus pusillus Say, 1821, (Preocc.), J. A. Nat. Sci., Phila., Vol. 2, p. 105.

Nemasoma minutum Bollman, 1887, Proc. U.S.N.M., Vol 10, p. 324.

Nopoiulus minutus Chamberlin, 1922, Proc. Biol. Soc. Wash., Vol. 35, p.9.

LOCALITY: Tennessee: Smoky Mt. Nat. Park, Gatlinburg. June 13-19, 1942, H. Dybas, collector.

Family PARAIULIDAE

ANIULUS IMPRESSUS (Say)

Julus impressus Say, 1821, Journ. Acad. Sci. Phila., Vol. 2, p. 102.

Paraiulus impressus Bollman, 1887, Ann. N. Y. Acad. Sci., Vol. 4, p. 32.

Aniulus impressus Chamberlin, 1941, Bull. Univ. Utah, Biol. Ser., Vol 5, No. 7, p. 3.

LOCALITIES: Illinois: Glenview, Oct. 13, 1940, W. J. Beecher coll.;

Willow Springs, Cook Co., Apr. 5, 1942, several taken by H. Dybas;

Olive Branch, May 8, 1907, one female by P. M. Barber.

Indiana: Dune Acres (Mineral Sps.), Porter Co., one taken by H. Dybas.

HAKIULUS DIVERSIFRONS (Wood)

Julius diversifrons Wood, 1867, Proc. Acad. Nat. Sci. Phila., Vol. 19, p. 43.

Parajulus castaneus Bollman, 1887, Ent. Amer., Vol. 2, p. 286.

LOCALITIES: Illinois: Thatcher's Woods, River Forest, three taken Nov. 3, 1922, by A. C. Weed.

Palos Park, one by W. J. Beecher, Oct. 26, 1940.

Indiana: Dune Acres (Mineral Sps.), Porter Co., one by H. Dybas; Smith's Woods, N.E. Springville, one taken by W. J. Beecher, Oct. 19, 1952.

PARAIULUS SCHMIDTI Chamberlin, new species

Body light brown with dark, nearly black, annuli on prozonites which fade out down the sides, a median black line along dorsum inclusive of anal tergite; on the anterior tergites, including the collum, a close network of dark lines; antennae dusky brown and legs pale.

Collum strongly narrowed down the sides, but the ends narrowly rounded; margined as usual and with one short longitudinal sulcus above the lower end on each side.

Segmental sulcus distinct throughout on the ordinary segments, not excurved opposite the pore which is twice or more its diameter from the sulcus. Prozonites anteriorly with encircling striae, with a band adjacent to the sulcus crossed by fine, irregular, longitudinal striae.

Cauda acute, straight, and much surpassing the anal valves.

Gonopods as shown in figs. 20, 21.

Width, 1.5 mm.

LOCALITY: Guatemala: Volcan Tajumulco. One male and two females taken by K. P. Schmidt on Feb. 16-18, 1934.

PARAIULUS VIGANUS Chamberlin, new species

Figs. 17-18

Light brown to yellow, dorsally dusky from the presence of a network of darker lines, with the segments showing an encircling dark line or stripe just back of position of pore; collum with a network of dark lines, the dark color solid at borders; head yellow, with vertex covered by a network of dark lines, a dark band between eyes enclosing a yellow spot adjacent to each antennal socket and a pair of much smaller dots higher up; caudal segment dusky; legs yellow and antennae dusky.

Stipes of male as shown in fig. 18.

Collum margined as usual; lower margin on each side straight or slightly convex; immediately above lower margin one (female) or two (male) longitudinal striae.

Segmental sulcus of the ordinary segments distinct throughout, slightly excurved opposite the pore which is removed from it by about a diameter. Striae of prozonites normal and the usual series of longitudinal striae on metazonites below, the series not extending up above middle on sides.

Cauda of anal tergite straight, acutely pointed and much surpassing the valves. Gonopods as drawn (Figs. 17, 19).

Number of segments, 45. Width of female, 2 mm.; of male, 1.5 mm.

LOCALITY: Mexico: Vera Cruz. Las Vigas. Four specimens taken June 30, 1941, by H. Dybas.

TUNIULUS OREGONENSIS (Wood)

Julius oregonensis Wood, 1864, Proc. Acad. Nat. Sci. Phila., Vol. 15, p. 11.
Codiulus oregonensis Chamberlin, 1940, Bull. Univ. Utah, Biol. Ser., Vol. 5, No. 7, p. 19.

Tuniulus oregonensis Chamberlin, 1941, Bull. Univ. Utah, Vol. 6, No. 4, p. 18.

LOCALITY: Washington: Happy Lake, Olympia Mts. One female taken by "Museum Expedition."

Order SPIROSTREPTIDA

Family PHALLORTHIDAE

Apparently distinguished from the Spirostreptidae sens. str., according to my present interpretation of the gonopods of the male, in having the posterior as well as the anterior legs of the seventh segment modified and functioning as gonopods instead of having the posterior pair missing.

Genus **PHALLORTHUS**, new

Probably a primitive genus in which the posterior gonopods are retained and applied to the caudomesal side of the anterior gonopods. Anterior gonopods retaining three articles which are distally separated.

Generotype: *Phallorthus colombianus*, new species

PHALLORTHUS COLUMBIANUS Chamberlin, new species

Figs. 10, 11

Body brown or dull chestnut, the prozonites in part showing as narrow yellow annuli; anal segment without lighter markings; collum light chestnut, with borders darker; head light chestnut excepting a round dusky or black spot mesodorsad of each antennal socket; legs yellow and antennae brown.

Median sulcus of vertex of head distinct, ending anteriorly in a small depression. Eyes widely separated, the ocelli unpigmented in the type specimen, arranged in three series. Clypeal foveolae 2 + 2. Surface of head smooth and shining throughout.

Collum with anterior margin widely and evenly convex, the caudal margin straight; lateral margin short, a little incurved at middle, with anterolateral corner more widely rounded than the subrectangular or slightly obtuse posterior corner; sulci on each side in the male holotype six on each side, these less sharply impressed and less regular in the female.

Segmental sulcus on the ordinary segments strongly impressed throughout, not bent or excurved at the level of the pore which is contiguous with it. Prozonites with numerous encircling striae. Surface of metazonites appearing smooth and shining, but under good magnification, showing irregular, fine and somewhat wavy lines or striae.

Anal tergite and valves without special furrows or roughening. Anal scale with caudal margin convex over middle portion and concave toward each end.

Sternites and legs of male without special processes; the last two joints of the anterior legs along ventral surface with a series of stout spiniform setae of about the same length as the claw.

Anterior gonopods with terminal division a closely papillose lobe. What is regarded as the posterior gonopod is closely applied to the anterior gonopod on its caudomesal side; each excavated at

its distal end and at caudal border of the excavation bearing a series of long setae and at mesal side a styliform process. (Cf. figs. 10 and 11).

LOCALITY: Colombia: vicinity of Santa Marta and Mauzanaris on River Kondo. Male holotype and several females collected Aug. 6, 1902 by H. W. Howland.

Family SPIROSTREPTIDAE

GYMNOSTREPTUS VENTRALIS (Porat)

Spirostreptus ventralis Porat, 1876, Bih. Svensk. Vet. Akad. Handl., Vol. 4, No. 7.

Gymnostreptus ventralis Brolemann, 1902, Ann. Soc. Ent. France, Vol. 71, *Gymnostreptus (Cochliogonus) ventralis* Verhoeff, 1945.

LOCALITY: Brazil: Therezopolis, July 9, 1926. K. P. Schmidt coll.; five miles north of Therezopolis. Nov. 29, 1926, el. 3,000 ft. K. P. Schmidt coll. (Capt. M. Field Brazilian Exped.).

ORTHOPORUS **BISULCATUS** Chamberlin, new species

Body with alternate rings of chocolate, or black, and yellow, the dark annuli narrowing down the sides and the yellow annuli correspondingly widening; collum entirely black; legs ferruginous.

Vertex of head finely shagreened, the head elsewhere essentially smooth. Ocelli in five series.

Collum on each side with two deep oblique sulci immediately above the margining sulcus; wings bent nearly vertically downward, depressed over middle portion; surface in general smooth.

Ordinary tergites appearing smooth to the naked eye, but under good magnification appearing finely punctate, especially toward the sides; the series of longitudinal striae below on the metatergites continuing up to within a short distance of the pore.

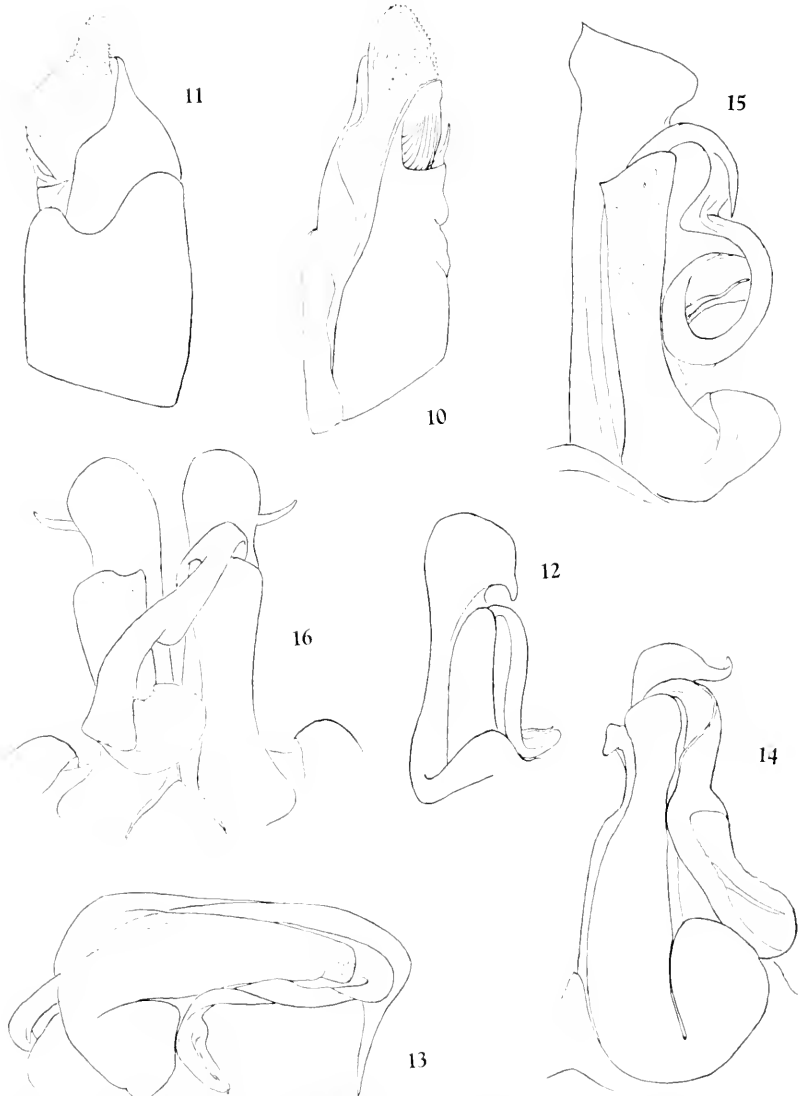
Caudal tergite depressed transversely just in front of the caudal angle; surface finely roughened with punctae. Anal scale broad, the caudal margin with median angle obtuse but well rounded.

Number of segments, 62.

Width, 4.2 mm.

LOCALITY: Mexico: Vera Cruz, Tejeria. One female taken by H. Dybas, Apr. 19, 1941.

Figures
II



- Fig. 10. *Phallorthus colombianus* n. sp. Right gonopod, caudal aspect.
 Fig. 11. The same. Right gonopod, anterior aspect.
 Fig. 12. *Orthoporus euthus* n. sp. Right gonopod, anterior aspect.
 Fig. 13. *Orthoporus gracilior* n. sp. Right gonopod, anterior aspect.
 Fig. 14. *Orthoporus unciferens* n. sp. Right gonopod, anterior aspect.
 Fig. 15. *Scaphiostreptus simplex* n. sp. Right gonopod, anterior aspect.
 Fig. 16. *Scaphiostreptus dybasi* n. sp. Gonopods, anterior aspect, the telopodite of left one not shown.

ORTHOPORUS **BOBOS** Chamberlin, new species

In general appearance the body is dark above and much lighter over the sides and venter. The metazonites dark, brownish, in a band behind the sulcus, the caudal border of this band deeper in color and the band fading out down the sides; between this band and the caudal margin a lighter band which usually darkens somewhat down the sides, but the sides as a whole appearing brownish yellow; anal segment light yellow; collum light, with darker borders; vertex of head with a reticulation of dark lines, and below this a triangular dark area with apex downward, deepest in color above and enclosing some paired light spots; the head otherwise yellow. Legs and antennae yellowish or in part of a ferruginous cast.

Eyes separated by nearly twice their transverse length; ocelli in six series. Median sulcus distinct.

Anterior corners of collum well rounded and lower margin of keel conspicuously convex; characterized by having above the lower margin six nearly longitudinal sulci, all of which run forward from the caudal margin and rise but little anteriorly.

On the ordinary segments the sulcus is deeply impressed throughout, widely slightly excurved opposite the pore which is removed from it by not more than one fifth the distance from sulcus to caudal margin. Prozonites with encircling striae as usual. Metazonites densely and rather coarsely puncto-rugose, the series of longitudinal sulci ending below the level of pore.

Elements of the anal segment normal.

Number of segments, 59. Width, 3.2 mm.

LOCALITY: Guatemala: Bobos River, Izabal. One female taken on Dec. 15, 1933, by K. P. Schmidt. (Mandel Expedition).

While represented only by the female, leaving the genus in some doubt, the species should be readily recognized from its small size, coloration, position of repugnatorial pore, sculpturing, and especially the characteristic striation of the collum.

ORTHOPORUS **CIENEGONUS** Chamberlin, new species

In size and coloration suggesting *C. torreonus*, but the dark annuli are broader, covering the metazonites not only behind the segmental sulcus but embracing a portion of the segment in front of it; the anal valves and tergite black or chocolate colored instead of light brown or golden; legs and antennae black.

Vertex of head densely finely punctate; sulcus as usual. Eyes somewhat less than twice their transverse length apart; ocelli in six moderately curving series.

Collum with anterior corner of wing not produced in the female, rounded; above the lower margin three curving, oblique sulci, with a short one between the lower two in front of the caudal margin.

Segmental sulcus on ordinary segments complete and distinct. Pore more than one third the distance from the sulcus to the caudal margin. Prozonites with the usual striation. Metazonites densely finely punctate with some longitudinal rugae; series of striae below and extending up close to the pore, the upper two or three short.

Anal tergite finely punctate like the other tergites; a transverse, shallow depression in front of the caudal end. Anal scale with margin each side of obtuse median angle a little concave.

Number of segments, 69. Width, 9 mm.

LOCALITY: Mexico: Cienego de Flores. Two females taken by H. Dybas. June 14, 1941.

ORTHOPORUS COBANUS Chamberlin

Orthoporus cabanus Chamberlin, 1922, Proc. U.S. Nat. Mus., Vol. 60, art. 8, No. 2403, p. 16.

LOCALITY: Coban. Several males and females, Mar. 18, 1934, taken by K. P. Schmidt. This is the type locality.

ORTHOPORUS CROTONUS Chamberlin, new species

A strongly banded form in which the annuli back of the sulci are chestnut to chocolate in color, a narrow band just in front of each of these of a lighter brown color and the anterior portion yellow; anal segments chocolate colored; head chocolate excepting the lighter, more reddish, clypeal area; collum chocolate colored, without lighter markings; legs and antennae chocolate colored to nearly black.

Collum with anterior corners not at all produced, obtuse; above the lateral margin three deep sulci which run first nearly horizontally and parallel with the lower margin, then bend at an angle obliquely upward and forward, with a shorter minor sulcus above and typically one below these major sulci.

On the ordinary segments the sulcus is deeply impressed throughout and is obtusely angled opposite the pore which is only about its diameter from the sulcus. The longitudinal sulci below on metazonites strongly marked, the series on middle and posterior segments failing to reach level of pore by a wide distance. Striation of prozonites normal.

Anal tergite slightly ridged along the middle, with no transverse depression or sulcus; surface finely punctate like the other tergites.

Anal scale with margin each side of angle a little concave as usual.
Number of segments, 72. Width, 10 mm.

LOCALITY: Texas: Croton Springs, north of Chisos Mts., Brewster Co. Two females taken by K. P. Schmidt, July 24, 1937.

ORTHOPORUS **EUTHUS** Chamberlin, new species

Fig. 12

The body conspicuously ringed with narrow reddish annuli, one about caudal border of each segment, the segments otherwise bluish grey, the amount of blue variable. Legs ferruginous.

Median sulcus of head ending anteriorly at a dusky band between eyes. Inner angles of eyes acute; ocelli in five transverse series; eyes separated by twice their diameter. Clypeal foveolae 2 + 2.

Collum with anterior margin nearly straight across its middle, bent back at level of eye in a rounded obtuse angle and then running nearly straight to the subrectangular anterior corner; posterior corner well rounded off; a sharply impressed sulcus beginning at caudal margin a little mesad of the lateral corner and running obliquely toward eye, with three sulci between this and the margining sulcus; surface otherwise smooth and shining.

Other tergites in general very finely coriaceously roughened. Segmental sulcus not at all, or, in the female, slightly widely excurred at level of pore which is well removed from it; sulcus beaded throughout by short, close-set, cross striae.

Anal scutum with surface densely finely punctate or coriaceous. Anal scale with caudal margin slightly obtusely angled at middle.

Anterior legs in male with ventral pads on penult and antepenult joints.

Gonopods characterized by having inner lamina produced at ectocaudal corner of the distally expanded portion into a short, blunt, retrose cone. See further fig. 12.

Number of segments, 61-63. Width of male, 3.2 mm.; of female, 4.2 mm.

LOCALITY: Guatemala: Tiquisate, Esquintla. A male and female taken by K. P. Schmidt, Jan. 1, 1904. (Mandel Expedition).

ORTHOPORUS **GRACILIOR** Chamberlin, new species

Fig. 13

General color cinereous to yellowish; strongly annulate with dark bands which are deeper in color dorsally than laterally, this

dark annulus following the segmental sulcus; anal segment light, in part ferruginous; legs and antennae ferruginous.

Clypeal foveolae 3 + 3. Vertex of head smooth and shining, the sulcus fine and rather weak. Eyes twice or more their greatest diameter apart, comparatively small, the ocelli forming but three longitudinal series.

Collum bowed strongly forward between the very obtuse anterior corners in front of which widely convex, but the median portion nearly straight; two deep, oblique sulci above the margining sulcus on each side; surface smooth and shining.

Segmental sulcus on other tergites sharply impressed throughout. Covered portion of prozonites with encircling striae few but distant. Metazonites densely finely punctate or coriaceous and the exposed part of prozonite somewhat more finely marked. Series of longitudinal sulci on metazonites not reaching up to the pore.

Caudal tergite finely punctate like the other tergites. Anal scale with caudal margin straight.

Gonopods with ectal cone long, slender and straight and nearly transverse; lateral lamina scabrous in an area near the end. See further fig. 13.

Number of segments, 77. Width, 3.2 mm.

LOCALITY: Guatemala: Volcan Tajumulco. A male and female taken at an elevation of 4,000 to 6,500 ft. by K. P. Schmidt on Feb. 21, 1934. (Leon Mandel Expedition).

ORTHOPORUS **TEHUACANUS** Chamberlin, new species

In this species the metazonites are mostly blue or bluish black with caudal borders of segments ferruginous and the prozonites yellow or orange; head dark above, somewhat chestnut below; anal segment black; legs ferruginous and antennae a darker chestnut.

Eyes subpyriform in outline, being broad across ectal end and narrowing mesad; ocelli in 8 or 9 transverse and moderately curved series. Vertigial sulcus only faintly indicated. Clypeal setae 2 + 2.

Anterior corners of collum obtuse, narrowly rounded; lateral margin a little incurved; on each side above the margining sulcus four deep sulci which are oblique, the uppermost of these beginning at posterior corner and curving obliquely forward and upward.

Segmental sulcus on other segments deeply impressed throughout, widely but only moderately excurved or obtusely angled opposite the pore which is located more than one third the distance from sul-

cus to caudal margin. Prozonites with the usual encircling striae. Metazonites with the usual series of longitudinal striae below and the series continued with shorter striae entirely across the dorsum; surface of metazonites densely puncto-rugose.

Elements of the segment normal.

Number of segments, 73. Diameter, 5 mm.

LOCALITY: Mexico: Puebla, Tehuacan. One female taken by H. Dybas at El. 5,500 ft. on July 6, 1941.

ORTHOPORUS UNCIFERENS Chamberlin, new species

Fig. 14

Dark brown, in part nearly black, with rings of light brown or yellowish which widen down the sides; legs ferruginous.

Clypeal foveolae 2 + 2. Head smooth above clypeus up to level of antennae; vertex with the usual median sulcus but no interocular culcus, its surface finely densely punctate or coriarius. Ocelli in 5 slightly curved rows.

Collum with anterior lateral corners obtuse, with apex truncate; on each side above the margining sulcus four long, oblique sulci; surface very finely and closely punctate.

Surface of ordinary tergites finely puncto-rugose. The striae as usual.

Anal tergite densely finely punctate, without rugae. Anal scale with caudal margin forming a wide, obtuse angle.

Ectal cone of inner lamina of gonopods curved conspicuously caudad; on mesal margin proximad of level of distal end of outer lamina a conspicuous truncate process. Distal expansion of telopodite beginning above middle of its free portion, the expanded only somewhat boat-shaped. See further fig. 14.

Number of segments, 63. Width, 4mm.

LOCALITY: Guatemala: El Provenir. San Marcos. One male taken by K. P. Schmidt, Mar. 5, 1934.

SCAPHIOSTREPTUS SIMPLEX Chamberlin, new species

Fig. 15

Body conspicuously ringed with narrow reddish or chestnut annuli about the caudal borders of the segments; in front of each of these annuli a narrow annulus of yellowish color, the broader remaining portion of the segment olivaceous. Legs and antennae light, somewhat ferruginous brown.

Clypeal foveolae 2 + 2. Above the clypeal setae the face is

glabrous and is marked with sparse and very fine punctae but is otherwise smooth and shining. A fine but distinct sulcus between inner angles of eyes. Eyes separated by somewhat more than their transverse diameter.

Collum with anterior margin straight across its middle, laterally moderately concave mesad of each anterior corner, the latter subrectangular; posterior corner rounded off; on each side above the margining sulcus 4 or 5 principal sulci.

On the ordinary segments the prozonites have the usual striation. Metazonites smooth and shining, the series of longitudinal striae extending upward close to the pore.

Anal tergite smooth. Anal scale very wide, slightly obtusely angled at middle.

Gonopods without lateral cones, the lateral margin simply rounded. Lateral margin without a dark claw-like process at end, its distal margin with a series of short, coarse setae or spinose. A femoral spine present, this straight, acute and of moderate size. Genuiculate distad of femoral spine, beyond this bend curving into a circle, with an expanded terminal lamina and a slender seminal stylus. See further fig. 15.

Number of segments, 58.

Length, about 100 mm.; width, 6.8 mm.

LOCALITY: Venezuela: probably near Caracas. One male, H. Irene coll., May 3.

SCAPHIOSTREPTUS TEXICOLENS (Chamberlin)

Orthoporus texicolens Chamberlin, 1938, Proc. Biol. Soc. Wash., Vol. 51, p. 207.

LOCALITY: Texas: Brownsville. One male taken by A. C. Weed, Sept. 8, 1923.

SCAPHIOSTREPTUS DYBASI Chamberlin, new species

Body bluish black, annulate with sharply defined bands of chestnut color, the annuli duller and less clearly defined when animal is dry; head dark over the vertex, becoming lighter down the front, with clypeal region and the antennae chestnut; collum narrowly bordered with chestnut; anal segment black or nearly so. Legs ferruginous.

Head smooth and shining. Vertigial sulcus distinct, ending in a depression at level of antennae. Eyes separated by their transverse length or but little more; ocelli in 5 or 6 series, the sixth or lowermost series embracing but 1 or 2 ocelli.

Keels of collum with two longitudinal oblique and deep sulci on each side above lower end; surface smooth.

On the following segments the prozonites lack any distinct encircling striae. Metazonites minutely punctate above; the lateral series of longitudinal striae not reaching to pore. Segmental sulcus distinct throughout, not excurved at level of pore which is separated from it by less than a diameter.

Anal tergite normal. Anal scale broadly triangular with the obtuse caudal angle rounded.

In the male, pads project distad from penult and antepenult joints of legs.

Gonopods in situ with the telopodites crossing each other at the middle line in front of the coxite. For details of structure see fig. 16.

Number of segments, 67. Width, 5.4 mm.

LOCALITY: Mexico: Vera Cruz, El Fortin. One male taken at 3,000 ft. by H. Dybas, July 10, 1941.

SPIROSTREPTUS (?) **ERGUS** Chamberlin, new species

Entire body with legs and antennae black, without annuli or other markings.

Vertigial sulcus extending across vertex to a fine, nearly obsolete line between eyes. Eyes large, with ocelli in six series, the eyes separated by somewhat less than their transverse diameter.

Wings of collum with anterior corners produced forward, the corner in outline moderately acutely rounded at apex. Above lower margin three principal oblique sulcis and a shorter one between the upper two of these. Surface of collum smooth.

Segmental sulcus very fine but distinct throughout on the following segments. The pore widely separated from the sulcus, being about one third the distance from the latter to the caudal margin. Surface of segments appearing smooth and shining but under good magnification seen to be densely punctate, the punctae fine. Prozonites with the usual encircling striae. Metazonites with longitudinal striae only below.

Anal tergite with surface as on other tergites. Anal scale broadly triangular, the median angle obtuse and the margin each side convex.

Number of segments, 64. Width, 9.2 mm.

LOCALITY: Venezuela: probably near Caracas. One female taken by Hermano Irene.

Order CAMBALIDA

Family CAMBALIDAE

CAMBALA ANNULATA (Say)

Julus annulata Say, 1821, Journ. Acad. Nat. Sci. Phila., Vol. 2, p. 103.

Julus annulata Say, 1821, Journ. Acad. Nat. Sci. Phila., Vol. 2, p. 103.

Cambala annulata Gray, 1832, in Griffith, "Cuvier's Animal Kingdom," Vol. 15, pl. 135.

LOCALITY: North Carolina: Asheville. A male and female taken Jan. 8, 1933, by Edw. Brundage, Jr.

CAMBALA SALTILLONA Chamberlin

Cambala saltillona Chamberlin, 1943, Bull. Univ. Utah, Biol. Ser., Vol. 8, No. 2, p. 3, figs. i, 2.

LOCALITY: Saltillo, Stephens Co., Texas. A male and female taken by K. P. Schmidt. (Types of the species).

Family LEIODERIDAE

LEIODERE ANGELORUM Chamberlin

Leiodere angelorum Chamberlin, 1943, Bull. Univ. Utah, Biol. Ser., Vol. 8, No. 2, p. 5, fig. 5.

LOCALITY: Los Angeles, California. June 5, 1936. Two females taken by G. Grant.

Order COLOBOGNATHA

Family ANDROGNATHIDAE

BRACHYCYBE LECONTEI Wood

Brachycybe lecontei Wood, 1864, Proc. Acad. Sci. Phila., p. 187.

LOCALITY: Tennessee, Great Smoky Mts. Nat. Park, several taken by Dr. Charles H. Seeversam. June 10, 1940; same park at Greenbriar Cove, many specimens taken by H. Dybas, June 14-19, 1942.

Family PLATYDESMIDAE

PLATYDESMUS CALUS Chamberlin, new species

With a strongly marked and distinctive color pattern. General color of dorsum, yellow; 5 pairs of longitudinal black stripes in sequence from head caudad, each pair beginning near middle line and diverging caudad so as to leave a narrowly sagittate yellow area between them, there being thus six of these sagittate areas, the point of each contacting the base of the preceding one. On the base of each contacting the base of the preceding one. On the base of each keel a black area enclosing at mesal end a large yellow spot and running out on keel to a narrowly acute point. Upper part of head black, enclosing a pair of yellow spots between bases of antennae. Venter and legs yellow.

Eyes present.

Collum notched at middle of anterior border nearly as in *crucis* but the margin each side of the notch straighter and more nearly strictly transverse. Anal tergite surpassed by the keels of the preceding tergite.

On the ordinary tergites the tubercles are much fewer than in *crucis*: in both rows the tubercles decrease in size ectad and neither series extends to the keels.

Sternites very wide, wider proportionately to the legs than in *crucis*.

Number of segments, 43.

Length, 13 mm.; width, 3.8-4 mm.

LOCALITY: Mexico: Vera Cruz Penuela. July 15, 1941, two specimens taken by H. Dybas. Also Vera Cruz at El Fortin, two specimens taken Aug. 8, 1941, by H. Dybas.

Distinct from other known species in color pattern and proportions of body.

PLATYDESMUS CRUCIS Chamberlin, new species

Fig. 1

Dorsum brown, a lighter area or series of lighter spots over base of keels and adjacent part of dorsum; keels lighter at tips. Venter and legs yellow.

One pair of eyes present.

Collum angularly excised at middle, not widely emarginate as in *mexicanus*, etc., the incision not narrow and deep as in, e.g., *perpictus*. (See fig. 1.)

Tubercles on the ordinary segments strongly developed, the anterior series extending out on the keels to their ends. Tubercles of posterior row reduced in size toward ends and not extending onto keels.

Last tergite narrow, narrowing posteriorly and much surpassed by the keels of the preceding segment.

Sternites broad, twice or more as wide as the first joint of legs.

Number of segments, 47-49.

Length, 16 mm.; width, 3.2 mm.

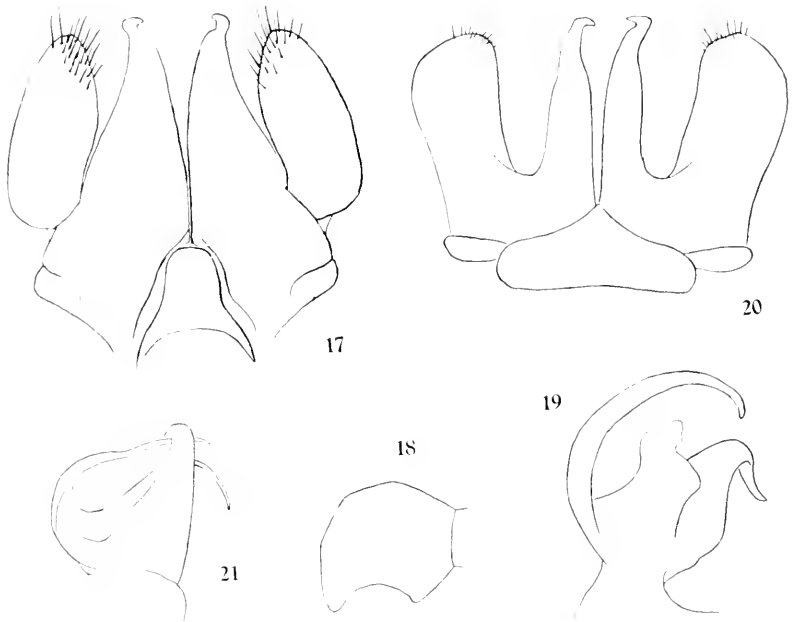
LOCALITY: Mexico: Vera Cruz, Las Vigas. Ten specimens taken by H. Dybas on June 30, 1941.

PLATYDESMUS EXCISUS Chamberlin, new species

Fig. 2

Specimens in full color are brown, with a median longitudinal band darker blackish, which is geminate by a fine median line: on

III



- Fig. 17. *Paraindus viganus* n. sp. Anterior gonopods, cephalic aspect.
 Fig. 18. The same. Stipes of mandible of male in outline.
 Fig. 19. The same. Right posterior gonopod, submesal aspect., on longer scale than fig. 17.
 Fig. 20. *Paraindus schmidti* n. sp. Anterior gonopods, cephalic aspect.
 Fig. 21. The same. Right posterior gonopod, caudal aspect.

each side a series of yellow spots on the prozonites; in some specimens a lighter mottled area on bases of keels and adjacent part of tergites. Venter and legs yellow.

One pair of eyes present.

Collum excised in a widely obtuse re-entrant angle, this leaving the head partly exposed in dorsal view. (See fig. 2.)

On the following tergites the two rows of tubercles are strongly developed, with both series extending out to, or nearly to, ends of keels where also there may be a few non-seriate, smaller tubercles or granules.

Anal tergite broad, moderately narrowed caudad, its caudal processes with tips about on a level with caudal margin of keels of the preceding segment.

Number of segments, 42.

Length, 18 mm.; width, 3 mm.

LOCALITIES: Guatemala, Sierra Santa Elena, Jan. 26 and Feb. 9, 1934, about 25 specimens; also near Tecpan, Jan. 20, 1934, five specimens, all collected by K. P. Schmidt. (Leon Mandel Expedition).

PLATYDESMUS **PERDITUS** Chamberlin, new species

Fig. 3

In color pattern resembling *P. calus* but differing in details.

Differing from the other species here described in its much broader form. There is a series of median dorsal sagittate areas of yellow color as in *calus*, these areas similarly enclosed in black and typically 5 in number instead of 6, each apically more slender. The outer part of tergites and base of keels brown or blackish, with enclosed yellow or mottled areas, the brown color, in more dilute state, continuing on outer part of keels where there is also a mottling of lighter spots, thus lacking the sharply defined, externally pointed, black mark on basal part of keel characterizing *calus*. Venter and legs yellow excepting that in the type there are four widely separated black areas on the mid-venter, each area embracing three or four sternites. Bead black above, with the usual pair of pale spots; brown below, this area enclosing a transverse series of four light spots.

Eyes present.

The collum completely concealing the head from above; with a median longitudinal furrow that ends anteriorly in a small narrow notch or slit. (See fig. 3.)

LOCALITY: Guatemala.

PLATYDESMUS **PERPICTUS** Pocock

Platydesmus perpictus Pocock, 1910, Biol. Centr.-Amer., Diplopoda, p. 47, pl. 4, figs. 1, 1a-j.

LOCALITY: Guatemala: Chichivac, near Tecpan. Four specimens taken Feb. 1, 1934, by K. P. Schmidt. (Mandel Expedition).

PLATYDESMUS **TRIANGULIFER** Pocock

Platydesmus triangulifer Pocock, 1910, Biol. Centr.-Amer., Diplopoda, p. 45, pl. 4, figs. 4, 4a-e.

LOCALITY: Guatemala: Escobas, Izabal, Dec. 4, 1933. One female with her numerous young and many other adults taken at El. 400 ft. on Dec. 4, 1933 by K. P. Schmidt who notes: "100 or more in an aggregate on a rotter liana, some three deep."

Family SIPHONOPHORIDAE

SIPHONOPHORA **GLOBICEPS** Pocock

Siphonophora globiceps Pocock, 1910, Biol. Centr.-Amer., Diplopods, p. 52, pl. 5, figs. 6, 6a.

LOCALITY: Guatemala: Chichivac. One taken Feb. 4-7, 1934, by K. P. Schmidt.

SIPHONOPHORA **CONICORNIS** Chamberlin, new species

Color yellow.

Beak longer than the head but shorter than the antennae.

Collum deeply angularly excised anteriorly.

Characterized especially by the form of the antennae which are widest at the third article from where subconically narrowed to the end.

The large number of segments, 129, also separates this species from, e.g., *S. barberi*, another Guatemalan species in which there are from 68 to 82 segments.

Length, about 50 mm.

LOCALITY: Guatemala: Escobas, Izabal. El. 400 ft. One female taken Dec. 4, 1943, by K. P. Schmidt.

SIPHONOPHORA **FALLENS ANNECTA** Chamberlin, new subspecies

This form seems to differ from the types of *fallens* in having the anterior border of the collum acutely notched at the middle instead of being merely widely a little concave. It is a somewhat longer form (20 mm. as against 15 mm.) with segments 73 instead of 55-60. LOCALITY: Guatemala: Volcan Tajumulco. One female taken by K. P. Schmidt on Feb. 13, 1934.

SIPHONOPHORA **VERA** Chamberlin, new species

The dorsum of the preserved type without special markings, the sides and venter more yellowish. Legs yellow.

Head very narrow, widest at base, longer than the beak. Antennae clavate, the heavy sixth article more than half the width of the head at base, surpassing the beak which reaches but little beyond the base of the sixth article.

Collum much wider behind than in front, its anterior margin widely incurved.

Posterior gonopods having terminal joint with a narrowly conical base above which attenuated into the usual slender style. Anterior gonopods with last joint longest as usual, and above its conical base also narrowed into a slender style.

Number of segments. 90 to 102.

LOCALITY: Mexico: Vera Cruz, Las Vigas. About 18 specimens taken in 1, 1941 by H. Dybas, at El. 5,500 ft.

GENUS *TREPOBATES* HERRICH-SCHAEFFER
(HEMIPTERA; GERRIDAE)

C. J. DRAKE AND F. C. HOTTES

The genus *Trepobates* Herrich-Schaeffer is known only from the Western Hemisphere. This paper enumerates 10 species, including a new species described from Panama and Mexico. As most of the species are about the same size and very similar in color and markings, they are often confused and wrongly named in collections. Individual variability in color markings is unusually pronounced in most species, and the degree of variability in different species is about the same. Both alate and apterous forms are generally common, and deälated males and females are often encountered during the breeding season.

The genus *Trepobates* is composed of moderately large and robust species with long legs. They are very alert and swift. They inhabit the quiet parts of running and protected coves of standing waters. Although primarily inhabitants of fresh bodies of water, most species also live and breed in brackish water near the mouth of streams flowing into the seas. Salt water marshes, lagoons and pools along the sea shore also afford favorable abodes. *T. vazquezae* Drake and Hottes is the only species of the genus not as yet recorded from fresh water. *T. trepidus* Drake and Harris and *T. taylori* (Kirkaldy) are very common and widely disseminated in the tropics, and sometimes are almost as abundant in brackish marshes, lagoons and ponds along the sea coast as in fresh water habitats.

TREPOBATES PANAMENSIS Drake and Hottes, new species

APTEROUS FORM: Color quite variable, especially the amount of yellow and black on dorsal surface of pro- and mesonotum; general appearance and coloration very similar to *T. taylori*. Pronotum blackish with a broad yellow or orange-yellow stripe on each side. Mesonotum with a broad, bow-like (concave within) yellow stripe on each side, the ends not meeting in front or behind. Thorax beneath pale testaceous; sides with a broad, sinuate, black-fuscous stripe. Venter and genital segments pale testaceous. Dorsal surface of abdomen bluish black with two oblique spots near the base and most of last tergite yellowish. Yellowish marks on dorsal surface more or less tinged with orange.

SIZE: Length, 3.10-3.50 mm.; width, 1.38-1.52 mm.

HEAD: Width across eyes, 1.00 mm. Antennae fuscous-brown with base of first segment testaceous; formula—(male) I, 56; II, 35;

III, 36; IV, 44; (female), I, 65; II, 38; III, 42; IV, 50. Head beneath pale testaceous. Rostum brownish black, testaceous at base, extending about two-fifths of its length beyond fore coxae.

THORAX: Pronotum much wider than long (65:36). Mesonotum very large, wider than pronotum, truncate behind. Legs brownish fuscous with base of femora, coxae and trochanters pale testaceous, shortly pilose, with longer pale hairs beneath. Front femora moderately incrassate, a little bowed, 1.25 mm. long, not constricted near apex in male. Middle legs very long, brown-fuscous with a short basal stripe above and narrow apical part yellowish; femora moderately incrassate, with a fringe of short hairs on front and hind margins of ventral surfaces (hairs about one-fourth as long as the diameter of the segment), 1.40 mm. long. Hind legs much shorter and slenderer; femora 2.10 mm. long; tibiae 1.75 mm. long.

ABDOMEN: Length, 1.60 mm. Connexiva beset with short dark hairs on outer margins, with a large, quadrate, orange-brown spot on each segment.

MALE: Last segment of venter about twice as long as preceding segment; first genital segment tapering a little posteriorly, clothed beneath with inconspicuous pubescence. Parameres rather broad, curved, strongly tapering apically with apex pointed. First genital segment above dark fuscous, roundly emarginate behind. Anterior femora not noticeable, constricted before apex.

FEMALE: Broader and stouter than male. Hind femora within beset with a dense fringe of hairs near the base.

Macropterous form: Pronotum very large, velvety fuscous-black with hind margin and a wide stripe (broader anteriorly) on each side testaceous; median length much shorter than width across humeral angles (120:90); produced posteriorly with apex rounded. Hemelytra much longer than abdomen, dark brown-fuscous with veins discernable, the deãlating suture distinct; wings also long and concolorous with hemelytra.

TYPE (male) and *allotype* (female), both apterous, collected in the wide reaches of a small stream, Feb. 2-10, 1939, Canal Zone, Panama. C. J. Drake. *Paratypess* 15 specimens, taken with type; 7 specimens, Panama City, Panama, Aug. 13, 1934, L. J. Rosebloom; 4 specimens, Tehautepec, Mex., July 21, 1951, and 5 specimens, Oaxaca, Mex., July 23, 1951, all taken by the authors. *Type* in Drake Collection, *paratypes* in collections of both authors.

Allied to *T. taylori* (Kirk.), but readily separated from it by

the much shorter hind pair of legs, the short hairs on underside of intermediate femora and non-constricted apex of fore femora in male; the female has the hind margin of the last ventral segment beset with rather long dark hairs. These same characters also separate both sexes from *T. inermis* Esaki. The much shorter pair of hind legs also distinguishes it from *T. pictus* (H.S.). In the apterous form of the latter species, the female has the mesonotum produced posteriorly into a knob-like structure. The male parameres of these species are also different, and are not as broad or as strongly tapering posteriorly as in *T. panamensis* n. sp.

TREPOBATES TAYLORI (Kirkaldy)

Kallistometra taylori Kirkaldy, Entomologist, 32:28, 1899.

Trepobates comitalis Drake and Harris, Fla. Ent., 12:7, 1928.

Trepobates comitalis Drake and Harris, Bull. Brookl. Ent. Soc., 27:117, pl. 12, fig. 10, 1932.

MEXICO: Cuidad Valles, July 14, 1950 and Aug. 8, 1951; Cuidad Victoria, July 14, 1950, and Aug. 9, 1951; Acapulco, July 23, 1950, and July 13, 1951; Alvarado, July 28, 1951; Tehautepec, July 23, 1951; Salina Cruz, July 24, 1951; Camargo, July 12, 1951; Tampico, July 16, 1950; Durango, Aug. 6, 1950; Veracruz, July 27, 1951; Mexico City, D. F., July 30, 1950; Puebla, July 30, 1950 and July 20, 1951; Aguascalientes, Aug. 5, 1950, and July 13, 1951; Guadalajara, Aug. 4, 1950; Patzcuaro, July 17, 1951. Other specimens have been examined from several Islands of the West Indies, Peru, Central America, and United States (Ariz., N. Mex., Tex.). It should also be noted that *T. trepidus* Drake and Harris was taken at all of the Mexican localities listed above. Distribution and habitat requirements of the two species are very similar. The long dark hairs on the male genital segments and the hind margin of the last ventral segment of the male distinguishes *trepidus* at once from *taylori*.

TREPOBATES FLORIDENSIS Drake and Harris

Trepobates floridensis Drake and Harris, Ohio Jr. Sci., 28:237, 1928.

This is the smallest species in the genus. The female is a little larger and more robust than the male, blackish with small yellowish markings. Hind margin of last ventrite pubescent, but without long hairs; mesonotum truncate behind. Hind femora short as in male, twice as long as tibiae (124:62). Middle femora short and stout, 80 unites or 1.00 mm. Length, 3.00 mm; width, 1.25 mm. Winged forms unknown.

ALLOTYPE (female), Jacksonville, Fla., in collection of C. J. Drake. The type (male) was also taken in Florida. The short mid-

dle and hind legs as well as the smaller body separate this species at once from its congeners.

Genus *TREPOBATES* Uhler, 1898

KALLISTROMETRA Kirkaldy, 1899

STEPHANIA B. White, 1883 (PREOC.)

TYPE, *HALOBATES PICTUS* Herrich-Schaeffer

1. *becki* Drake and Harris, 1932 Mex., U.S. (Ariz.)
2. *floridensis* Drake and Harris, 1928 Florida
3. *inermis* Esaki, 1926 U. S., Can.
4. *knighti* Drake and Harris, 1928 Mo., Io., Kan., Ark.,
Okla., Ill., Md., Ind.
5. *panamensis* Drake and Hottes, 1952 Mex., Pan.
6. *pictus* Herrich-Schaeffer, 1848 U. S. (East of Miss. R.)
7. *subnitidus* Esaki, 1926 Ind., Mich., Fla., Miss.
8. *taylori* (Kirkaldy), 1899 W. I., Mex., Cent.-Amer, Peru,
comitalis Drake and Harris, 1928 Col., Venez., U.S.
pictus Uhler, 1894 (in part) (Ariz., N. Mex., Tex.)
9. *trepidus* Drake and Harris, 1928 W. I., Mex., Centr.-Amer.,
Col., U. S. (Ariz., N. Mex., Tex.)
10. *vazquezae* Drake and Hottes, 1951 Mex.

SOME HETEROSPHYRONID PSEUDOSCORPIONS FROM NEW MEXICO

C. CLAYTON HOFF⁽¹⁾

The occasion of the present paper is to record for the first time the presence of heterosphyronid pseudoscorpions from New Mexico. The material serving as the basis for this report has been collected during the past three years by the author and his students.

The state of New Mexico is not a geographical area particularly favorable to pseudoscorpions. At lower elevations semiarid grasslands are common, at middle elevations the typical vegetation consists of somewhat open stands of conifers adapted to relatively dry situations, and in higher elevations the more moist climax vegetation is restricted chiefly to a closed stand of spruce and fir. Within the areas covered by climax vegetation and on the whole not especially suited to pseudoscorpions, there are many niches in which environmental conditions are more favorable. For instance, pseudoscorpions are common in the underground nests of rodents and in deciduous tree litter, especially the litter of aspen and oaks at moderate elevations. Some species also live under the started bark and in the decayed wood of coniferous logs and stumps, especially when these occur within or are adjacent to open areas. Although some species occur in the coniferous litter, especially litter of pinyons and junipers, presence here is not nearly so common as in the litter of the deciduous forests of eastern United States.

The occurrence of isolated and somewhat restricted suitable habitat niches is an apparent factor in creating the general impression that pseudoscorpions are very rare in New Mexico. In all probability the number of species in the state compares favorably with the number in other states of equal latitude, but the population density, even in the more favorable niches, is not great. As a result, adequate collections are not easily secured.

With respect to the heterosphyronid pseudoscorpions in particular, none have been found in rodent nests in New Mexico. Indeed this group is rare in rodent nests everywhere, in contrast to the abundance of monosphyronid pseudoscorpions found in such a habitat. The heterosphyronid pseudoscorpions of the state are found chiefly in deciduous tree litter and in well-rotted coniferous logs, although some individuals may be found in the litter beneath coniferous trees. In general, the heterosphyronid pseudoscorpions of

(1) The University of New Mexico, Albuquerque, New Mexico. This investigation was aided by a faculty research grant from the University of New Mexico.

New Mexico are more frequent in disturbed areas, both disclimax and subclimax, than elsewhere.

At present three species of Heterosphyronida, all of the family Clthoniidae *sensu stricto*, are known to occur in New Mexico. These are discussed in the present paper. The three species have been associated taxonomically with species already described in the literature, but specific assignment must be made with some reservation because of the inadequacy of available species descriptions. Some specific diagnoses are especially wanting because certain species have been described from one or a few individuals without regard to possible limits of variation. Variations of an intraspecific nature are conspicuous in the present material, these variations probably resulting from environmental factors that may play an important part in determination of such characters as absolute size. Since one does not know the exact limits or the causes of these variations, it seems proper at this time to neglect all possibilities of subspecific rankings.

The collections of heterosphyronid pseudoscorpions reported here serve to extend radically the geographical ranges of the included species. Marked extensions of the geographical ranges of many of our North American pseudoscorpions may be expected since there has been virtually no concentrated research on the pseudoscorpion fauna of the basin and range country of the Southwest.

MUNDOCHTHONIUS MONTANUS Chamberlin

Figures 1 - 4

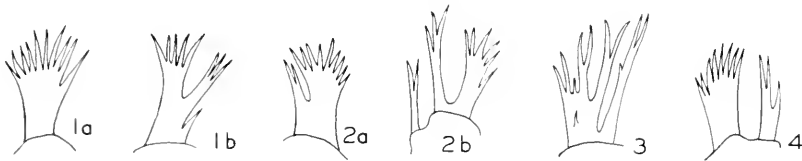
Mundochthonius montanus CHAMBERLIN, 1929, Ann. Mag. Nat. Hist., ser. 10, vol. 4, p. 65.

RECORDS: Nine collections, including nine males, 14 females, and 14 nymphs, from Tejano Canyon on the east slope of the Sandia Mountains, Bernalillo Co., New Mexico. The elevation is 8300 feet. The collections were made in November and December of 1949 and in December, 1950.

The collections come from a biotically diverse area in which both climax and subclimax communities occur in a somewhat confused pattern. The south-facing slope of the canyon is covered chiefly by a dense stand of small Gambel oaks and the north-facing slope by fir trees. Among the latter are interspersed small groups of subclimax aspen. The south-facing slope is much warmer and drier than the north-facing one. Three of the nine collections were made from oak litter and soil; four collections were from the soil and litter beneath aspens; one collection was from fir litter and soil near

the edge of an aspen grove; and one collection was from a well-decayed coniferous log in the fir-forested area. It is curious to note that although collections have been made from various areas and communities in other parts of the Sandia Mountains, this species has been found only in Tejano Canyon.

REMARKS: There would appear to be no uncertainty regarding the species determinations of these specimens, although, in the absence of an adequate modern description, one must exercise some caution. There is as complete agreement as can be expected with the original description given by Chamberlin (1929) for *M. montanus*, a species described from a single female specimen taken from surface soil at an elevation of 8500 feet at Manitou, Colorado. The



COXAL SPINES OF *MUNDOCHTHONIUS MONTANUS*
FROM NEW MEXICO

Fig. 1—Spines of right coxa II (a) and left coxa II (b), specimen S-1506.2, female. Fig. 2—Spines of right coxa II (a) and left coxa II (b), specimen S-1435.1, male. Fig. 3—Spines of left coxa II, specimen S-1502.1, female. Fig. 4—Spines of left coxa II, specimen S-1434.1, female.

agreement in tergal chaetotaxy is particularly significant. The agreement of our specimens with the type specimen in regard to the length/width ratios of palpal femur and chela is not especially close, but one must consider that the single type specimen was treated with potassium hydroxide solution before examination. Such treatment commonly distorts the length/width ratios of palpal and pedal podomeres. On examination of some of our specimens, it is apparent that the nature of the spines of coxa II is much different from the spines of *M. montanus* pictured by Chamberlin (1931, fig. 21-I). In other individuals, however, the coxal spines approximate the spines pictured by Chamberlin. The extent of variation in the coxal spines of our specimens from the Sandia Mountains is shown in the figures.

In order to establish more fully this species in the literature, important measurements are given here for the specimens from New Mexico. Previous descriptions have not included the sizes of body and appendages. Based on seven females, the various parts

measured show the following ranges: body length 0.95-1.25 mm.; length of carapace 0.34-0.37 mm.; palpal femur 0.272-0.319 mm. long, 0.078-0.088 mm. wide, length 3.3 to 3.75 times the width; palpal tibia 0.164-0.186 mm. long, 0.096-0.105 mm. wide, length 1.65 to 1.84 times the width; chela 0.45-0.50 mm. long, 0.113-0.127 mm. wide, length 3.85 to 4.07 times the width; chela 0.113-0.124 mm. deep, length of chelal hand 0.160-0.191 mm.; length of the movable finger 0.295-0.326 mm. For the male, the following ranges have been secured from five specimens: body length 0.92-1.18 mm.; length of carapace 0.32-0.40 mm.; palpal femur 0.276-0.292 mm. long, 0.074-0.084 mm. wide, length 3.5 to 3.74 times the width; tibia 0.155-0.165 mm. long, 0.086-0.097 mm. wide, length 1.7 to 1.8 times the width; chela 0.445-0.475 mm. long, 0.103-0.118 mm. wide, length 4.03 to 4.37 times the width; chelal hand 0.103-0.117 mm. deep; hand length 0.167-0.177 mm. long; movable finger 0.280-0.308 mm. in length.

The species has been reported previously only from the type locality, Manitou, Colorado.

APOCHTHONIUS MOESTUS (Banks)

Chthonius moestus BANKS, 1891, *Canad. Ent.*, vol. 23, p. 165.

Apochthonius moestus CHAMBERLIN, 1929, *Ann. Mag. Nat. Hist.*, ser. 10, vol. 4, p. 67.

RECORDS: Specimens of this species have been found in three collections from New Mexico. One female occurs in a collection from oak soil and litter in Tejano Canyon, 8300 feet elevation, Sandia Mountains, Bernalillo Co., New Mexico, on Dec. 10, 1949; one female was found in a collection of oak litter and soil from the area near Cole Springs, elevation about 7400 feet, Sandia Mountains, Bernalillo Co., New Mexico, on July 21, 1951; and two males and one female have been taken from a sample of pinyon litter at an elevation between 6500 and 7000 feet at the south edge of Mt. Taylor, near Grants, Valencia Co., New Mexico, on Oct. 20, 1951.

REMARKS: A comparison of present specimens with specimens from the Mississippi River Valley and from North Carolina indicates a close morphological agreement among specimens from all three areas. No significant difference in the chaetotaxy and in the apodemes of the male genitalia have been discovered. The length/width ratios of palpal podomeres of New Mexico specimens fall within the ranges given for specimens from North Carolina (Hoff, 1945) and Illinois (Hoff, 1946), but close measurements of the available specimens indicate that the palpal podomeres may be

slightly larger on the average for specimens from North Carolina and Illinois. Until adequate collections from New Mexico allow statistical expressions of the variations in length of palpal femur and chela, it will be impossible to demonstrate a valid difference in size. If a significant size difference does occur, the smaller size of specimens from New Mexico may be a function of the habitat, since certainly food is much more restricted and the climatic and edaphic factors, especially soil and litter moisture, are much less favorable for specimens from New Mexico.

In order to more fully establish the present species in the literature, it seems advisable to give here the ranges for five specimens, including two males and three females, from New Mexico. While sexual dimorphism occurs in this species, the differences in measurements of palpal podomeres of the two sexes is so small that, in view of our present limited material, measurements of the structures of the two sexes are combined. Body length 1.18-1.35 mm.; length of carapace 0.34-0.40 mm.; palpal femur 0.338-0.350 mm. long, 0.076-0.085 mm wide, length 4.12 to 4.6 times the width; tibia 0.171-0.178 mm. long, 0.089-0.105 mm. wide, length 1.66 to 1.82 times the width; chela with length 0.51-0.55 mm., width 0.109-0.128 mm., length 4.3 to 4.8 times the width; chelal hand 0.110-0.131 mm. deep, 0.173-0.190 mm. long; movable finger 0.35-0.37 mm. in length.

The present records serve to extend the geographical range of this species far west of the previously known range. In general *Apochthonius moestus* is common in the deciduous forests east of the Mississippi River, with a few records in the tier of states just west of the River (Chamberlin, 1929; Hoff, 1949). When the pseudoscorpions of the plains area have been investigated, a continuity of range may be found between areas occupied by this species in New Mexico and the general area of the Mississippi River Valley.

LECHYTTIA PACIFICA (Banks)

Roncus pacificus BANKS, 1893, *Canad. Ent.*, vol. 25, p. 66.

Lechyttia pacifica BANKS, 1895, Jr. *New York Ent. Soc.*, vol. 3, p. 13.

RECORDS: This species has been found in four collections from New Mexico. A male and three nymphs were taken from a pile of acorn hulls in the cavity of a yellow pine stump near Cole Springs, elevation about 7400 feet, Sandia Mountains, Bernalillo Co., New Mexico, on July 21, 1951; one female and five nymphs were found in pinyon litter at an elevation of about 6500 feet at the south base of Mt. Taylor, near Grants, Valencia Co., New Mexico, Oct. 20, 1951; four males and three nymphs were secured from a well-rotted yellow

pine log at an elevation of about 7500 feet in the foothill area of Gallinas Peak, Lincoln Co., New Mexico, on July 1, 1951; and four males, one female, and four nymphs were taken from a well-rotted yellow pine log near the junction of State Routes 4 and 126, north of Jemez Springs at an elevation of about 7600 feet, Jemez Mountains, Sandoval Co., New Mexico, on July 23, 1950. This species seems to be definitely associated with coniferous debris at elevations between 6500 and 7500 feet.

REMARKS: Our specimens agree with the very inadequate original description of the species and with the figures of the palpus given by Chamberlin (1931, fig. 28-C). Unfortunately exact measurements of palpal podomeres are not available in the literature. Neither is there a record of the length/width ratios of the palpal podomeres although an indication of these ratios may be secured from the figure previously mentioned. From measurements of the palpal femur, tibia, and chela shown in Chamberlin's figure, it is obvious that in our New Mexican species the femur and chela are a little more slender, but one must keep in mind that length/width ratios based on measurements of a figure may not be especially accurate. A comparison of the measurements of the present females with measurements of a single female from Utah (Hoff and Clawson, 1952) indicates that the New Mexico specimens are slightly larger. In the light of possible intraspecific variation, the differences are probably of no significance and, since full agreement occurs in the length/width ratios of palpal podomeres of the New Mexico and Utah specimens, the individuals from the two areas are considered to be conspecific.

Measurements have been secured from two females and four males from the New Mexico collections. In view of the few specimens available and the slight differences manifest among specimens of the two sexes, it appears feasible to express measurements as the ranges of all six individuals. Body length 1.25-1.55 mm., length of carapace 0.35-0.40 mm.; palpal femur 0.366-0.397 mm. long, 0.095-0.109 mm. wide, length/width ratio 3.65 to 4.03; palpal tibia 0.21-0.232 mm. long, width 0.113-0.128 mm., length 1.75 to 1.92 times the width; chela 0.57-0.615 mm. long, 0.140-0.168 mm. wide, length 3.65 to 4.15 times the width; chelal hand 0.144-0.171 mm. deep, 0.264-0.303 mm. long; movable chelal finger 0.325-0.343 mm. long.

The present records serve to extend appreciably the range of this species, since the form has been reported previously only from

the states of Washington and California (Chamberlin, 1929) and Utah (Hoff and Clawson, 1952). *Lechytia pacifica* probably has an extensive geographical range throughout the southern and western portions of the Rocky Mountain area.

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WATER-STRIDERS FROM TERRITORIO AMAZONAS OF VENEZUELA

(Hemiptera: Hydrometridae, Veliidae)

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The insects enumerated in this paper were collected by the junior author during a scientific expedition, sponsored by the University of Puerto Rico, to the Marahuaca Mountains of the Pacariama range, in Territorio Amazonas, Venezuela, from February to July, 1950. The route followed by the expedition was by the Cunucunuma River, to the north of Mount Duida, or savannah Culebra, and from here east then southeast of the Marahuaca Mountains. Collections were also made along the route from Puerto Ayacucho, capital of the Territorio Amazonas, by the Orinoca river to the Cunucunuma.

The collection contains 48 specimens of water-striders divided among the families Hydrometridae and Veliidae. Of the veliids, one genus and four species are described as new to science. The types of the new species are in the Drake Collection, paratypes in collections of both authors.

Family HYDROMETRIDAE

HYDROMETRA GUIANANA Hungeford and Evans

Hydrometra guianana Hungeford and Evans, Ann. Mus. Nat. Hung., 28:94, pl. 10. 1934.

Six specimens, Territorio Amazonas, upper Cunucunuma river, Julian, May 27, 1950, collected in a small creek in the mountains on the trail from Camp Culebra, north of Mount Duida, to Mount Marahuaca, elevation 2,000 feet. The species lives in quiet waters protected from the slowly moving currents by fallen branches. The male processes are elongate-oval in outline. Sometimes, the stiff bristles on the posterior end of the periphery of the processes are much reduced, and thus appear open behind. Other specimens are at hand from Barinites, Venez., and Satipo, Peru.

Family VELIIDAE

VELIA RECENS Drake and Harris

Velia recens Drake and Harris, Proc. Biol. Soc. Wash., 48:192. 1935.

Four specimens, taken in water-pockets in bromeliads at Camp

Benitez, foot of the northern slope of Mount Marachuaca, elevation 4000 feet. No specimens of this insect were taken in temporary rain pools on the ground in the vicinity of the plants. Associated with the water-strider in the plant, were the larvae of *Proniomyia*, larvae of *Culex (Micrades) corethrella* and some larvae of aquatic Coleoptera. Another species of a small water-strider, *Microvelia distanti* Lundblad, was taken in a bromeliad habitat in Trinidad, B. W. I. Other specimens of *V. recens* are at hand from Panama and British Honduras.

MICROVELIA PUCHELLA Westwood

Microvelia puchella Westwood, Ann. Soc. Ent. France, 3:647, pl. 6, fig. 5. 1834.

Puerto Ayacucho, Territorio Amazonas, 1 specimen, June 15 and 1 specimen, Nov. 12-23, 1950. This is one of the commonest water-striders in South, Insular and Central America.

MICROVELIA AYACUCHANA Drake and Capriles, sp. new

Apterous forms Moderately large, subfusiform, widest at base of thorax, fuscous-black or blackish with a transverse brownish or yellowish brown band near the middle of pronotum. Pubescence very short, inconspicuous, dark brown. Body beneath testaceous to brown with sides dark fuscous.

SIZE: Length, 2.50-2.75.; width, 0.80-1.00 mm.

HEAD: Width across eyes, 0.75 mm. Interocular space slightly greater than the combined width of both eyes. Eyes large, dark fuscous. Head moderately convex above with distinct median line. Rostrum stout, reaching beyond middle of mesosternum, yellowish brown with apex black. Antennae long, slender, shortly pilose, without bristly hairs, brownish black with base tending to be paler; segment I moderately incrassate, slightly bowed; II much more slender than I but stouter than III; III and IV slender, the latter feebly thicker; formula—I, 30; II, 22; III, 30; IV, 35.

THORAX: Pronotum short, not produced posteriorly or overlapping mesonotum; mesonotum practically twice as long as pronotum, broadly truncate behind; metanotum about as long as pronotum.

LEGS: Very long, slender, with all femora unarmed and nearly equal in thickness. Length of middle femora, 0.95 mm.; tibiae, 0.81 mm. Length of hind femora, 1.14 mm.; tibiae, 1.30 mm. Intermediate and hind tarsi long; formula of middle tarsi—I, 20; II, 20 and of hind tarsi—I, 30; II, 24.

ABDOMEN: Length, 1.50 mm. Narrowed posteriorly; above ferruginous-testaceous with pale markings.

MALE: Femora feebly thicker near base than in other legs. Abdomen slowly narrowed posteriorly; connexiva not produced behind. Last venter unusually long, longer than the two preceding segments, with a very large broadly U-shaped notch at the middle, the median length and width of notch at apex almost equal. First genital segment singularly modified on underside, roundly impressed at base then strongly produced downwards at the apex into a long tongue-like projection which is pointed directly ventrally, a little tapering apically and with the underside shallowly grooved on median line; above with hind margin of first segment broadly emarginate; second segment small, not modified.

FEMALE: Distinctly broader than male. Abdomen abruptly narrowed behind the middle, thence almost parallel-sided to apex. Connexiva a little wider than in male, strongly produced posteriorly into a long pointed process, which is wide at base, then narrowed beneath to apex and moderately hairy. Last venter very long, occupying most of posterior constricted part of abdomen.

MACROPTEROUS FORM: Length, 2.75 mm.; width (across humeral angles), 1.00 mm. Widest at humeral angles, thence slowly narrowed posteriorly. Pronotum with moderately prominent humeral angles, median length greater than widest part (80:70). Hemelytra a little longer than abdomen, fuscous with cells much paler and veins darker.

TYPE (male) and **ALLOTYPE** (female), both apterous, Puerto Ayacucho, Territorio Amazonas, Venez., June 15, 1950. *Paratypes:* 3 apterous and 1 macropterous specimen, taken with type, also 1 specimen from same locality, May 15, 1950.

This singular species belongs to the group of *Microvelia* Westwood, which have a very short pronotum in the apterous form. The greatly modified first genital segment and deeply notched last ventrite in the male and strongly produced apically connexiva in the female separate this species at once from its congeners.

MICROVELIA DUIDANA Drake and Capriles, sp. new

APTEROUS FORM: Small, robust, fuscous-black with a broad transverse band in front as well as posterior margin of pronotum brownish or testaceous. Antennae dark fuscous. Pubescence dense, short, dark in dark areas and pale in testaceous markings. Body beneath fuscous-black. Legs fuscous with coxae, trochanters, and basal part and most of underside of femora testaceous.

SIZE: Length, 1.65-1.75 mm.; width, 0.62-0.75 mm.

HEAD: Width across eyes, 0.50 mm. Broad, convex above, the median impressed line distinct. Rostum stout, testaceous with apical two-fifths blackish, extending on mesosternum. Antennae rather short, stout, shortly pilose, all segments with a few long dark bristly hairs; segment I very stout, enlarged apically; II much slenderer than I, thicker than III, the latter feebly thinner than IV; formula—I, 15; II, 11; III, 14; IV, 19.

THORAX: Pronotum very large, strongly produced posteriorly, covering dorsally the rest of thorax, coarsely pitted, wider than long (50:30), very broadly and slowly rounded behind, the pale markings variable in width, sometimes very narrow. Pro- and mesosternum furrowed on median line, the sides strongly rounded posteriorly on mesosternum.

LEGS: Rather short, stout, dark fuscous with coxae, trochanters and base of femora above and most of ventral surface testaceous; pubescence short with longer pale hairs beneath; all femora unarmed and about the same thickness; segments of intermediate tarsi subequal in length (14:13); hind tarsi with basal segment feebly shorter (10:12). Hind femora and tibiae subequal in length (40:42); middle femora slightly longer than tibiae (35:30).

ABDOMEN: Length, 1.00 mm. Fuscous-black without color markings. Entire body beneath as well as venter blackish. Female with connexiva and abdomen wider than in male, the connexiva strongly reflexed behind and with the tergites so wide that the margins of the reflexed connexiva do meet within. Last venter of female long, almost twice as long as preceding segment, slowly narrowed posteriorly; connexiva not produced posteriorly, rounded behind. Male with abdomen slowly narrowed posteriorly, the connexiva rounded behind; last segment of venter nearly as long as two preceding, distinctly compressed laterally; first genital segment beneath mostly concealed within abdomen, above with hind margin rounded emerginate.

WINGED FEMALE: Larger and stouter than apterous form, 2.15 mm. long. Head mostly brown above. Pronotum with median part in front and hind margin narrowly brown, pitted, wider than long (80:60). Hemelytra slightly longer than abdomen, brownish fuscous with cells quite pale and veins darker.

TYPE: (male) and ALLOTYPE: (female), both apterous, and 12 *paratypes*, summit of Mount Duida, Territorio Amazonas, Venez., June 2-3, 1950, approximately 12,000 feet elevation. Paratype, 1

specimen, San Fernando de Atabapo, Territorio Amazonas, Venez., June 5, 1950.

This is a typical species of the group of *Microvelia* which have the pronotum in the apterous form strongly produced posteriorly so as to cover the dorsal surface of the meso- and metanotum. It is probably most closely related to *M. marginata* Uhler, but has stouter antennae and pale spots in the cells of hemelytra. The apterous form of the latter is unknown. Other species with similarly enlarged pronotum in the apterous condition are *M. limaiana* Drake, *M. austriana* Bueno, *M. hidalgoi* McKinister and *M. refescens* Champion.

OIOVELIA Drake and Capriles, gen. new

Head strongly deflected in front of eyes, distinctly longer in front of an eye than and length of an eye; longitudinal median line distinct; eyes moderately large, their hind margins touching front margin of pronotum, the interocular space large; ocelli absent. Antennae moderately long, rather stout; segment I longest, stoutest, slightly bowed. Legs moderately long, slender, the hind femora not passing tip of abdomen. All tarsi stout, composed of three segments, the last segment with a deep wide cleft at middle and with three chitinous claws arising from the bottom of a cleft as in figure 1; cleft very wide, with outer lobe almost twice as long as inner lobe; claws sickle-shaped, the blade of the middle claw only about one-fourth as wide as other two, which are equal in width; all three claws of equal length with their tips just attaining apex of longer lobe. Hemelytra scarcely extending beyond apex of abdomen, with veins forming a few closed cells. Other characters as in the genus *Velia* Latreille.

Type of genus, **OIOVELIA CUNUCUNUMANA** Drake & Capriles, sp. new

Very similar in appearance to the genus *Velia*, but easily separated from it by the stout tarsi, which have the terminal segment widely and deeply divided in the middle at the apex, and with three blade-like claws attached at the bottom of the cleft; claws subequal in length to longer lobe. Sometimes, the claws rest with the flat sides of their blades fitting closely together and then may appear like only one or two claws unless separated. The middle claw is as long as the others, but is very much narrower and all are distinctly sickle-shaped. In *Velia*, the last tarsal segment is not divided longitudinally at the apex, and there are only two claws, both long and of the same size.

OIOVELIA CUNUCUNUMANA Drake and Capriles, sp. new

MACROPTEROUS FORM: Moderately large, moderately robust, fuscous-brown with base of head and broad median part of pronotum reddish brown. Hemelytra black with a broad basal whitish spot, which extends apically as far as apex of pronotum. Abdomen beneath fuscous or dark fuscous with a bluish tinge. Thorax beneath darker, also with some bluish. Legs fuscous-black, beneath fuscous, coxae, trochanters and bases of femora testaceous. Antennae fuscous-black, all segments concolorous. In one paratype, most of head and pronotum reddish brown.

HEAD: Width across eyes, 0.75 mm. Eyes dark brown to fuscous. Head in front of eyes beset with numerous, long, stiff, dark hairs. Rostrum black or fuscous, extending between middle coxae, becoming black apically. Antennae shortly pilose, fuscous-black, with a few bristly hairs; segment I moderately incrassate, slightly bowed, a little enlarged apically, stouter than II; II slenderer than III; IV scarcely thicker than III, tapering a little beyond the middle; formula—I. 48; II. 40; III. 30; IV. 34.

THORAX: Pronotum distinctly longer than wide (120:100), coarsely pitted, with a few scattered, erect, dark, inconspicuous hairs, with hind margin rounded; humeral angles a little raised. Sides of

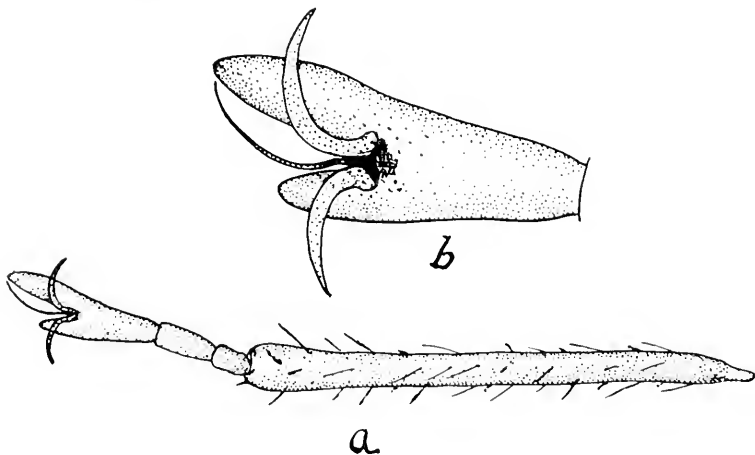


Fig. 1. Left hind leg of *Oiovelia cunucunumana*, new gen. & sp.; a—femur and tibia; b—last tarsal segment showing deep cleft with 3 tarsal claws (middle claw with narrow blade, only about one-fourth as wide as other blades).

thorax beset with numerous, erect, dark hairs. Legs moderately stout, unarmed; femora scarcely dilated, the middle and hind fe-

mora about equal in thickness, the fore femora slightly enlarged near base and there a little thicker than others. Hind femora a little shorter than tibiae (56:68); intermediate femora and tibiae about subequal in length (52:50). Formulas of tarsal segments: Fore legs—I, 3; II, 4; III, 13; Middle legs—I, 4; II, 9; III, 15; Hind legs—I, 4; II, 9; III, 16. Claws of all three pairs of legs as in figure 1.

ABDOMEN: Clothed beneath with short pubescence, the sides with numerous stiff dark hairs; connexiva clothed on outer margins with numerous, erect, dark brown hairs. Hemelytra concealing dorsal surface of abdomen, save outer edge of connexiva; veins distinct, the cells distinct but not plainly countable without removing hemelytra from body, last segment of venter in female much longer than preceding segment. Male and brachypterous forms unknown.

TYPE (female) and 2 **PARATYPES** (female), all apterous, Culebra, north of Mount Duida, Territorio Amazonas, Venez., July 1-4, 1950.

In general aspects, this species resembles *Velia nexa* Drake and Harris, but it is larger and has much shorter and stouter antennae. The tarsal segments are also much stouter with the terminal segment widely divided and armed with three chitinous claws, which are attached at the bottom of the cleft.

RHAGOVELIA CULEBRANA Drake and Capriles, sp. new

APTEROUS FORM: Moderately elongate, fusiform, blackish with some bluish lustre on under surface; legs black with base of femora, coxae and trochanters testaceous. Antennae fuscous-black with base narrowly testaceous. Pronotum sutured off from mesonotum, not produced posteriorly, bluish black with transverse brownish band in front.

SIZES Length, 3.20-3.75 mm.; width, 1.30-1.45 mm.

HEAD: Width across eyes, 0.94 mm. Narrowest part of interocular space about as wide as an eye. Eyes large, dark fuscous. Head impressed and shallowly furrowed behind median line, with a few dark bristly hairs in front. Rostrum very stout, black-fuscous, shining, extending to base of mesosternum. Antennae long, with a few, scattered, dark, bristle-like hairs on two basal segments; formula—I, 85; II, 48; III, 54; IV, 46.

THORAX: Pronotum very short, concave behind, much wider than long, distinctly sutured off from mesonotum; mesonotum very large, moderately convex above, moderately narrowed posteriorly, truncate at apex, median line and greatest width subequal (50:50).

Posterior part of pronotum and mesonotum clothed with fine, dark brown, semierect hairs.

MALE: Abdomen strongly narrowed posteriorly, entire dorsal surface clothed with fine dark hairs, the hairs same size as hairs on posterior part of thorax. Venter with an unusually large basal swollen area, which is somewhat like an isosceles triangle in outline with the apex greatly attenuated in form of a narrow and rather high ridge or carina on the last two ventrites (interrupted at sutures); on each side of dorsal surface of swollen area beset with a dense deep fringe of rather long, brownish, upright hairs. Genital segments black; first segment above long, truncate behind. Coxae unarmed. Hind legs clothed with very long brownish hairs, the femora and tibiae with some longer stiff black hairs; coxae stramineous; femora not strongly incrassate, thickest on basal half, armed beneath with a long spine in front of middle, from there to apex with a row of short dark teeth; tibiae unarmed, with short stout spur at apex, slightly shorter than femora (150:160); tarsal segments II and III subequal. Intermediate legs long, slender, also with a few long stiff hairs; femora very long, much longer than tibiae (180:120); tarsal segment II longer than III (72:64).

FEMALE: Broader than male. Legs long, slenderer than in male, all femora rather slender and nearly equal in thickness; hind femora beneath with a long outwardly bent dark spine just before the middle, thence to apex with short dark teeth. Connexiva broader than in male, blunt at apex, there clothed with rather long dark hairs. Last segment of venter long, less than twice as long as preceding segment. Winged forms unknown.

TYPE: (male), ALLOTYPE: (female) and 8 PARATYPES, *Culebra*, north of Duida, Territorio Amazonas, Venez., April 7-16, 1950. *Paratypes*, 4 specimens, upper Cumucunuma river, Territorio Amazonas.

This species is at once set off from its congeners of the group of *Rhagovelia* with very short and distinctly sutured off pronotum in the apterous form by the large and strongly swollen area at the base of the venter in the male.

NOTES ON TWO LITTLE KNOWN APHID PAPERS
PUBLISHED BY LUIGI MACCHIATI.

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Through the generosity of Dr. Minos Martelli I have recently come into possession of photo-reproductions of two Aphid papers by Prof. Luigi Macchiati about which little appears to be known. The new genus described in one, has not been recorded in Aphid literature, or by Neave in Vol. III of his *Nomenclator Zoologicus*, neither have the species described as new in this paper been recorded in Aphid literature, or in such species lists as those published by Wilson and Patch. Neither Wilson or Patch seem to have seen the original of the second paper, of which I already had a reprint from the Buckton library.

Myzus roseum is described as a new species on what would be pages 512 and 513, if these pages were numbered. Both alate and apterous viviparous females are described. Pages 512 and 513 are identical except that page 512 has the words *Memoire Originali* in large type at the top. My reprint does not repeat the descriptions and the pages are numbered from 1-4, the description of *Myzus roseum* being on the title page which is not numbered, and which is the same as that of page 513 of the original. The food plant is given as *Zucca* on page 512 of the original, this is changed to *Yucca* in ink on page 513 there being no Y in the Italian alphabet, this page also bears a correction in the title, the word *tre* being inked out and the letter *e* of the word *nuove* changed to *a*. Similar changes have been made in my reprint copy, most likely by Macchiati himself. Both Wilson and Patch indicate the species name as *roseus* and list the host plants as *Rosa centifolia*, *R. gallica* and *Yucca* sp. Only the last host is indicated in the original description, and I have found no others listed in the papers by Macchiati in my library. Patch lists the paper under the corrected title.

The second paper, published in the same volume as the first, and to which I know of only one reference, that of Dr. Minos Martelli, 1950, who lists it in a species bibliography, describes one new genus and three new species, all unrecorded, so far as I am aware in Aphid literature. On the title page, which if numbered would be page 354 the description of *Toxoptera fusca* new species is started. Both alate and apterous viviparous females are described. The host is given as *Petroselinum sativum*. *Sipha euphorbiae* new species is

described on pages 355-356, the description being limited to the apterous viviparous female. The host is given as *Euphorbia esula* L. On page 356 the genus *Passerinia* is very briefly described and indicated as new. The characters used being the number of segments in the antennae, the relative lengths of antennal segments, and long cylindrical cornicles. *Passerinia rosae* a yellow species is described as new, various species of rose being given as hosts. All three new species are figured. I am not able to place two of the species described as new in synonymy and am not sure of the third, this is in part due to language difficulties. The name *Passerinia* is preoccupied having been used in the birds by Viellot in 1816. The figures of the apterous viviparous female, the only form described, appears not to be very accurate and surely is not in accordance with the description of the genus in all respects. If it were not for the very short cauda figured, I should place *Passerinia* as a synonym of *Macrosiphum*. I do this, despite the figure, for I suspect that it is of an immature female, in which case the cauda would be short, and if such be the case *Passerinia rosae* M. is most likely a synonym of *Macrosiphum rosae* L.

In a paper published by Macchiati in 1882 *Myzus roseum* M. *Sipha euphorbiae* M. and *Toxoptera fusca* M. are listed under their respective genera, under a heading "Indice Delle Specie Di Afidi Osservati In Sardegna." *Passerinia rosae* M. is not listed, but *Siphonophora rosae* L. is. I think this is the first listing of *Macrosiphum rosae*(L.) from the works of Macchiati. Can it be that he already recognized his new genus and species as synonyms?

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Altro Contributo Agli Afidi Di Sardegna Colla Descrizione Di Tre Specie Nuove. Revista scientifico-industriale di G. Vimercati, a. XII. 1880.* n. 16, pp. 354-360. Page 354 not numbered. I tav.

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*The date of the volume is given as 1880, however the Author indicates the date as 1881 in a footnote page not numbered of a reprint Aggiunta Agli Afidi Di Sardegna originally printed in *Bullettino della Società Entomologica Italiana*, Anno XIV, pp 243-249, 1882.

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TWO NEW SPECIES OF *LACHNINI* (APHIDIDAE) FROM COLORADO

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In 1951 the writer and Dr. L. P. Wehrle published a paper, "Two New Species of *Lachnini* (Aphididae) from Arizona." Quite by coincidence the species published as new here, are closely allied to the two species described from Arizona.

SCHIZOLACHNUS **WAHLEA** HOTTES, new species

APTEROUS VIVIPAROUS FEMALE.

Size and general color. — Length from vertex to tip of anal plate varying from 2.43-2.86 mm. Head and thorax black. Head made more or less gray by white powder. Prothorax with a broad "T" shaped powdered area. Mesothorax and metathorax almost free from powder except laterally and the posterior region of the metathorax which is provided with a transverse band. Abdomen either light brown or green alternately banded with narrow transverse rows of powder, there being about seven such rows. The rows are not confined to the dorsum, but continue on the ventral surface where they are almost complete. Immature specimens are free from powder, and are either black or greenish-black. Antennal segments dusky brown, with the first and last segments darkest. All femora except extreme base dark brown to almost black. Prothoracic and mesothoracic tibiae brown, with apical portions and tarsi darker. Metathoracic tibiae uniform dark brownish-black, tarsi the same.

Head and thorax. — Width of head through the eyes .48 mm. Head with a median suture. Rostrum typical of genus, attaining metathoracic coxae, in most cases: always surpassing coxae of mesothorax. Antennal segments with the following proportional

lengths: III .39-.45 mm., IV .17-.21 mm., V .14-.17 mm., as a rule always shorter than V, but in a few cases IV and V are equal. VI .07-.11 + .03-.04 mm. There are no secondary sensoria. Antennal hair rather sparse, coarse, that on III just short of being two times as long as width of segment. Prothorax with small lateral tubercles. Femora of prothorax and mesothorax broad and rather heavy, apical hair on these segments somewhat thicker than remaining. Metathoracic femora .71-2.00 mm.

These femora are much broader apically than they are near the base, and in most cases appear to be more or less deformed. Hair of the ventral surface of the hind femora thick, short, peg-like. The pegs being unequal in length, remaining hair of equal coarseness, but longer and sharp pointed. Metathoracic tibiae 2.71-3.07 mm. long, with coarse dull pointed hair, which are shorter than width of tibiae. Hind tarsi .40-.42 mm. long. First segment of hind tarsis with a few long much inclined hair. Apex of tibiae on inner side with a few fine short hair.

Abdomen.—Cornicles dusky brown, base of cornicles .07-.10 mm. with about three hair. Dorsum with about seven transverse rows of hair. Cauda and anal plate with long fine hair on outer margins, inner portions with much shorter and finer hair. Cauda more or less pointed.

OVIPAROUS FEMALE.

Unless otherwise noted as in apterous viviparous female. Length 2.21-2.50 mm. Comparative lengths of antennal segments as follows: III .37-.42 mm., IV .17-.18 mm., V .14-.16 mm., VI .07-.1 + .03-.04 mm. Hind femora 1.57-1.64 mm. Hind tibiae 2.07-2.50 mm. The hind tibiae are somewhat swollen beyond their middle, the sensoria are tuberculate but have an atypical appearance.

This species is extremely limited in nature. I have not taken it except by "beating." Observations made indoors indicate that it is a needle feeder, but it has not been observed feeding in nature. For some reason I have not been able to take males, and apparently I located it too late for alate viviparous females.

The fact that both this species and *S. tusoca* H. & W. have peg-like hair on the hind femora indicates that these species have a close affinity. Lacking specific information to the contrary, and after having again examined the type of *tusoca* I believe them to be distinct. They two species differ as follows: *S. Wahllea* is larger, has longer antennae, segments IV and V of the antennae differ in relative

length, the rostrum is much longer, the cornicles have a wider base, the metathoracic femora and tibiae are much longer, the hair on the upper surface of the hind femora are of the same quality as the pegs.

Holotype apterous viviparous female Aug. 17, 1952. Morphotype apterous oviparous female Oct. 6, 1952. Both types deposited in the United States National Museum. Host *Pinus ponderosa* (Needles?) Carson Hole, South of Whitewater, Colorado.

CINARA **WAHLUCA** HOTTES, new species

APTEROUS VIVIPAROUS FEMALE.

Size and general color.—Length from vertex to tip of anal plate varying from 2.72-3.00 mm. Color of head thorax and abdomen reddish-brown, with the head somewhat lighter. Specimens collected just before the appearance of the oviparous females darker than specimens taken in August. Free from all pulverulence, but not shining. Thorax and abdomen with a pale yellowish-orange median line. Median line with two and sometimes three rows of brownish spots or punctures on each side. Cornicles darker than abdomen, very dark brownish-black, but not black. Apical portions of antennal segments three, four, five and six darker than remaining portions, segment three less dark than the others. Last three segments of the rostrum dark brown, remaining portion of rostrum more or less spotted. Cleared specimens show the head brownish and pigmented spots on the thorax and fore part of the abdomen, these do not show in life. There are two rather narrow transverse spots of a pigmented nature on the dorsum of the abdomen just anterior to the cauda. Cauda and anal plate dusky. Spiracles arising from small pigmented areas. Hind femora with apical halves dusky, remaining portion of femora pale. Hind tibiae with small portion near base and apical half dusky. Tarsi dusky.

Head and thorax.—Head with a median suture which is not deeply pigmented. On either side of this suture there is a row of long hair, lateral to these hair there is an area rather free from hair. Width of head across eyes .61 mm. Ocular tubercles well developed. Antennal segments with the following proportional lengths: III .28-.32 mm., IV .16 mm., V .17-.21 mm., VI .08-.1 + .04 mm. There are one to two secondary sensoria on segment five. Antennal hair not numerous, but long, and quite upright, that on segment three almost three times as long as width of segment. Rostum long, reaching about to mid region of abdomen. Hind tibiae

1.28 mm. long. Hair on hind tibiae upstanding, that on outer surface longer and more upstanding than that on inner. Ratio of length of hair to width of tibiae 17-12. Hind tarsi .29 mm. long, first segment with about twelve hair. Hair on inner surface of hind tibiae near apex more numerous than that on outside, also shorter and finer.

Abdomen.—Cornicles with outer margin of base very irregular, width of cornicles at base about .21 mm. Cornicles with two to three rows of hair, the third row very irregular and depending upon base being present. Cauda and anal plate with long hair. Pigmented spots anterior to cauda with one to two rows of long hair. Dorsum of abdomen with many long fine hair.

OVIPAROUS FEMALE

Length varying from 2.28-2.66 mm. Color essentially the same as that of viviparous female, and free from powder. Specimens taken late in the season are inclined to be darker and to have the lateral and dorsal spots surrounded with areas tinged with green. Comparative lengths of antennal segments as follows: III .33-.40 mm., IV .13-.17 mm., V .20-.22 mm., VI .1-.11 + .02-.05 mm. There is one secondary sensorium on segment five. Hind tibiae .97-1.07 mm. long. Hind tarsi .21-.24 mm. long. Sensoria on hind tibiae indistinct, few if any breaking to the surface.

APTEROUS MALE.

Length varying from 1.72-2.07 mm. Specimens of this sex were not noted in life, color of head apparently brown, thorax with pigmented areas of brown, abdomen yellowish-brown. Antennal segments and legs quite dark. Comparative lengths of antennal segments as follows: III .28-.32 mm., IV .14-.15 mm., V .17-.21 mm., VI .08-.1 + .05 mm. Segment four of antennae with five to six secondary sensoria, segment five with three to five secondary sensoria. The secondary sensoria are irregular in size, and are as a rule rather small except for one of normal size on each segment. There is a tendency for the secondary sensoria to cluster.

Hind tibiae .97-1.07 mm. long. Hind tarsi .21-.24 mm. The rostrum reaches almost to the cornicles. Width of cornicles at base .07-.11 mm. with one row of hair, and a partial second. Gonapophyses curved, rather pointed, with fine short hair at the tip.

This species is easily overlooked, I took it first by "beating." I have found it on only two trees. It is a bark feeder, showing a preference for the trunk and larger limbs where it lives concealed under partially free scales. I have also located it in cracks, and in

regions where the bark has been injured. Its color is such that it blends in well with the red color of the under bark. It is closely allied with *C. tonaluca* H. & W. from which it differs in size, in length of antennae, over all length of rostrum, and length of last three segments of rostrum, length of hind tibiae, wider cornicles, length of hair on antennae and tibiae, and by the median line not being black. It also differs by not having powder.

Holotype apterous viviparous female Aug. 17, 1952. Morphotype oviparous female Sept. 12, 1952. Allotype apterous male Sept. 22, 1952. All types deposited in the United States National Museum. All specimens collected on *Juniperus scopulorum*, located in a small area on Pinon Mesa, south of Glade Park, Colorado.

CINARA TONALUCA H. & W.

The description of *C. tonaluca* was not written till after the death of Dr. Wehrle. Mrs. Wehrle has since provided me with notes made by Dr. Wehrle from which I quote, "On woody stem of young tree, wingless adults covered with white waxy bloom on upper and under sides of body. Black longitudinal dorsal mid line shows through wax, as do two rows of black punctures on each side of line. Cornicles show through wax as circular black spots."

NOTE

A LAND PLANARIAN COLLECTED IN UTAH: On March 13, 1952, a specimen of **Bipalium kewense** Mosely, an interesting turbellarian of the family Bipalidae, was brought to me by Robert Liddiard of Provo, Utah. He found it in a Provo greenhouse in a container of iris rhizomes which he was unpacking for greenhouse planting. On March 19, three other specimens from the same location were found. One of the specimens was carefully collected while two others became damaged. Mr. Liddiard reports that the iris shipments were received October, 1951, and placed in a cool basement cellar room with an approximate temperature of 55° F. They were left there until March 13, 1952 and then removed for planting. The shipment of rhizomes came from an area near Tacoma, Washington.

Bipalium kewense is quite large as compared to **Dugesia tigrina** (**Planaria maculata**) the one commonly used for class room instruction. The latter, however, is an aquatic form. The **Bipalium kewense** presented to me by Mr. Liddiard measured 145 mm. in length.

Land planarians are found in humid habitats and as would be expected, are largely confined to tropical and sub-tropical jungle situations. Some species of terrestrial planarians have become transported from tropical and sub-tropical areas to more temperate regions. The main vehicle of distribution for the land planarians, by man, has apparently been by means of shipments of plants. **B. kewense** has become quite widely distributed throughout the world and generally so in the United States. It is reported from Georgia, Louisiana, Washington D.C., California, New Jersey, Illinois, Ohio, Florida and now Utah.—D Elden Beck, Department of Zoology and Entomology, Brigham Young University.

DIADOPHIS REGALIS REGALIS (B. & G.) FOUND IN NEVADA

WILMER W. TANNER

Brigham Young University

Recently an adult male specimen of *Diadophis regalis regalis* (Baird & Girard) was presented to me by Andrew Barnum, a student and Arthur Bruhn, Professor in charge of the Biological Sciences at Dixie Junior College, St. George, Utah. The specimen was collected by Mr. Barnum in August, 1947, approximately one mile east of Caliente, Lincoln County, Nevada.

Although this species has been found near Nevada in the Deep Creek Mountains of Utah (Tanner 1940) and might be expected to occur in Nevada, this new locality record represents, insofar as I have been able to ascertain, a new reptile record for that state. This specimen is now a part of the Brigham Young University Vertebrate Collection and bears the number, BYU 11113. It has the following scale counts and measurements: total length 317 mm, tail length 86 mm; dorsal scale rows 17-17-15; ventrals 21+; caudals 81; the head scales are normal for the species.

On June 6, 1952, I secured a specimen of this snake while collecting in the vicinity of the Forest Camp, east of Pine Valley, Washington County, Utah. The specimen is a sub-adult male with the following characters: total length 220 mm; tail length 43; dorsals in 17-17-15 rows; ventrals 212, caudals 76; and the head scales are normal except that the infralabials are increased to 9 on one side.

Inasmuch as the color descriptions given (Blanchard 1942) for this species are based primarily on preserved material, the following description may be of value. The dorsals and head plates are a Deep Medici Blue (Ridgeway color standards); whereas the ventrals are Salmon-Orange and the caudals, the anals and the posterior four ventrals are Carnelian Red. To my surprise the color on the ventral scutes does not blend, but ends abruptly where the two colors meet. It is doubtful if the above colors are standard for the adults of this species. Living adult specimens seen in previous years seemed not to have the bright orange on the ventrals and to have more green in the dorsal color.

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A RECORD OF THE OCCURRENCE OF THE TICK *IXODES*
MURIS BISHOPP AND SMITH ON MUSKRATS IN UTAH •

Glen M. Kohls

Published records indicate that although the tick *Ixodes muris* occurs rather commonly on a wide variety of birds and mammals in the northeastern United States and eastern Canada, this and other species of ticks are seldom found on muskrats anywhere in North America (Bishopp and Smith 1937; Cooley and Kohls 1945; Bishopp and Trembley 1945; Bequaert 1945; Anastos 1947). The most westerly locality record of this tick until now was that of a female off *Microtus p. pennsylvanicus*, Portage Lake, Washtenaw County, Michigan, June 6, 1920, as reported by Cooley and Kohls (1945).

In March 1951, Mr. Robert A. McCullough, a graduate student in wildlife management at Utah State Agricultural College, examined 812 trapped muskrats for ear tags near Locomotive Springs at the north end of Great Salt Lake. Three partially engorged female ticks, subsequently identified by the writer as *Ixodes muris*, were found behind the ears of two of the animals examined. This appears to be the first record of the occurrence of ticks on muskrats in western North America, and the discovery of the species concerned at a point so distant from previously recorded localities is of additional interest. Speculation as to whether this tick is native to Utah or was introduced would appear to be futile but it may be worth nothing that according to McCullough (in litt.) a number of "black muskrats" were imported to the area from Canada about 1920. "This transplantation persisted in all probability, as the skulls are very similar to those of the eastern muskrat, *Ondatra zibethica zibethica* L."

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*From the Federal Security Agency, Public Health Service, National Institutes of Health, National Microbiological Institute, Rocky Mountain Laboratory, Hamilton, Montana.

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PLAGUE IMPORTANT FLEAS AND MAMMALS IN UTAH AND THE WESTERN UNITED STATES¹

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In recent years increased interest has been shown toward those arthropods which are capable² and potential³ vectors of diseases to man and animals closely associated with man. Although outbreaks of human plague in the United States have never been of such disastrous proportions as those in Europe and Asia, there has been continued concern over its presence in sylvatic form since its discovery in rats at San Francisco in 1900. Various workers have implicated more than sixty species and subspecies of fleas with human and sylvatic plague throughout the world. Of this number, over forty-five species and subspecies are known to occur in the United States as obligate or facultative parasites of birds and mammals. Although much work has been done, still relatively little is known concerning the disease transmission potentialities of these species of fleas and their ecological relationships to native mammals and birds which may serve as reservoirs of sylvatic plague.

This study was initiated for three major reasons: (1) to bring together the scattered data from the literature concerning plague important fleas and their hosts, (2) to add to the knowledge concerning the host-flea relationships, and (3) to determine the geographic distribution of medically important species of fleas in Utah.

The author wishes to express appreciation to those men and institutions⁴ who helped to make this study possible. For access to unpublished collection records, thanks are due Dr. Vasco M. Tanner, Brigham Young University; Dr. J. Sedley Stanford, Utah State Agricultural College; Mr. Fred C. Harmston and Mr. Roy J. Myklebust, Utah State Board of Health, United States Public Health Service; the Communicable Disease Center, United States Public Health

1 An abstract from a thesis submitted to the faculty of the Department of Zoology and Entomology, Brigham Young University, Provo, Utah in partial fulfillment for the degree of Master of Arts, June, 1951.

2 "Capable vectors" are herein classified as those fleas which have been found infected with plague bacilli in nature or have been infected under experimental conditions, and are known or have been experimentally shown to be able to transmit the disease either under natural or experimental conditions.

3 "Potential vectors" are those fleas which fall under the same categories of natural or experimental infection as "capable vectors," but are not known or have not been shown to be able to transmit the disease either naturally or under experimental conditions.

4 Collections for this study were supported (in part) by a research grant from the Microbiological Institute of the National Institutes of Health, United States Public Health Services.

Service, Atlanta, Georgia; Mr. Frank M. Prince and Harold Stark, Western Communicable Disease Center Laboratory, United States Public Health Service, San Francisco, California. For assistance in determinations and/or verifications, the writer is indebted to Lt. Col. Robert Traub and Lt. Vernon J. Tipton, Army Medical Service Graduate School, Washington, D. C. To Dr. D Elden Beck, Brigham Young University, the writer is much indebted for his permission to use unpublished records, and for his assistance in determinations, helpful suggestions, and enthusiastic support.

In the western United States more than sixty-five species and subspecies of rodents and lagomorphs have been shown to harbor plague bacilli in their body tissues or have acted as hosts for fleas infected with plague. Following is a list of mammals which have been reported as having plague-infected tissue, or have acted as hosts for plague-infected fleas. These reports were taken from the United States Public Health Reports, years 1936 to 1950 inclusive, from Mohr (1948), and from Ecke and Johnson (1950). The system of taxonomy followed is that of Anthony (1928), Hall (1946), and Howell (1938).

PLAGUE IMPORTANT MAMMALS IN THE WESTERN UNITED STATES

<i>Citellus armatus</i> (Kennicott)	<i>Dipodomys ordii ordii</i> Woodhouse
<i>C. beecheyi beecheyi</i> (Richardson)	<i>Eutamias quadivittatus frater</i>
<i>C. beecheyi douglasii</i> Richardson	(Allen)
<i>C. beecheyi fisheri</i> Merriam	<i>E. minimus</i> ssp.
<i>C. beecheyi nudipes</i> Huey	<i>Glaucomys sabrinus lascivus</i>
<i>C. beldingi oregonus</i> (Merriam)	(Bangs)
<i>C. columbianus columbianus</i> (Ord)	<i>Lagurus curtatus</i> ssp.
<i>C. columbianus ruficaudus</i> Howell	<i>Lepus californicus</i> ssp.
<i>C. idahoensis</i> Merriam	<i>Marmota flaviventer avara</i> (Bangs)
<i>C. lateralis chrysodeirus</i> (Merriam)	<i>M. flaviventer engelhardti</i> (Allen)
<i>C. mexicanus parvidens</i> (Mearns)	<i>M. flaviventer flaviventer</i>
<i>C. richardsonii elegans</i> (Kennicott)	(Audubon & Bachman)
<i>C. richardsonii nevadensis</i> Howell	<i>M. flaviventer nosophora</i> Howell
<i>C. richardsonii richardsonii</i> (Sabine)	<i>Microtus californicus</i> ssp.
<i>C. spilosoma major</i> (Merriam)	<i>M. montanus</i> ssp.
<i>C. townsendii mollis</i> (Kennicott)	<i>M. nanus</i> ssp.
<i>C. tridecemlineatus</i> ssp.	<i>M. townsendii</i> (Bachman)
<i>C. variegatus grammurus</i> (Say)	<i>Mus musculus</i> ssp.
<i>C. variegatus utah</i> Merriam	<i>Mustela</i> sp.
<i>C. washingtoni loringi</i> Howell	<i>Neotoma albigula</i> ssp.
<i>C. washingtoni washingtoni</i> Howell	<i>N. cinerea occidentalis</i> (Baird)
<i>Cynomys gunnisoni gunnisoni</i>	<i>N. fuscipes mohavensis</i> Elliot
(Baird)	<i>N. lepida intermedia</i> (?)
<i>C. gunnisoni zuniensis</i> Hollister	<i>N. lepida lepida</i> Thomas
<i>C. leucurus</i> Merriam	<i>N. micropus</i> ssp.
<i>C. ludovicianus arizonensis</i> Mearns	<i>Onychomys leucogaster</i> ssp.
<i>C. parvidens</i> Allen	<i>O. torridus</i> ssp.
	<i>Oryzomys</i> sp.

Perognathus sp.	Reithrodontomys megalotis ssp.
Peromyscus boylii ssp.	Sigmodon hispidus ssp.
P. leucopus ssp.	Sylvilagus auduboni ssp.
P. maniculatus ssp.	S. bachmani ssp.
P. truei gilberti Allen	S. nuttallii nuttallii (Bachman)
P. truei truei (Shufeldt)	Tamiasciurus douglasii albolim-
Rattus norvegicus (Erxleben)	batus (Allen)
R. rattus alexandrinus (Geoffroy)	Taxidea taxus neglecta (Mearns)
R. rattus rattus (Linnaeus)	Thomomys talpoides ssp.

In Utah, sylvatic plague was first discovered in 1936. Since that time it is believed to have occurred in thirteen of the twenty-nine counties implicating six species of rodents. Implication of these rodents was based on the identification of plague bacilli in the tissues of the animal, or fleas collected from the animal. Following is a listing of the counties, the implicated animals, and the dates of known occurrences of the disease in Utah.

Beaver County: *Citellus variegatus*, July and August, 1936
Marmota flaviventer, July, 1936

Sevier County: *Citellus variegatus*, July, 1936
C. armatus, May, 1949

Garfield County: *Cynomys parvidens*, August, 1936

Morgan County: *Citellus variegatus*, August, 1937

Kane County: *Neotoma lepida*, May, 1938

Rich County: *Citellus armatus*, July, 1938

Wasatch County: *C. armatus*, August, 1937 and June, 1938

Salt Lake County: *C. variegatus*, Sept., 1948 and March, 1949
Peromyscus maniculatus, Sept., 1948

Millard County: In late November or early December of 1939, a man supposedly contracted plague from skinning a coyote. (From conversation with residents who remember the case, the writer has strong reason to believe that the man had some other disease contracted from some other source).

Weber and Iron Counties: The Communicable Disease Center Bulletin (1948) lists plague as having occurred in these counties, but gives no specific data of date, host, or locality.

Grand and San Juan Counties: During 1949 a hyper-epizootic occurred among prairie dog colonies in these counties. However, no evidence was found to indicate sylvatic plague as the cause of the decrease in population.

Thirty-two species and subspecies of fleas which have been implicated with plague in the western United States are known to occur in Utah. Eleven of these are herein listed as potential vectors, and twenty-one are listed as capable vectors. Following is the known

distribution of these fleas in Utah. All collection records are listed by county. The plague transmission potentiality of each species is given following the name of the species of flea.

- Athyloceras multidentatus* (C. Fox 1909) — Capable Vector
Salt Lake, Utah
- Catallagia decipiens* Rothschild 1915 — Potential Vector
Cache, Davis, Salt Lake, Uintah, Utah, Wasatch
- Ctenocephalides felis felis* (Bouche 1835) — Capable Vector
Salt Lake
- Diamanus montanus* (Baker 1895) — Capable Vector
Cache, Davis, Emery, Grand, Kane, Salt Lake, San Juan, Sanpete, Utah, Washington, Wayne, Weber
- Echidnophaga gallinacea* (Westwood 1875) — Capable Vector
Grand, San Juan, Washington
- Epididia wenmanni* (Rothschild 1904) — Potential Vector
Cache, Salt Lake, Utah
- Foxella ignota* ssp. — Potential Vector
Beaver, Box Elder, Cache, Emery, Grand, Iron, Juab, Millard, Salt Lake, San Juan, Sevier, Tooele, Utah
- Hoplopyllus affinis* (Baker 1904) — Potential Vector
Beaver, Garfield, Iron, Kane, San Juan, Sevier, Washington
- Hoplopyllus anomalus* (Baker 1904) — Capable Vector
Beaver, Cache, Davis, Emery, Garfield, Grand, Iron, Juab, Kane, Millard, Morgan, Rich, Salt Lake, San Juan, Sanpete, Sevier, Tooele, Uintah, Utah, Washington, Wayne, Weber.
- Hystrihopsylla gigas dippiei* Rothschild 1902 — Capable Vector
Box Elder, Cache, Duchesne, Iron, Salt Lake, Sevier, Summit, Uintah, Utah, Wasatch
- Malaraeus telchinum* (Rothschild 1905) — Capable Vector
Box Elder, Cache, Davis, Garfield, Millard, Salt Lake, Utah
- Megabothris abantis* (Rothschild 1905) — Capable Vector
Cache, Daggett, Salt Lake, Uintah, Utah
- Megarhroglossus divisus divisus* (Baker 1895) — Potential Vector
Cache, Iron
- Monopsyllus eumolpi eumolpi* (Rothschild 1905) — Capable Vector
Box Elder, Cache, Davis, Salt Lake, Sevier, Utah, Weber
- Monopsyllus wagneri wagneri* (Baker 1904) — Potential Vector
Beaver, Box Elder, Cache, Davis, Garfield, Grand, Kane, Millard, Salt Lake, San Juan, Sevier, Tooele, Uintah, Utah, Wasatch, Weber
- Ncopsylla inopina* Rothschild 1915 — Potential Vector
Cache, Salt Lake, Summit, Wasatch, Weber
- Nosopsyllus fasciatus* (Bosc 1801) — Capable Vector
Salt Lake, Utah
- Opisocrostitis hirsutus* (Baker 1895) — Capable Vector
Carbon, Daggett, Duchesne, Emery, Garfield, Iron, Kane, Millard, Rich, San Juan, Sevier, Uintah, Wayne
- Opisocrostitis labis* (Jordan and Rothschild 1922) — Capable Vector
Beaver, Daggett, Millard, Rich, Sevier, Summit
- Opisocrostitis tuberculatus cynomuris* Jellison 1939 — Potential Vector
Iron, Salt Lake, Weber
- Opisocrostitis tuberculatus tuberculatus* (Baker 1904) — Capable Vector
Beaver, Cache, Duchesne, Millard, Rich, Salt Lake, Summit, Utah, Weber
- Orchopeas sexdentatus agilis* (Rothschild 1905) — Potential Vector
Beaver, Cache, Grand, Iron, Kane, Millard, Utah, Washington
- Orchopeas sexdentatus nevadensis* (Jordan 1929) — Potential Vector
Kane
- Oropsylla idahoensis* (Baker 1904) — Capable Vector
Beaver, Box Elder, Cache, Duchesne, Emery, Garfield, Iron, Kane,

- Morgan, Rich, Salt Lake, Sanpete, Sevier, Summit, Uintah, Utah, Wasatch, Weber
Pulex irritans (Linnaeus 1758) — Capable Vector
 Carbon, Duchesne, Emery, Millard, Summit, Uintah, Washington, Weber
Thrassis acamantis (Rothschild 1905) — Capable Vector
 Duchesne, Sevier
Thrassis arizonensis arizonensis (Baker 1898) — Capable Vector
 Cache
Thrassis francisi (C. Fox 1927) — Capable Vector
 Beaver, Box Elder, Millard, Rich, Salt Lake, Sanpete, Sevier, Tooele, Utah, Wasatch, Weber
Thrassis howelli howelli (Jordan 1925) — Capable Vector
 Salt Lake
Thrassis pandorae Jellison 1937 — Capable Vector
 Box Elder, Cache, Daggett, Davis, Duchesne, Emery, Morgan, Piute, Rich, Salt Lake, Sanpete, Sevier, Summit, Utah, Wasatch, Weber
Thrassis petiolatus (Baker 1904) — Potential Vector
 Salt Lake
Xenopsylla cheopis (Rothschild 1903) — Capable Vector
 Salt Lake

FLEA-HOST ASSOCIATIONS KNOWN TO OCCUR IN UTAH

ATYPHLOCERAS MULTIDENTATUS

Neotoma cinerea *Peromyscus maniculatus*

CATALLAGIA DECIPIENS

<i>Citellus variegatus</i>	<i>Peromyscus</i> sp.
<i>Eutamias quadrivittatus</i>	<i>Phenacomys intermedius</i>
<i>Microtus montanus</i>	<i>Sorex</i> sp.
<i>Microtus</i> sp.	<i>Sylvilagus nuttallii</i>
<i>Neotoma cinerea</i> (nest)	<i>Thomomys talpoides</i>
<i>Peromyscus maniculatus</i>	<i>Zapus princeps</i>

CTENOCEPHALIDES FELIS FELIS

Canis familiaris *Felis domestica*

DIAMANUS MONTANUS

<i>Citellus armatus</i>	<i>Marmota flaviventris</i>
<i>C. lateralis</i>	<i>Mustela frenata</i>
<i>C. leucurus</i>	<i>Neotoma cinerea</i>
<i>C. townsendii</i>	<i>N. cinerea</i> (nest)
<i>C. variegatus</i>	<i>Neotoma</i> sp.
<i>Citellus</i> sp.	<i>Peromyscus maniculatus</i>
<i>Cynomys gunnisoni</i>	<i>Rattus norvegicus</i>
<i>C. leucurus</i>	<i>Spilogale saxatilis</i>
<i>C. parvidens</i>	<i>Sylvilagus idahoensis</i>
<i>Dipodomys ordii</i>	<i>Sylvilagus</i> sp.
<i>Eutamias</i> sp.	<i>Thomomys bottae</i>
<i>Lepus californicus</i>	

ECHIDNOPHAGA GALLINACEA

<i>Citellus leucurus</i>	<i>Neotoma lepida</i>
<i>C. variegatus</i>	<i>Neotoma</i> sp.
<i>Dipodomys merriami</i>	<i>Sylvilagus audubonii</i>

EPITEDIA WENMANNI

Microtus montanus	Peromyscus maniculatus
M. pennsylvanicus	P. maniculatus (nest)
Mus musculus	

FOXELLA IGNOTA

Citellus variegatus	Peromyscus sp.
Clethrionomys gapperi	Rattus norvegicus
Mustela arizonensis	Sylvilagus audubonii
M. frenata	Thomomys bottae
Perognathus parvus	T. perpallidus
Perognathus sp.	T. talpoides
Peromyscus maniculatus	Thomomys sp.

HOPLOPSYLLUS AFFINIS

Lepus californicus	Sylvilagus sp.
Sylvilagus audubonii	

HOPLOPSYLLUS ANOMALUS

Citellus grammurus	Marmota flaviventer
C. lateralis	Microtus montanus
C. leucurus	M. pennsylvanicus
C. townsendii	Mustela frenata
C. variegatus	Onychomys leucogaster
Cynomys leucurus	Peromyscus sp.
C. parvidens	Spilogale saxatilis
Eutamias sp.	Sylvilagus sp.

HYSTRICHOPSYLLA GIGAS DIPPETI

Citellus armatus	Peromyscus boylii
C. lateralis	P. maniculatus
Clethrionomys sp.	Phenacomys intermedius
Marmota flaviventer	Tamiasciurus hudsonicus
Microtus montanus	Tamiasciurus sp.
Microtus sp.	Zapus princeps
Neotoma cinerea	

MALARAEUS TELCHINUM

Microtus montanus	P. maniculatus
Neotoma sp.	P. truei
Peromyscus boylii	Peromyscus sp.

MEGABOTHRIS ABANTIS

Citellus armatus	Peromyscus maniculatus
Clethrionomys gapperi	Phenacomys intermedius
Microtus longicaudus	Rattus norvegicus
M. montanus	Zapus princeps
Microtus sp.	

MEGARTHIROGLOSSUS DIVIUS DIVIUS

Neotoma cinerea	Tamiasciurus fremonti
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MONOPSYLLUS EUMOLPI EUMOLPI

Citellus armatus	Glaucomys sabrinus
Eutamias minimus	Microtus montanus
E. pictus	Peromyscus boylii
E. quadrivittatus	P. maniculatus
Eutamias sp.	Reithrodontomys megalotis

MONOPSYLLUS WAGNERI WAGNERI

Bubo virginianus	Mustela arizonensis
Citellus armatus	M. frenata
C. lateralis	Mustela sp.
C. townsendii	Neotoma lepida
C. variegatus	N. stephensi
Clethrionomys gapperi	Neotoma sp.
Cynomys leucurus	Ochotona princeps
Dipodomys ordii	Onychomys leucogaster
Dipodomys sp.	Peromyscus crinitus
Eutamias minimus	P. maniculatus
E. quadrivittatus	P. maniculatus (nest)
Lepus californicus	P. truei
Microtus macropus	Peromyscus sp.
M. montanus	Rattus norvegicus
Microtus sp.	Reithrodontomys megalotis
Mus musculus	Sylvilagus audubonii

NEOPSYLLA INOPINA

Citellus armatus

NOSOPSYLLUS FASCIATUS

Citellus armatus	Mustela frenata
C. variegatus	Peromyscus maniculatus
Microtus montanus	Phenacomys intermedius
M. pennsylvanicus	Rattus norvegicus
Mus musculus	R. rattus

OPISOCROSTIS HIRsutus

Citellus armatus	Dipodomys ordii
C. lateralis	Lepus californicus
Cynomys gunnisoni	Mustela sp.
C. parvidens	Neotoma sp.
Cynomys sp.	"Rabbit" sp.

OPISOCROSTIS LABIS

Citellus armatus	Cynomys leucurus
C. townsendii	

OPISOCROSTIS TUBERCULATUS CYNOMURIS

Citellus armatus	Cynomys parvidens
C. variegatus	

OPISOCROSTIS TUBERCULATUS TUBERCULATUS

Citellus armatus	C. variegatus
C. leucurus	Cynomys leucurus
C. mollis	Marmota flaviventer
C. townsendii	Lepus californicus

ORCHOPEAS SEXDENTATUS AGILIS

Neotoma cinerea	Peromyscus crinitus
N. cinerea (nest)	P. maniculatus
N. desertorum	Reithrodontomys megalotis
N. lepida	

ORCHOPEAS SEXDENTATUS NEVADENSIS

Neotoma desertorum	N. lepida
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OROPSYLLA IDAHOENSIS

Citellus armatus	Falco mexicanus
C. castanurus	Marmota flaviventer
C. lateralis	Mustela arizonensis
C. leucurus	Mustela sp.
C. townsendii	Peromyscus maniculatus
C. variegatus	Sylvilagus sp.
Cynomys parvidens	Thomomys sp.
Eutamias sp.	

PULEX IRRITANS

Canis latrans	Speotyto cunicularia
Cynomys leucurus	S. cunicularia (nest)
Cynomys sp.	

THRASSIS ACAMANTIS

Marmota flaviventer

THRASSIS ARIZONENSIS ARIZONENSIS

Citellus armatus

THRASSIS FRANCISI

Citellus armatus	Cynomys leucurus
C. leucurus	Thomomys sp.
C. townsendii	

THRASSIS HOWELLI HOWELLI

Citellus variegatus	Marmota flaviventer
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THRASSIS PANDORAE

Citellus armatus	Eutamias sp.
C. mollis	Marmota flaviventer
C. townsendii	Peromyscus sp.
C. variegatus	Thomomys sp.
Cynomys leucurus	

THRASSIS PETIOLATUS

Citellus armatus

XENOPSYLLA CHEOPIS

Rattus norvegicus	R. rattus
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INDEX TO VOLUME XII

The new genera and species described in this volume appear in black-face type in this index.

- Ablepharus boutonii metallicus Blgr., 11.
 Allred, Dorald M., Article by, 67.
 Amphibolus barbatus (Cuvier), 8
 Anniulus impressus (Say), 18.
 A Record of the Occurrence of the Tick Ixodes Muris Bishipp and Smith on Muskrats in Utah, 65.
 Apochthonius moestus (Banks), 42.
- Bipalium kewense Mosely, 62.
 Beck, D E., Article by, 62.
 Blaniulus guttulatus (Bosc.), 17.
 Brachyiulus pusillus (Leach), 16.
 Brachygybe lecontei Wood, 30.
- Chamberlin, Ralph V., Article by, 13.
 Cleidogona mandeli Chamb., 13.
 C. punctifer Chamb., 13.
 C. tajumulco Chamb., 15.
 Cambala annulata (Say), 30.
 C. saltillona Chamb., 30.
 Cinarua wahuca Hottes, 59.
 C. tonaluca H. & W., 61.
- Diadophis regalis regalis (B & G.)
 Found in Nevada, 63.
 Drake, C. J., Articles by, 35, 47.
 Diploilus caeruleocinctus (Wood), 17.
 D. hortensis (Wood) 17.
- Emoia cyanura (Lesson), 3.
 E. caeruleocauda de Vis, 5.
 E. b. baudinii (D. & B.), 6.
 E. tropidolepsis (Blgr.), 6.
 E. kordoana (Meyer), 6.
- Further Records and Descriptions of American Millipeds, 13.
 Flea-host Associations Known to Occur in Utah, 71.
- Gehyra oceanica (Lesson), 2.
 G. mutilata (Weigmann), 2.
 Genus Trepobates Herrich-Schaeffer (Hemiptera; Gerridae), 35.
 Gymnostreptus ventralis (Porat), 21.
- Heteronota binoei, 7.
 Hemidactylus garnetii, 2.
- Hoff, C. Clayton, Article by, 39.
 Hottes, F. C., Articles by 35, 55.
 Hakiulus diversifrons (Wood), 18.
 Hydrometra guianana Hungeford and Evans, 47.
- Julus moreleti Lucas, 17.
- Kohls, Glen M., Article by, 65.
- Lizards From Marquesas and Society Islands, 1.
 Lygosoma (Leiolopisma) noctua (Lesson), 3.
 L. (Sphenomorphus) variegatum stickeli Loveridge, 4.
 L. (Lygosoma) solomonis schodei Vogt, 5.
 L. (Leiolopisma) miotis Blgr., 5.
 L. (Leiolopisma) fuscum luctuosum (B. & D.), 5.
 L. (Spehenomorphus) f. fasciolatus (Gunther), 9.
 L. (Leiolopisma) fuscum (D. & B.), 10.
 L. (Sphenomorphus) fenuis brachysoma (L. & A.), 9.
 L. peronnii (D. & B.), 10.
 L. trilineata (Gray), 10.
 Lialis burtonis (Gray), 8.
 Lepidodactylus lugubris (D. & B.), 1.
 Land Planarian Collected in Utah, 62.
 Leiodere angelorum Chamb., 30.
 Lechyta pacifica (Banks), 43.
- Mundochthonius montanus Chamb., 40.
 Microvelia puchella Westwood, 48.
 M. ayacuchana Drake and Capriles, 48.
 M. duidana Drake and Capriles, 49.
- Notes on Some Australian Reptiles, 7.
 Notes on Two Little Known Aphid Papers Published by Luigi MacChiati, 55.
 Nopoiulus minutus (Brandt), 18.
- Oedura lesueurii (D. & B.), 8.
 Ophiulus pilosus (Newport), 17.
 Oiovelia cunucunumana Drake and Capriles, 52.
 Oiovelia Drake and Capriles, 51.

- Orthoporus bisulcatus* Chamb., 21.
O. bobos Chamb., 23.
O. cienegonus Chamb., 23.
O. cobanus Chamb., 24.
O. crotonus Chamb., 24.
O. euthus Chamb., 25.
O. gracilior Chamb., 25.
O. tehuacanus Chamb., 26.
O. unciferens Chamb., 27.
- Pacific Islands Herpetology No. VI,
 Tahiti and Marquesas Islands, New
 Guinea and Australia, 1.
- Plague Important Fleas and Mammals
 in Utah and the Western United
 States, 67.
- Prostemmiulus atypus* Chamb., 15.
P. obscurus Chamb., 16.
Peraiulus schmidti Chamb., 18.
P. viganus Chamb., 19.
Phallorthus columbianus Chamb., 20.
Platydesmus claus Chamb., 30.
P. crucis Chamb., 31.
P. excisus Chamb., 31.
P. perditus Chamb., 33.
P. perpictus Pocock, 33.
P. triangulifer Pocock, 33.
- Rhagovelia culebrana* Drake and Ca-
 priles, 53.
- Schizolachnus wahlea* Hottes, 57.
 Some Lizards from New Guinea, 4.
 Some Heterosphyronid Pseudoscorp-
 ions From New Mexico, 39.
Spirostrephon lactarium (Say), 15.
Scaphiostreptus simplex Chamb., 27.
S. texicolens (Chamb.), 28.
S. dybasi (Chamb.), 28.
Spirostreptus (?) *ergus* Chamb., 29.
Siphonophora globiceps Pocock, 33
S. conicornis Chamb., 34.
S. fallens annexa Chamb., 34.
S. vera Chamb. 34.
- Trachysaurus rugosus* Gray, 9.
 Tanner, Vasco M., Article by, 1.
 Tanner, Wilmer W., Article by, 63.
Typhlops diversus Waite, 7.
Tuniulus oregonensis (Wood), 19.
Trepobates panamensis Drake and
 Hottes, 35.
T. taylori (Kirkaldy), 37.
T. floridensis Drake and Harris, 37.
- Velia recens* Drake and Harris, 37.
- Water-Striders from Territorio Ama-
 zonas of Venezuela (Hemiptera: Hy-
 drometridae, Veliidae), 47.

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