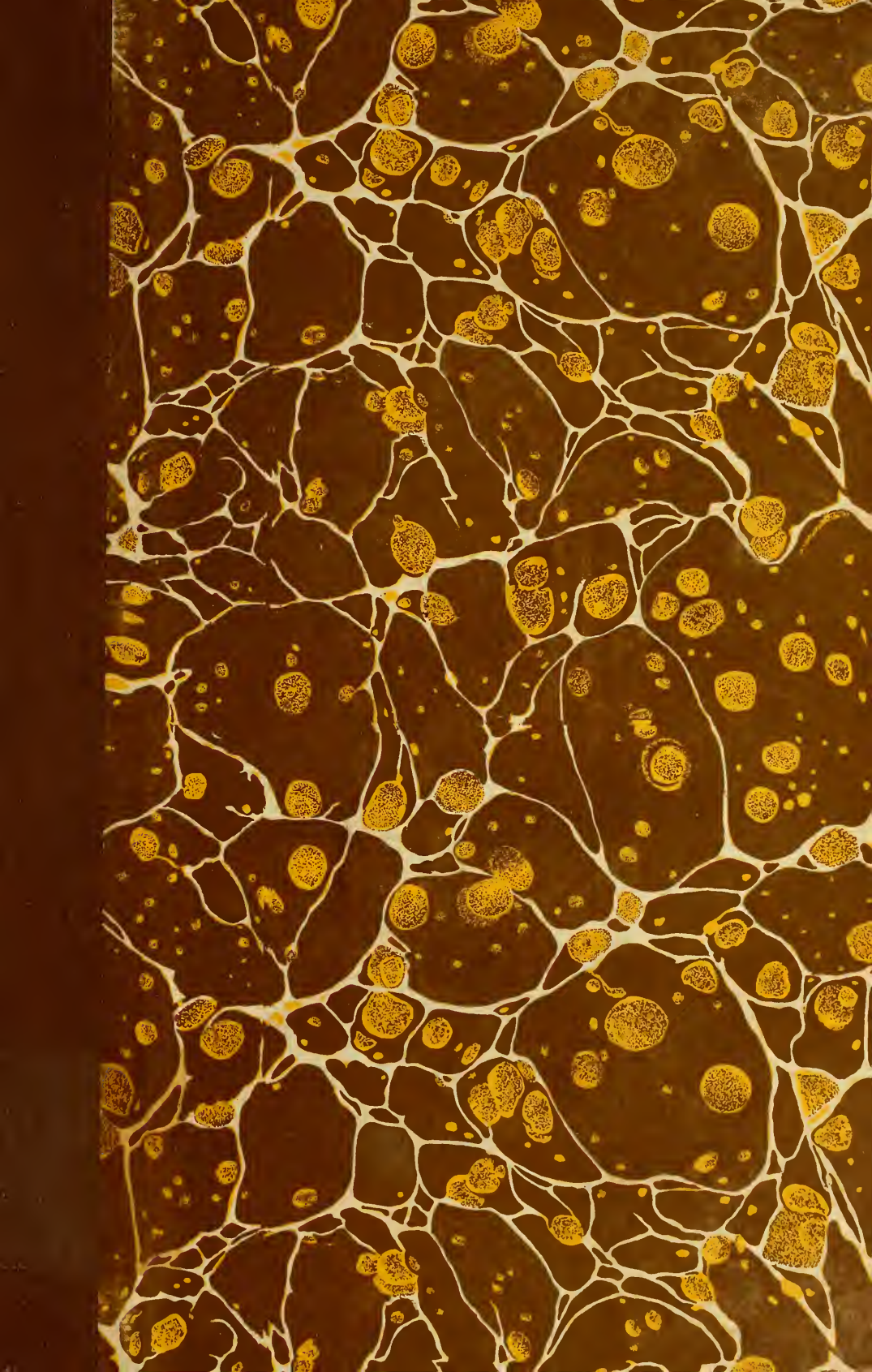

PROCEEDINGS

OF THE

Biological Society of Washington

VOLUME 54
1941

WASHINGTON
PRINTED FOR THE SOCIETY

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PUBLICATION NOTE

By a change in the By-Laws of the Biological Society of Washington, effective March 27, 1926, the fiscal year now begins in May, and the officers will henceforth hold office from May to May. This, however, will make no change in the volumes of the Proceedings, which will continue to coincide with the calendar year. In order to furnish desired information, the title page of the current volume and the list of newly elected officers and committees will hereafter be published soon after the annual election in May.

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OF THE

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(FOR 1941-1942)

(ELECTED MAY 3, 1941)

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*Deceased.

TABLE OF CONTENTS.

The Committee on Publications declares that each paper of this volume was distributed on the date indicated on its initial page. The contents, minutes of meetings, and index for 1941 (pp. v–xii; 217–228), were issued on February 19. The title page and lists of officers and committees for 1941–1942 (pp. i-iv) were issued in June, 1941.

PLATES.

Vol. 54, pp. ix–xii

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

January 11, 1941—904th Meeting.

President Walker in the chair; 60 persons present.

President Walker was nominated to the Washington Academy of Sciences as Vice-President to represent the Biological Society.

New members elected: Robert Allen, F. F. Dicke, A. C. Elmer, D. F. Hoffmeister, J. W. Scrivener, H. H. Stage, F. M. Wadley, Milton Wigod.

Informal communication: Frank Thone, Exhibition of new books on biological subjects.

Formal communications: D. E. McHenry, Tree flowers; R. A. Nesbitt, Atlantic coast shad.

The meeting was followed by a buffet luncheon and social gathering to commemorate the 60th anniversary of the Society.

January 25, 1941—905th Meeting.

President Walker in the chair; 240 persons present.

The death of C. W. Stiles was announced.

Formal communication: W. M. Mann, The Smithsonian-Firestone Liberia Expedition.

February 8, 1941—906th Meeting.

Vice-President Humphrey in the chair; 44 persons present.

Informal communications: S. F. Blake, Note on observation of a large flock of purple grackles in December; J. S. Wade, Exhibition of new books on biological subjects.

Formal communications: W. H. Wright, Dr. Charles W. Stiles' achievements in the field of public health; L. Stejneger, The work of Dr. Stiles on the International Commission of Zoological Nomenclature; C. N. Smith, Relation of ticks to mammals

on Marthas Vineyard; S. G. Jewett, The mystery of the marbled murrelet and other bird notes.

February 22, 1941—907th Meeting.

President Walker in the chair; 62 persons present.

New members elected: A. E. Demaray, Anne D. McLaughlin.

Informal communication: V. B. Scheffer, Notice of the 6th Wild Life Conference.

Formal communications: L. Helen Fowler, Waterlilies and lotus; V. B. Scheffer, The 1940 biological investigations, Pribilof Islands, Alaska.

March 8, 1941—908th Meeting.

Vice-President Humphrey in the chair; 25 persons present.

Informal communication: Frank Thone, Exhibition of new books on biological subjects.

Formal communications: L. P. Schulz, Collecting natural history specimens in the Phoenix and Samoan Islands; L. G. Henbest, Kodachrome views of natural history specimens.

March 22, 1941—909th Meeting.

President Walker in the chair; 110 persons present.

New members elected: Edith Breechbill, N. B. Drury, R. E. Griffith, C. E. Kellogg.

Informal communications: L. K. Couch, Note of a recent visit to C. Hart Merriam; Frank Thone, Exhibition of new books on biological subjects.

Formal communications: W. L. Schmitt, Biological investigations on the Alaska Peninsula; I. N. Gabrielson, Fauna of some of the Alaskan Islands.

April 5, 1941—910th Meeting.

President Walker in the chair; 37 persons present.

Informal communications: I. N. Hoffman, Note on observation of late flights of Canada geese; Frank Thone, Exhibition of new books on biological subjects.

Formal communications: C. C. Presnall, Vanishing species; P. H. Roberts, Wildlife relationships in the shelter belt.

April 19, 1941—911th Meeting.

Vice-President Shillinger in the chair; 22 persons present.

New member elected: W. W. Dalquest.

Informal communications: Frank Thone, Exhibition of new books on biological subjects; J. P. Miller, Note on the work of the Virginia Academy of Sciences.

Formal communications: E. P. Walker, Perognathus pacificus; E. A. Goldman, Mexican deer introduction in the Southern States.

May 3, 1941—912th Meeting.

SIXTY-SECOND ANNUAL MEETING.

President Walker in the chair; 12 persons present.

The reports of the Recording Secretary, Corresponding Secretary, Treasurer, and Committee on Publications were read. A report was given for the Trustees of Permanent Funds.

The following officers and members of council were elected: President, E. P. Walker; Vice-Presidents, J. E. Shillinger, Frank Thone, H. B. Humphrey, L. K. Couch; Recording Secretary, S. F. Blake; Corresponding Secretary, J. S. Wade; Treasurer, F. C. Lincoln; Members of the Council, I. N. Hoffman, J. E. Benedict, Jr., E. G. Holt, F. W. Poos, J. W. Aldrich.

October 18, 1941—913th Meeting.

President Walker in the chair; 51 persons present.

Informal communication: J. S. Wade, Exhibition of new books on biological subjects.

Formal communications: A. Wetmore, E. P. Walker, C. Cottam, V. Bailey, L. K. Couch, F. C. Lincoln, Round-table discussion of recent field trips; W. F. Kubichek, The western grebe: contributions to its life history.

November 1. 1941—914th Meeting.

President Walker in the chair; 34 persons present.

New members elected: Joseph Brues, J. C. Crawford, Rachel L. Carson, N. H. Hill.

Informal communication: Frank Thone, Exhibition of new books on biological subjects.

Formal communications: L. K. Couch, J. W. Aldrich, E. P. Walker, V. Bailey, Round-table discussion of recent important

events in biological research; Ralph Imler, The 1941 Alaska investigations of our national emblem—the bald eagle.

November 15, 1941—915th Meeting.

President Walker in the chair; 70 persons present.

Informal communication: Frank Thone, Exhibition of recent books on biological subjects.

Formal communication: Cleveland Grant, Wildlife in color.

November 29, 1941—916th Meeting.

President Walker in the chair; 105 persons present.

Informal communications: H. H. T. Jackson, E. P. Walker, H. C. Oberholser, Notices of recent publications.

Formal communication: Murray Weiner, Little America.

December 13, 1941—917th Meeting.

President Walker in the chair; 9 persons present.

President Walker was nominated to the Washington Academy of Sciences as Vice-President to represent the Society.

New members elected: Marian Gordon, D. H. Johnson, Dale Pontius.

Informal communications: Frank Thone, Exhibition of new books on biological subjects; E. B. Young, Professional personnel in the Federal Government.

Formal communication: (None.)

Vol. 54, pp. 1–14 February 26, 1941

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE NOMENCLATORIAL STATUS OF CERTAIN NORTHERN TURRITID MOLLUSKS.

BY PAUL BARTSCH,

Curator, Divisions of Mollusks and Cenozoic Invertebrates, United States National Museum.

In a report on the marine mollusks obtained by the naturalists of the Union of Soviet Socialist Republics, in their exploration of the Japanese, Okhotsk, Bering, and Arctic Seas, prepared a couple of years ago, I had occasion to deal with the northern members of the family Turritidae.

The unfortunate war and unsettled conditions in Europe and Asia have held up the publication of this report so far, and I feel that it is very desirable to place the classificatory portion of this report on record.

I therefore here extract the superspecific data dealing with the classification which I proposed for these groups in the manuscript mentioned above.

The groups of northern Turritid mollusks which repose in various collections under the generic designations Bela, Lora, Oenopota, Defrancia, Ishnula, Pleurotomoides, Pleurotomina, Clathurella, Propebela, etc., have had their systematic status built upon a shifting sand foundation, for when critically examined under the rules of modern nomenclature their names are almost all found untenable for the shells to which they have been applied. It is more than likely that when the complete anatomic structure and ontogeny of these northern members will have been revealed, they will prove to represent a distinct supergeneric subdivision of the family Turritidae.

It would seem that every collection made in northern waters, no matter where, has yielded members of this complex, which is greatly diversified in superspecific groups, species, and subspecies. Collections such as rest in the United States National Museum, both recent and fossil, present such a bewildering multitude of forms that an approach to a taxonomic unraveling thereof makes one feel a candidate for the well-known designation of "Fools

rush in where angels fear to tread," and yet it seems unfair to slight this portion of the large family Turritidae, which embraces more species than any other northern molluscan family. Therefore, craving the indulgence and the sympathy of fellow-workers, I shall venture to offer an arrangement—faulty as the lack of complete anatomic data may eventually prove it to be—which will at least enable museumists and collectors to assemble their material into convenient groups that may in turn be divided into species, subspecies or geographic races.

Before offering a new classification for this group and new designations for unnamed fractions thereof, it becomes necessary to discuss the status of some of the names heretofore applied.

HISTORY.

DEFRANCIA Millet 1827.

Defrancia was created by Millet[1] for five species of Glyphostomoid Turritids: D. pagoda, variabilis, hordeacea, suturalis and milletii. These were Upper Middle Eocene fossils described from the calcaire grossier of Maine-et-Loire.

Their superficial resemblance to Propebela Iredale has caused them to be confused with these. The deep posterior canal, varicially reenforced and denticulated aperture of Defrancia should have kept them from this confusion. Related forms are found living in our warmer seas.

The type of Defrancia Millet, Defrancia pagoda Millet, was designated by Dall in 1908[2] and 1918.[3] The name Defrancia Millet, however, was stillborn as it is preoccupied by the earlier Defrancia of Brown[4] for Bryozoa.

PLEUROTOMOIDES Brown 1831.

In 1831 Brown[5] used the name Pleurotomoides as a substitute for Millet's preoccupied Defrancia without designation of type. The type, therefore, must be Defrancia pagoda Millet, as stated by Dall in 1908 and 1918.

BELA Gray 1847.

This generic name will bring to the mind of the older molluscan students the major portion of the complex here discussed. It is, however, untenable for even a fraction of it, for Bela was proposed by Gray[6] for B. nebula, rufa, cranchii, minima, septangularis and attenuata. The following month, in his paper, "A List of the Genera of Recent Mollusca, their Synonyms and Types,[7]" he designates Murex nebula Mont(agu) as type. The application

1 1827. Mem. Soc. Linn. Paris, vol. 5, pp. 437–441, pl. 9.
2 1908. Bull. Mus. Comp. Zool., vol. 43, p. 260.
3 1918. Proc. U. S. National Museum, vol. 54, p. 320.
4 1825. Syst. urwelt. Pflanzenth., pp. 13 and 42.
5 1831. Italiens Tertiär-Gebilde und deren organische einschlüsse, Heidelberg, p. 47.
6 1847. Ann. Mag. Nat. Hist., vol. 20, p. 270 (October).
7 1847. Proc. Zool. Soc. London, p. 134.

of the name Bela to our boreal complex by authors was most unfortunate, for B. nebula as well as the rest of the species listed by Gray, are typically Mangelioid.

ISHNULA (Clarke MS.) Gray 1847.

Gray[1] in the place cited has the statement: "? Mangelia Risso 1826 f. 30 Ishnula Clarke." As Risso's figure 30 represents Mangelia menardiana Risso, this species becomes the type of Ishnula Gray. The type is a fossil from la Trinite.

In 1857 Mörch[2] introduced an emendation of the name by correctly transliterating it from the Greek, namely, Ischnula. The fact that he also cites it as of Clarke, plainly indicates this, although it is not so stated.

The type species, Mangelia menardiana Risso, belongs to the Mangelioid complex, not to that of our boreal shells.

PLEUROTOMINA Beck 1847.

In 1847 Beck[3] replaces Defrancia Millet 1829 with Pleurotomina, which he credits to Gray; no type is mentioned. Pleurotomina is, therefore, a pure and simple synonym of Pleurotomoides Brown 1831, with the same type, that is, Defrancia pagoda Millet.

LORA Gistel 1848.

The name Lora has been used by various authors to serve in place of Bela. It is, however, equally untenable, for Gistel in creating it states: Defrancia (Millet, Gasterop. D. viridula O. Fabr.); Lora M., which means that he had recognized the fact that Defrancia Millet 1827 was preoccupied by Defrancia Brown 1825, and he rechristened it Lora. I suspect that the bracketed portion is a misidentification of D. viridula Möller, which he may have thought the same as the earlier Fabrician species, for Möller's species falls in the popular concept of Lora.

The type of Lora Gistel must be the same as that of Defrancia, i. e., D. pagoda Millet as designated by Dall in 1908 and 1918.

OENOPOTA Mörch 1852.

Mörch, in listing the Pleurotomas in the Yoldi Catalogue,[4] uses as one of the subdivisions Oenopota and lists under this O. pleurotomaria Couth., pingelli Bk., livida Möll. and viridula Möll. (non Fabr.). H. and A. Adams in 1858[5] use the name "Onopota Mörch," which is plainly an emendation or misquotation. Dall in 1919[6] designated Pleurotoma pleurotomaria as type.

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1 1847. Proc. Zool. Soc. London, p. 134.
2 1857. (Clarke) Mörch in H. Rink Grönl., vol. 2, Natur. Bird. p. 82.
3 1847. Verhandl. Gesells. Deut. Naturf. & Urtzte, vol. 24, p. 217.
4 1852. Yoldi Cat., vol. 1, p. 73.
5 1858. Gen. Rec. Moll., vol. 2, p. 654.
6 1919. Proc. U. S. National Museum, vol. 56, p. 40, footnote.

CLATHURELLA Carpenter 1857.

In 1857[1] Carpenter introduced the name Clathurella to replace the preoccupied Defrancia Millet 1827, and in part Clavatula Hinds.[2] Carpenter, in the above paper, described Clathurella rava Hinds and C. aurea Carpenter, and mentions a number of other species. Cossmann[3] in 1896 designates Clavatula rava Hinds[2] as type.

This name has no bearing upon the northern complex under discussion here, but its relation to Defrancia made it desirable to be quoted.

PROPEBELA Iredale 1918.

This name was proposed by Iredale[4] for shells typified by Murex turricula Montagu. It embraces many of our northern shells.

THE PROPOSED NEW ARRANGEMENT.

OBESOTOMA, new genus.

= Bela and Lora of authors, in part.

Shell large, rather heavy, ovoid, with inflated whorls which are appressed at the summit and neither angulated nor shouldered, covered with a moderately thick periostracum. Early portion of the nuclear whorls smooth, the succeeding part marked by fine incremental lines and microscopic spiral striations. The axial sculpture of the postnuclear whorls varies from incremental lines to well developed ribs, while the spiral sculpture thereof ranges from absence through microscopic striations to strongly incised lines or even lirations, depending upon the species in question. Aperture large, oval; posterior sinus scarcely indicated; anterior channel profound. Operculum corneous, claw-like, increasing gradually in width, marked by incremental lines and radiating lirations on the early part. The radula has the teeth dagger-shaped, the basal portion corresponding to the hilt.

Type: Obesotoma japonica, new species (fig. 11).

Genus OENOPOTA Mörch.

1852. Oenopota Mörch, Yoldi Cat., vol. 1, p. 37.
1858. Oenopota H. & A. Adams, Gen. Rec. Moll., vol. 2, p. 654.
1919. Oenopota Dall, Proc. U. S. National Museum, vol. 56, p. 40, footnote type designation.

Shell varying from elongate-ovate to elongate-turrited. Early portion of the nuclear turns smooth, succeeded by a turn or portion thereof having three spiral cords and rather distantly spaced axial ribs, which enclose more or less squarish or rhomboidal pits. The spiral sculpture gradually becomes weakened on succeeding whorls and finally becomes reduced to mere obsolete threads, while the axial ribs become stronger and stronger, usually evanescing on the base. The aperture is pear-shaped, deeply channeled

[1] 1857. Cat. Reigen Coll. Mazatlan Mollusca, p. 399.
[2] 1844. Zool. Voy. Sulphur, p. 17.
[3] 1896. Essais de Paleoconch. Comp., vol. 2, p. 121.
[4] 1918. Proc. Malac. Soc. London, vol. 13, p. 32.

anteriorly with a feeble posterior sinus in the outer lip near or at the summit.

Type: Oenopota pleurotomaria Couthouy (fig. 12).

NODOTOMA, new genus.

Shell small, elongate-ovate, covered with a thin periostracum. Nuclear whorls decollated; the postnuclear whorls are rather broadly slopingly shouldered at the summit and crossed by strong, retractively slanting, axial ribs, which are cut into segments by two or three deeply incised spiral lines. Periphery well rounded. Base short, strongly rounded, marked by the continuation of the axial ribs and deeply incised spiral lines which again cut the ribs into segments, but these here are shorter than on the spire. Columella moderately long, almost straight, marked by spiral threads which decrease in size from the insertion of the columella toward the tip. Aperture pear-shaped, strongly channeled anteriorly with a slight sinus in the outer lip at the angle of the shoulder; outer lip thin, rendered somewhat wavy by the spiral sculpture; inner lip reflected over the columella, which it slightly excavates, and also over the parietal wall is similarly treated.

Type: Nodotoma impressa (Beck) Mörch. (fig. 2).

FUNITOMA, new genus.

Shell elongate-ovate, covered with a thin periostracum. Nuclear whorls unknown; postnuclear whorls well rounded, appressed at the summit, crossed by somewhat sinuous, strong, retractively slanting axial ribs and low rounded spiral cords. Aperture oval or pear-shaped, decidedly channeled anteriorly; outer lip with a feeble sinus near the summit.

Type: Funitoma (Funitoma) areta, new species (fig. 3).

The genus as here conceived readily breaks up into two subgenera, as follows:

FUNITOMA, new subgenus.

Funitomas in which the spiral cords on the middle whorls are closely spaced and in combination with the axial ribs do not form a netlike pattern.

Type: Funitoma (Funitoma) areta, new species (fig. 8).

CESTOMA, new subgenus.

Funitomas in which the spiral cords on the middle whorls are distantly spaced, forming a netlike pattern in combination with the axial ribs.

Type: Funitoma (Cestoma) eurybia, new species (fig. 5).

GRANOTOMA, new genus.

Nuclear whorls with spiral cords; postnuclear turns with closely spaced axial ribs and deeply incised spiral lines, which cut the ribs so as to render the spaces between the spiral lines finely nodulose. The entire surface of spire and base therefore becomes granose. Columella somewhat twisted.

Type: Granotoma krausei (Dall) = Bela krausei Dall (fig. 9).

This group extends from the Arctic Sea south over Alaska on the American side and to the Japan Sea along the Asiatic continent.

NEMATOMA, new genus.

Shells of ovate or elongate-ovate outline, covered with a thin periostracum. Nuclear whorls, judging from a fragment present, smooth, well rounded, with the last part of the last turn showing a feeble beginning of the postnuclear sculpture. Postnuclear whorls inflated, strongly rounded with an obsolete angle below the summit, which frequently gives the part between this and the summit a shouldered effect. The postnuclear whorls are marked by axial ribs, which evanesce on the base, and numerous spiral threads which are present on both spire and base. Aperture pear-shaped, decidedly channeled anteriorly with a feeble sinus in the outer lip near its summit.

Type: Nematoma hokkaidoensis, new species (fig. 1).

CURTITOMA, new genus.

Shell short, stubby, ovoid. Postnuclear whorls strongly tabulatedly shouldered, but without a keel at the angulation of the shoulder. Axial ribs very strong between the shoulder and periphery, evanescing on the base. The spiral sculpture consists of incised lines on the spire and threads on the columella. Aperture pear-shaped, decidedly channeled anteriorly, with a feeble sinus at the shoulder.

Type: Curtitoma hecuba, new species (fig.. 3).

VENUSTOMA, new genus.

Shell small, varying in shape from ovate to broadly ovate. The first nuclear turn is smooth, the next shows the beginning of the spiral cords of the postnuclear sculpture. Postnuclear whorls with a roundly sloping shoulder, which extends over almost half of the turns and terminates in a well-marked angulation. The whorls are ornamented by well developed, sigmoid axial ribs and almost equally strong spiral cords, the junction of which produce rounded tubercles. The spiral sculpture of the shoulder is usually weaker and more crowded than that on the rest of the whorls. Suture moderately constricted. Periphery well rounded. Base moderately long, ornamented like the spire, but with the sculpture a little finer. Columella stout, marked by spiral cords and slender axial threads. Aperture pear-shaped, strongly channeled anteriorly, with a weak sinus at the shoulder on the outer lip.

Type: Venustoma harucoa, new species (fig. 7).

CANETOMA, new genus.

Shell small, ovate. Nuclear whorls unknown; postnuclear whorls with a strong shoulder which extends over the posterior half of the turns; the anterior termination of the shoulder is marked by a spiral cord which renders the shell decidedly angulated here. The whorls are marked by well developed axial ribs and strong spiral cords that form rounded tubercles at their junction. In addition to this, there are finer spiral lirations and incremental lines that give the spaces between the axial ribs and spiral cords a fine reticulation, the whole producing a basket-like effect. Suture

decidedly constricted. Periphery well rounded. Base rounded, marked by the continuation of the axial ribs, which evanesce here, and spiral cords as well as the finer sculpture mentioned for the spire. Columella short and stout, marked by spiral cords. Aperture pear-shaped, strongly channeled anteriorly and having a feeble posterior sinus at the shoulder.

Type: Canetoma tersa, new species (fig. 6).

Genus PROPEBELA Iredale.

1918. Propebela Iredale, Proc. Malac. Soc. London, vol. 13, p. 32.

Shell of moderate size, turrited. The early nuclear whorls are smooth, succeeded by a portion that bears weak spiral threads, which rapidly gain strength as they pass to and over the postnuclear turns; the last part of the nuclear whorls also shows fine, feeble, fairly closely spaced, axial riblets, which are best developed on the last part of the nuclear spire. The postnuclear whorls are broadly slopingly shouldered; the anterior edge of the shoulder is delimited by a strong keel. Both shoulders and the rest of the whorls are marked by axial ribs and spiral cords. The columella is usually slightly twisted and marked with spiral threads. Aperture pear-shaped, decidedly channeled anteriorly, having a shallow posterior sinus at the angulation of the shoulder.

Type: Propebela turricula Montagu (fig. 10).

This genus, which contains numerous species, can be divided into two subgenera as follows:

Subgenus PROPEBELA Iredale.

Propebelas with the shoulder of the whorls marked by spiral cords as strong as those found on the rest of the turns.

Type: Propebela turricula Montagu (fig. 10).

TURRITOMA, new subgenus.

Propebelas having the spiral sculpture of the shoulder of the whorls much weaker than on the rest of the turns.

Type: Propebela (Turritoma) exquisita, new species (fig. 4).

DESCRIPTION OF THE NEW SPECIES USED AS TYPE FOR THE NEW GENERA AND SUBGENERA HERE DESCRIBED.

Obesotoma japonica, new species.

Plate I, Figure 11.

Shell large, elongate-ovate, rather thin, covered by a thin horn-colored periostracum, which is a little darker near the summit than on the rest of the turn. The early whorls are badly decorticated, the last one only retaining the periostracum, and even here the substance of the shell is badly eaten into in spots. This whorl shows rather poorly, irregularly

developed, axial ribs with fine incremental threads covering them and the spaces between them. In addition to this, the whorl is marked by fine incised spiral lines which are a little finer and more closely spaced near the summit than on the middle of the turn. This type of sculpture continues more or less uniformly to the tip of the columella. The basal portion of the last whorl is rather produced and renders the left outline decidedly concave. Aperture auriculate, posterior sinus very shallow and a little below the summit; anterior sinus deeply channeled; outer lip thin. The substance of the shell of the columella and the parietal wall forming in the labial margin is smooth and undoubtedly sunken into the shell by erosion. Operculum quite small compared to the size of the aperture, thin, corneous, with a decided emargination in its left border a little distance below its posterior extremity, marked by concentric lines of growth and in the early half by fine radiating striations.

The type, U. S. N. M. No. 204967, was dredged by the U. S. Bureau of Fisheries Steamer *Albatross* at Station 4983 in the Japan Sea in 428 fms. on mud bottom; bottom temperature 32.7° F. It has 5 whorls remaining (the extreme tip being lost), which measure: Length, 24.9 mm.; diameter, 12.5 mm. The operculum measures: Length, 7.2 mm.; diameter, 3.6 mm.

The large size, strong spiraled sculpture and the presence of axial ribs will distinguish this from most of the Asiatic species.

Funitoma (Funitoma) areta, new species.

Plate I, Figure 8.

Shell of medium size, elongate-ovate, pale chestnut brown. Nuclear whorls partly decorticated, but showing traces of the characteristic sculpture. Postnuclear whorls well rounded, marked by broad, strong, flexuose axial ribs, of which 22 occur on the first and second, 20 on the third and 18 on the last whorl. These ribs are about as wide as the spaces that separate them. They become somewhat enfeebled toward the summit, and evanesce on the base. In addition to the axial ribs, the whorls are marked by six equal and equally spaced spiral striations on the posterior third of the last whorl, while the space between these and the periphery is marked by five strong, low, rounded, rather broad, spiral cords in the interval between which a finer thread is present. Periphery well rounded. Base slightly rounded, marked by the feeble continuations of the axial ribs and four spiral cords and finer threads between them. These are a little less strong than those on the spire. On the stout columella additional spiral threads are present, which grow successively finer and closer spaced from the base to the tip of the columella. Aperture ovate, strongly channeled anteriorly; outer lip thin at the edge with a shallow and rather narrow sinus near the summit; inner lip reflected over and appressed to the columella as a smooth callus which extends up on the parietal wall.

The type, U. S. N. M. No. 428857, was collected by Dr. Derjugin in 1926, at Station 12, in the Japan Sea. It has 6 whorls remaining and measures: Length, 8.5 mm.; diameter, 3.7 mm. Another specimen is in Dr. Derjugin's collection.

Funitoma (Cestoma) eurybia, new species.

Plate I, Figure 5.

Shell small, pale yellow. Nuclear whorls badly eroded; those remaining are marked with five spiral cords which are much narrower than the spaces that separate them. In addition to this, there are numerous slender axial threads which are about half as wide as the spaces that separate them. The combination of spiral cords and axial ribs gives to the nucleus a fenestrated appearance. The postnuclear whorls are quite strongly rounded and marked by a decided angulation about two-fifths of the distance between the summit and the suture, anterior to the summit. The axial ribs are moderately strong, decidedly better developed on the early turns than on the last where they become evanescent. These ribs are flexuose and about one-third as wide as the spaces that separate them. Twenty-two of them are present on the first and second, and 25 on the last turn. In addition, to these axial ribs, fine incremental lines are present on both the ribs and intercostal spaces. The space between the summit and the angulation anterior to it is marked by 12 slender spiral threads which are not all of the same strength or spacing. On the first of the postnuclear turns the junction of the ribs and spiral cord at the angulation forms slender nodules. The second cord about halfway between the angulation and periphery is less strongly nodulose. Another cord is present in the suture. Shortly after the first whorl, a slender spiral thread makes its appearance between the two strong cords and a little later another between the peripheral cord and the one anterior to it. To these additional threads are added as the shell increases in size, so that on the last whorl 5 rather strong cords are present. Two finer threads between the cord at the angulation and the next strong cord anterior to it are present, and an additional spiral thread between that and the next strong cord and likewise the next. So that in reality on the last turn we have five strong spiral cords and four slender threads between the shoulder and the suture. Periphery well rounded. Base moderately convex, marked by fine incremental lines and 7 slender spiral threads, which are equal and equally spaced. The spaces between the stronger lirations of the base are marked by a slender spiral liration. The columella is moderately long and moderately stout, marked by about a dozen subequal spiral threads, which become successively a little closer spaced from the insertion of the columella to its tip. Aperture moderately large, oval, decidedly channeled anteriorly. The channel at the posterior angle is on the shoulder of the whorls and only moderately incised. The inner lip is reflected over and appressed to the base as a smooth callus, which extends also over the parietal wall.

The type, U. S. N. M. No. 428862, was collected by Dr. Derjugin in Soujet Harbor, Japan Sea, in 1928. It has about 5 whorls and measures: Length, 7.4 mm.; diameter, 2.8 mm.

Nematoma hokkaidoensis, new species.

Plate I, Figure 1.

Shell moderately large, subglobose, pale yellow. Early whorls badly eroded; those remaining very strongly inflated and rounded and marked by

very sinuous, slender, poorly developed, distantly spaced axial ribs, of which 24 are present on the last, 21 on the penultimate and 18 on the antepenultimate turn. These ribs grow feeble on the roundly shouldered summit and evanesce shortly after passing the periphery. In addition to the axial ribs, the whorls are marked by slender axial threads, which are very regular and regularly spaced and about as far apart as the threads, and which cover the entire surface of both ribs and intercostal spaces. The spiral sculpture consists of numerous slender threads which render the axial ribs and the fine threads minutely nodulose. Twenty-five of these threads are present between the summit and the periphery on the last whorl. Suture strongly constricted. Periphery inflated, strongly rounded. Base moderately long, strongly rounded, marked by the fine axial threads referred to on the spire and 25 spiral threads. Here, as on the spire, the continuation of these two elements produces minute nodules. The columella is rather slender, short, concave on the left side and marked by 21 fine spiral threads. Aperture pear-shaped, strongly channeled anteriorly with a feeble sinus immediately below the summit; inner lip sinuous, slightly excavating the columella, which is also the case on the parietal wall.

The type, U. S. N. M. No. 204951, was dredged by the U. S. Bureau of Fisheries Steamer *Albatross* at Station 5036, off the southeastern Hokkaido in 464 fms. on brown mud bottom; bottom temperature 37.9°. It has 5.3 whorls remaining, and measures: Length, 9.3 mm.; diameter, 5.3 mm.

Curtitoma hecuba, new species.

Plate I, Figure 3.

Shell small, flesh colored. Nuclear whorls badly eroded, but showing traces of spiral liration. Postnuclear whorls with a moderately broad tabulated shoulder at the summit and strong broad rounded, protractively slanting, axial ribs which extend from the shoulder to the base, gradually weakening toward this and evanescing shortly after reaching it. There are 18 of these ribs on the second and third postnuclear whorls and 20 on the last. These ribs at their summit weakly crenulate the whorls at the angulation. The spiral sculpture is absent on the shoulder. Anterior to the shoulder, there is a moderately strong incised line followed by 3 very feeble lines which in turn are followed by 3 considerably stronger. These 7 lines do not divide the space between the shoulder and the periphery into equal segments. The periphery is well rounded. The base is short and marked by 9 slender incised spiral lines, the spaces between which are also of varying width. The columella is quite short and heavy and somewhat flexed, marked by slender spiral threads which grow successively finer from its insertion to the tip. Aperture rather broad, decidedly channeled anteriorly with the posterior sinus narrow and at the shoulder. Outer lip thin; inner lip somewhat flexed, reflected over and appressed to the base as a polished callus which also extends over the parietal wall.

The type, U. S. N. M. 428871, was collected by Dr. Derjugin in the Japan Sea in 1926. It has a little more than 5 whorls remaining and measures: Length, 6.0 mm.; diameter, 3.4 mm.

U. S. N. M. No. 428872, contains another specimen from the same lot, while two additional ones are in the collection of Dr. Derjugin.

Venustoma harucoa, new species.

Plate I, Figure 7.

Shell small, ovoid, cream colored. Nuclear whorls decollated, only the last one remaining, which is well rounded and smooth, excepting the last portion, which shows the beginning of the postnuclear sculpture. Postnuclear whorls inflated, strongly rounded with a decided angle on the middle of the turns marking the anterior termination of the shoulder, and appressed at the summit, crossed by decidedly sigmoid, rather slender, axial ribs which extend from the summit to the posterior portion of the columella, which become less strong on the base. Of these ribs there are 23 on the first, 19 on the second, 28 on the third and 34 on the fourth whorl. The spaces between the summit and the anterior tuberculated angle of the shoulder are marked by four slender cords, which render the axial ribs at their junction slightly nodulose. The space between the periphery and the angulated shoulder is marked by 3 spiral cords, which are as strong as that forming the angle of the shoulder, and of which the anterior one marks the periphery. Between the shoulder and the next cord and between the periphery and the cord posterior to it, another slender spiral cord is present. All these cords render the axial ribs feebly nodulose. Base short, well rounded, marked by 4 equal and equally spaced, spiral cords which correspond in strength to those on the spire. Here the axial ribs are very slender and the nodulations therefore less strongly expressed. Columella somewhat concave on the left border, moderately stout, marked by 8 equal and equally spaced spiral cords, the spaces that separate them being a little wider than the cords. Aperture ovate, strongly channeled anteriorly with a moderately deep sinus on the outer lip at the shoulder; inner lip appressed to the columella as a thin callus, which extends up on the parietal wall.

The type, U. S. N. M. 428874, is part of the Edward Morse Collection, and is labeled "Japan Seas," without specific locality. It has a little more than 6 whorls remaining and measures: Length, 6.5 mm.; diameter, 3.5 mm.

U. S. N. M. No. 227179 contains 2 additional specimens from the same source.

Canetoma tersa, new species.

Plate I, Figure 6.

Shell small, white. Nuclear whorls badly eroded but showing traces of spiral sculpture; postnuclear whorls decidedly angulated at the shoulder, marked by rather slender axial ribs, of which 14 occur on the third and 16 on the last whorl. In addition to the axial ribs, the early postnuclear whorls are marked by two strong spiral cords which equal the axial ribs in strength. The first of these is at the angle of the shoulder and the second a little posterior to the periphery. These cords render the axial ribs nodulose at their junction, while the spaces enclosed between them are squarish shallow

pits, marked by fine incremental lines and very fine spiral striations. On the last turn, 3 slender spiral threads are present on the shoulder, and another spiral thread appears between the two strong cords referred to above, anterior to the shoulder, while a fourth slender cord marks the periphery. Base well rounded, marked on the posterior portion by the feeble continuation of the axial ribs and six low, somewhat flattish, spiral cords, which are about half as wide as the spaces that separate them. Columella short, only moderately stout, somewhat twisted and marked by five feeble spiral cords. Aperture moderately large, decidedly channeled anteriorly, with a shallow posterior sinus at the shoulder of the whorls; outer lip thin at the edge; inner lip somewhat flexuose, reflected over and appressed to the base as a smooth callus, which also extends on the parietal wall.

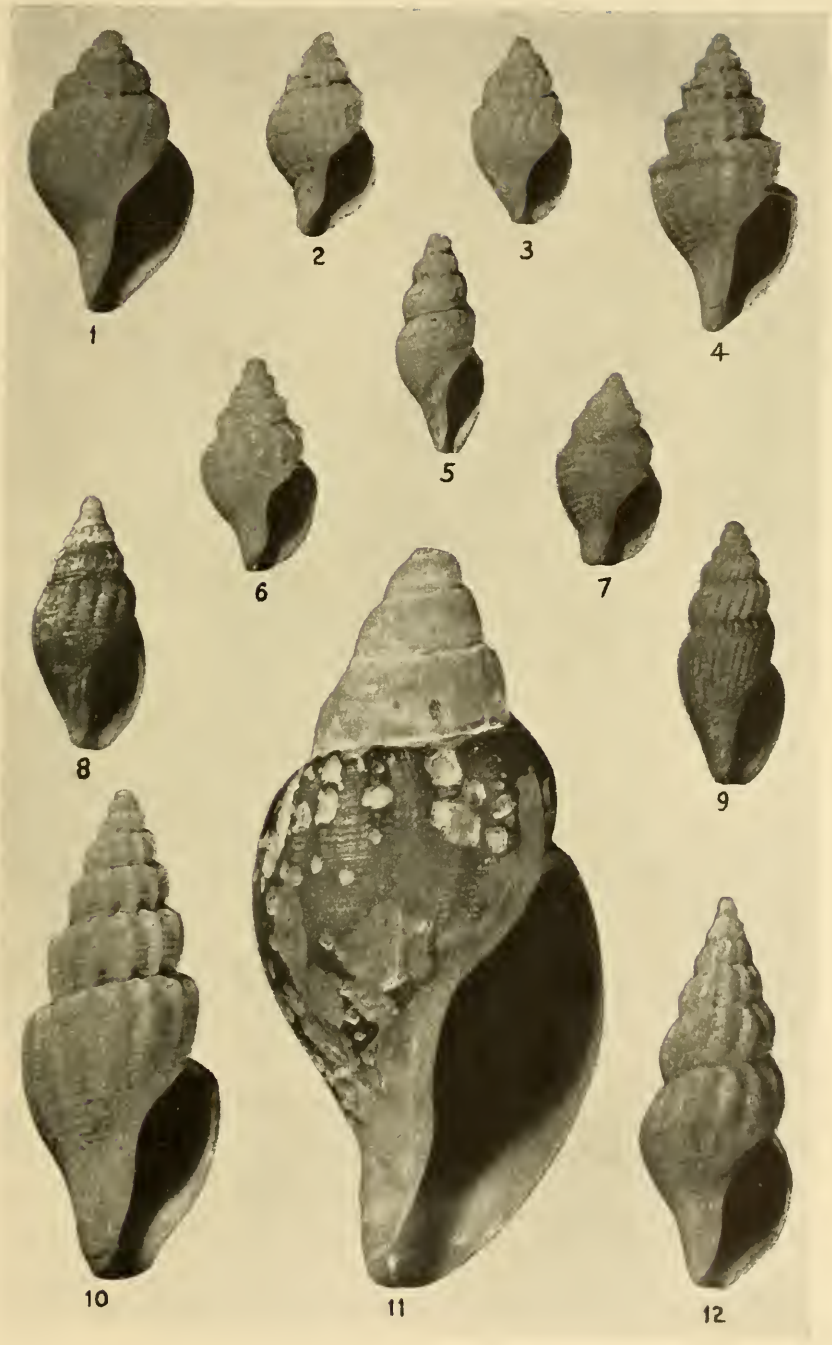
The type, U. S. N. M. No. 428877, was collected by Dr. Derjugin in 1926, in the Japan Sea. It has a little more than 5 whorls remaining and measures: Length, 7.0 mm.; diameter, 4.0 mm.

Two additional specimens are in Dr. Derjugin's collection.

Propebela (Turritoma) exquisita, new species.

Plate I, Figure 4.

Shell small, ovoid, decidedly turrited, cream yellow with a faint flush of brown on the shoulder, covered with a thin periostracum. Nuclear whorls 1.6, strongly rounded, rather high, forming a rather pointed apex, smooth, excepting incremental lines and the beginning of the spiral sculpture on the last portion of the last turn as slender threads. Postnuclear whorls with a very broad sloping shoulder which terminates anteriorly in a lamellar keel, and extends over the posterior two-fifths of the turns. Anterior to the keel the whorls are slightly rounded; the postnuclear whorls are marked by strong narrow axial ribs, of which 14 occur on the first three, 15 on the fourth and 16 on the last half turn; these ribs are considerably less strong on the shoulder than on the rest of the spire. They also evanesce before reaching the columella on the last turn. The sloping shoulder bears about 10 ill-defined spiral threads and numerous, closely spaced, microscopic spiral striations. The junctions of the axial ribs and the strong cord at the shoulder form knoblike prominent tubercles. On the early whorls the keel at the shoulder is simple; on the last turn it is partly divided by an impressed line. The space between the shoulder and the periphery is marked by four strong spiral cords, which are equal and almost equally spaced; however, the space between the shoulder and the first of these cords is about double the width of the rest. Suture strongly constricted. Base well rounded, marked by the gradually diminishing ribs and 7 spiral cords which equal those between the keel and suture in strength. Wherever these spiral cords between the periphery and columella cross the axial ribs, they render these feebly nodulose. Columella moderately long, somewhat twisted, moderately stout, marked by 11 spiral threads, which decrease in size and spacing from the posterior toward the tip. The columella, as well as the rest of the shell, is also marked by fine lines of growth. Aperture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pear-shaped, truncated posteriorly, decidedly channeled anteriorly with a moderately deep sinus at the shoulder; inner lip reflected over the columella as a moderately thick callus; parietal wall covered by a thin callus.

The type, U. S. N. M. No. 428882, was dredged by the U. S. Bureau of Fisheries Steamer *Albatross* at Station 3738, off Yokohama, Japan, in 167 fms. on mud bottom. It is a perfect specimen, having 6.3 whorls and measures: Length, 10.0 mm.; diameter, 4.9 mm.

U. S. N. M. No. 204988 contains 4 additional specimens from the same source.

Explanation of Plates.

These are figures of the genotypes recognized in this paper; they are 4 times enlarged.

Fig. 1. Nematoma hokkaidoensis, new species.
2. Nodotoma impressa.
3. Curtitoma hecuba, new species.
4. Propebela (Turritoma) exquisita, new species.
5. Funitoma (Cestoma) eurybia, new species.
6. Canetoma tersa, new species.
7. Venustoma harucoa, new species.
8. Funitoma (Funitoma) areta, new species.
9. Granotoma krausei.
10. Propebela turricula.
11. Obesotoma japonica, new species.
12. Oenopota pleurotomaria.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE PROPER SPECIFIC NAME FOR THE ORIENTAL CATFISH USUALLY CALLED *PLOTOSUS ANGUILLARIS* (BLOCH).

BY HUGH M. SMITH.

In 1794 Bloch (Naturgeschichte der Ausländischen Fische, VIII) established the genus *Platystacus* and included therein two new species, *cotylephorus* and *anguillaris*. These fishes are not congeneric, and when, in 1863, Bleeker made *cotylephorus* the genotype the species *anguillaris* was left without an available generic name. Incidently, *cotylephorus* belongs in the genus *Aspredo* (Scopoli, 1777), and *Platystacus* became a synonym. In the meantime Lacepède (Histoire Naturelle des Poissons, IV, 1803) had set up the genus *Plotosus*, with *Platystacus anguillaris* as the haplotype, and the fish has generally been known as *Plotosus anguillaris* since that time.

There was, however, an earlier available name which had been given to the fish by Carl Peter Thunberg in a paper entitled Tvänne Utländska Fiskar (Kongliga Vetenskaps Academiens Nya Handlingar, XII, 1791, p. 190). The fish, called *Silurus lineatus*, was described in considerable detail and was unmistakably represented on a plate shared with a new goby (*Gobius patella*), both species being ascribed to the Indian Ocean.

It would therefore appear that the proper name for this fish is *Plotosus lineatus* (Thunberg).

Cuvier and Valenciennes (Histoire Naturelle des Poissons, XV, 1840) revived the name *lineatus* for the fish but made no reference to its previous employment and wrote *Plotosus lineatus*, nob. They pointed out assumed differences between their fish and *P. anguillaris*, but Bleeker, Günther, Weber and de Beaufort, and other authorities have had no hesitancy in regarding *lineatus* of Cuvier and Valenciennes as a synonym of *anguillaris* of Bloch.

The availability of the name *arab* for this species naturally comes up for consideration. This designation seems to have originated with Bleeker, who at first credited the name *Silurus arab* to Forskål (Descriptiones

Animalium, 1775) but later adopted it as his own. In his Systema Silurorum Revisum (1863) he designated *Plotosus arab* "(= *Plotosus anguillaris* Lacepède = *Silurus arab* Forskål)" as the type of *Plotosus*, and in the Atlas Ichthyologique (II, 1862) he called the fish *Plotosus arab* Bleeker, thus illustrating the peculiar conception of nomenclatorial priority and propriety which existed at that period. In recognizing *Silurus arab* Forskål as a valid name, Bleeker was followed by Günther (Catalogue of Fishes in British Museum, V, 1864) and by Day (Fishes of India, 1878); but while Günther did not, as consistency required, adopt *Plotosus arab* as the approved name for the fish, Day did so.

An inspection of Forskål's work will make it obvious that the word "Arab." as used on page XVI was not intended as a specific name, but was a Latin abbreviation for Arabicus. It was followed immediately by "*Boa* vel *Buja*," indicating Arabian vernacular names for the fish, as was frequently done by Forskål. In this particular case, the fish appears among 56 species "nominati," while 114 other species are "descripti." Four kinds of Silurus are listed in the first category of which three, *mystus*, *anguillaris*, and *clarias*, are printed in italic type, while for the fourth no name except the Arabic vernaculars is given, although there is a brief description which leaves no doubt that the present species was involved. If Forskål had intended to make a new species he would undoubtedly have followed his invariable course by placing it in the other list and later in the same work providing a detailed description as was done for the 114 new species cited.

The synonymy of this species was unnecessarily complicated by the action of Jordan (Genera of Fishes, I, 1917, p. 66) in listing *Silurus anguillaris* as mentioned by Forskål as the equivalent of *Platystacus anguillaris* Bloch. The former specific name, thirty-two years older than the latter, represents a catfish, of an entirely different family, now known as *Clarias anguillaris* and dating from Linnaeus, 1762.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW ASTERACEAE FROM NORTHERN MEXICO COLLECTED BY I. M. JOHNSTON.

BY S. F. BLAKE.

The new Asteraceae here described are based on specimens collected in northern Mexico by Dr. Ivan M. Johnston in 1938, and referred by him to the writer for study.

Brickellia robinsoniana Blake, sp. nov.

Suffrutescens ramosa, ramis erectiusculis usque ad apicem foliosis glanduloso-puberulis; folia alterna ramealia parva ovata breviter petiolata obtusa basi cuneata grosse paucidentata utrinque viridia glanduloso-puberula firma; capitula magna in apicibus ramorum sessilia solitaria ca. 82-flora ca. 1.8 cm. alta (corollis omissis); involucri 7–8-seriati valde gradati 1.5 cm. alti dense stipitato-glandulosi phyllaria exteriora et media obovata obtusa v. acutiuscula, basi cuneata valde costata costis 4–6 albis, apice abrupte dilatato herbaceo ovato, intima multo tenuiora linearia acuminata non appendiculata purpurascentia; achenia sparse hispidula 6 mm. longa, pappo albido 8.5 mm. longo, setis minute hispidulis.

"Stems numerous, tufted, forming round masses 1½–2 ft. high;" old stems denudate, brownish-white, 4 mm. thick below; branches numerous, again branched, leafy except toward base, terete, striate, brownish-white, densely stipitate-glandular with longer and shorter gland-tipped hairs; internodes mostly 3–8 mm. long; petioles narrowly margined to base, 1 mm. long or less; blades 7–10 mm. long, 4–6 mm. wide, coarsely and sometimes subhastately toothed with 1–3 blunt triangular teeth on each side, 1-nerved and with a pair of weak basal veins, densely stipitate-glandular like the stem and more or less impressed-glandular with shining glands, especially beneath; heads campanulate, sessile, erect, about 1.8 cm. high (excluding corollas), 1.5–2 cm. thick (as pressed); herbaceous tips of middle and outer phyllaries 2–5 mm. wide, the inmost phyllaries only 0.5–0.8 mm. wide; corollas purple, very slender, glabrous, 9.5 mm. long (teeth 0.7 mm. long, ovate, obtusish); achenes subcylindric, blackish, sparsely and minutely hispidulous, 10-ribbed and with occasional weaker intermediate ribs, 6–6.3 mm. long; pappus 1-seriate, the bristles 30–32; style branches clavellate, whitish.

Mexico: Crest of pass 8 miles south of Majoma, on road from Cardona southwest to Sierra Hermosa, Zacatecas, 4 Sept. 1938, *Johnston* 7395 (type in Gray Herb.; dupl. in Nat. Arb. Herb.).

This species, by reason of its many-flowered heads and appendaged phyllaries, is a member of the section *Macrobrickellia*. *Brickellia monocephala* Robinson, the only species of that section previously known, is very different in aspect, being a simple herb from a tuberous-thickened, somewhat moniliform rootstock, with merely puberulous stem, thin ovate entire or few-toothed leaves up to 5 cm. long and on slender petioles about 1 cm. long, a single long-pedunculate nodding head, and linear or linear-spatulate inner phyllaries with dilated, subscarious, lacerate tips. The species is dedicated to the memory of Dr. B. L. Robinson, monographer of this genus and of the Eupatorieae generally, whose death in 1935 left an unfilled gap in the ranks of American botanists.

Aplopappus johnstonii Blake, sp. nov.

Suffrutescens valde ramosus ca. 10 cm. altus ubique canescenti-tomentosus dense foliosus; folia minima sessilia oblonga v. ovata pauciserrata dentibus setis albis rigidis 1–1.5 mm. longis donatis, in axillis prolifera; capitula mediocria discoidea sessilia apicibus ramorum et ramulorum solitaria; involucri strigoso-pilosi phyllaria linearia apice albo-setosa; achenia dense sericeo-pilosa; pappus rigidus, setis interioribus complanatis; appendix ramorum styli lineis stigmaticis paullo brevior.

Caudex woody, becoming 1 cm. thick; stems numerous, much branched throughout, 5–10 cm. high, rigid, spreading, densely canescent-tomentose, densely leafy; leaves alternate; internodes 1–2 mm. long; main stem leaves linear-oblong, 3–6 mm. long, 1–2 mm. wide, obtuse, slightly amplexicaul, densely and canescently subtomentose-pilose, plane, thick, crenate-serrate, the 3–5 pairs of teeth short, thick, calloused, tipped, like the apex of leaf, with a stiff white seta 1–1.5 mm. long; branch leaves mostly ovate, shorter and relatively broader, like those of main stem bearing tufts of reduced leaves in the axils; heads hemispheric-campanulate, 33-flowered, about 7 mm. high and thick (moistened), solitary at tips of branches and branchlets, these leafy throughout, sometimes in cymose groups of 2 or 3; involucre about 7-seriate, strongly graduate, about 7 mm. high, appressed, the phyllaries linear or the outer narrowly lance-linear, obtuse to acute, tipped with a stiff white mucro 0.2–0.3 mm. long, the outer subherbaceous essentially throughout and densely canescent-substrigose, the inner broader, whitish-chartaceous with greenish midline above, 1-nerved, canescent-substrigose chiefly along midline; receptacle fimbrillate; corollas pale yellow, sparsely erect-pilosulous on tube and lower part of throat, glabrous on the teeth, at anthesis 4.5 mm. long, with subcylindric throat little thicker than the tube (tube 0.8 mm., throat 3–3.2 mm., teeth ovate, erect, 0.6 mm. long), in age about 5.2 mm. long, with throat abruptly enlarged above the middle (tube 1.2 mm., throat 3–3.3 mm., teeth 0.8 mm.); achenes obovoid, densely silky-pilose, 1.5 mm. long; pappus slightly brownish-white, 5 mm. long, of stiff graduated hispidulous bristles, the inner decidedly

flattened; style branches 1.2 mm. long, the triangular acuminate hispidulous appendage 0.5 mm. long, slightly shorter than the stigmatic area.

Mexico: In dry heavy alkaline soil, one mile south of Hermanas, on road from Piedras Negras south to Monclova, Coahuila, 22–24 Aug. 1938, *Johnston* 7066 (type, Gray Herb.; duplicate, Nat. Arb. Herb.); on alkaline flats, not common, 4 miles west of Cuatro Cienegas, on road from Monclova westward to beyond Cuatro Cienegas, Coahuila, 24–26 Aug. 1938, *Johnston* 7131 (Gray Herb.).

In Hall's key (1928) to the species of the section *Blepharodon* this plant, having style appendages shorter than the stigmatic lines, would come next to *A. brickellioides* Blake. Its obviously closest relationship, however, is with *A. nuttallii* Torr. & Gray, from which it is very distinct in its low much-branched habit, its dense canescent tomentum, its tiny few-toothed leaves not at all narrowed to base and consistently with axillary fascicles, its canescently substrigose or strigose-pilose (not glandular-puberulous) involucre, its glabrous corolla teeth, and other characters.

Viguiera phenax Blake, sp. nov.

Annua tenuis erecte ramosa foliosa 3–6 dm. alta; caulis strigosus; folia inferiora opposita superiora alterna anguste lanceolata v. lineari-lanceolata longe acuminata basi longe cuneata petiolata remota serrata v. serrulata utrinque strigosa et praecipue in margine sparse hispida; capitula pauca mediocria radiata aurea terminalia et in axillis supremis bene pedunculata; involucri 2-seriati inaequalis 6–8 mm. alti phyllaria acuminata strigillosa et sparsius hispida et hispido-ciliata infra medium valde 2-costata costis albidis, apice longiore herbaceo plusminusve laxo; achenia juventate sparse puberula maturitate glabra; pappus nullus.

Stem greenish white, terete, obscurely sulcate, 1–3 mm. thick below, branched above the middle or sometimes also near the base with erectish branches, toward base sparsely strigose with subtuberculate-based hairs or nearly glabrous, densely strigose above, leafy to the apex; lower internodes 2–6 cm. long, the upper shorter; lowest leaves (2 or 3 pairs) opposite (fallen in specimens examined), the others alternate; petioles 0.5–1.5 cm. long, narrowly margined above by the decurrent leaf base, naked only toward base, strigose and sparsely hispid-ciliate with hairs 1.5–3 mm. long; blades narrowly lanceolate or linear-lanceolate, or the uppermost linear, the larger 4–7 cm. long, 4–9 mm. wide, attenuate and often falcate, callous-tipped, not revolute on margin, remotely serrate or serrulate above the tapering base (teeth low, obtuse, callous-tipped, mostly 4–8 mm. apart) or the uppermost entire, above deep green, rather densely strigose on surface and with some longer looser hairs chiefly along the nerves and margin, beneath equally green and similarly strigose, the hairs along the ribs longer and with distinctly tuberculate base, the costa whitish and prominulous above, it and the pair of subbasal nerves prominulous beneath; heads about 5–12 per stem, solitary at tips of branches and in the uppermost axils, 1.5–1.8 cm. wide (as pressed), on densely strigose naked or few-bracted very slender peduncles 2.5–8.5 cm. long; disk 5– (fruit) 10 mm. high, 8– (fruit) 12 mm.

thick (as pressed); involucre hemispheric-campanulate; phyllaries not contracted above the 2-ribbed base; rays 13, golden yellow, neutral, the tube spreading-hispidulous, 1.5 mm. long, the lamina oval, 2-denticulate, 7–10-nerved, about 5.5 mm. long, 3.2 mm. wide, sparsely hispidulous dorsally on the nerves; disk corollas numerous, golden yellow, densely hispidulous on tube and base of throat, sparsely so on teeth, 4.2–4.5 mm. long (tube 1.2 mm., slightly calyptrate at base, throat obconic, 2.2–2.5 mm., teeth ovate, 0.8 mm. long); pales acute to acuminate, blackish green above, 4.5– (in age) 8 mm. long, the outer long-hispid along keel, the inner short-hispid, the subscarious margin often produced into 2 short teeth; achenes oblong, bluntly quadrangular, in youth sparsely hispidulous on sides and at apex, at maturity mottled black and white, glabrous except for the puberulent apex, 2.8 mm. long, 0.8 mm. wide; pappus none.

Mexico: In low heavy soil in grasslands, 6 miles west of Piloncillo, on road from Jimenez to Camargo, via El Arroyo del Fierro, Chihuahua, 24 Sept. 1938, *Johnston* 7868 (type, Gray Herb.); abundant and conspicuous plant in *Hilaria* meadow, 7 miles north of Charco Piedro (25 miles northeast of Camargo), on road from Camargo northeast to Mesteñas, Chihuahua, 25 Sept. 1938, *Johnston* 7932 (Gray Herb., Nat. Arb. Herb.).

In general appearance and in most of its characters this plant is remarkably similar to *Viguiera ciliata* and its var. *hispida* (Rob. & Greenm.) Blake. In that species, however, which belongs in the section *Heliomeris*, the phyllaries are strictly herbaceous throughout (and marked with 3 oil-tubes), without indication of the two strong whitish ribs that are so conspicuous in the lower part of the phyllaries of *V. phenax* even when the heads are young. *Viguiera phenax*, accordingly, must be placed in the section *Diplostichis* near *V. mucronata* Blake of Colombia and Venezuela, a species with pappose achenes and of quite different general appearance.

Thelesperma ramosius Blake, sp. nov.

Perenne e radice verticali multicaule e basi ramosum subpedale glabrum; folia lineari-filiformia crassa integra prope basin parce ciliata; capitula pro genere parva discoidea solitaria longe pedunculata; phyllaria exteriora brevissima ovata obtusa, interiora usque infra medium libera modice scarioso-marginata; corollae inaequaliter lobatae, dente uno fauce paulo longiore, ceteris fauce brevioribus; achenia oblonga valde tuberculata; pappi aristae 2 validae 1 mm. longae erectae et antrorsim hispido-ciliatae vel interdum patentes et retrorsim hispido-ciliatae.

Herbaceous perennial about 25 cm. high from a deep vertical root passing above into a short much-branched caudex, glabrous and glaucous throughout except for the ciliate leaf-bases; stems numerous, forming a dense entangled mass, slender, 1–1.5 mm. thick, oppositely branched (branches diverging at an angle of 45° or less), striate, inconspicuously leafy for about half their length; leaves opposite, connate at base, narrowly linear, 1–2.7 cm. long, 0.6–1 mm. wide, flattened, fleshy, obtusely callous-tipped, the upper reduced; peduncles very slender, naked, 10–15 cm. long, terminating stems and branches and in the upper axils; disk campanulate, 7–8 mm. high, 5–7 mm. thick; outer phyllaries 5–6, ovate or lanceolate, thick-herbaceous,

appressed, 1–1.2 mm. long; inner phyllaries 7–8, ovate, 4–4.5 mm. long, obtuse, united for less than half their length, the whitish margins about 0.3 mm. wide; corollas golden yellow with brown nerves, glabrous, zygomorphic, 3.8–4.5 mm. long (tube 1.8–2 mm., throat campanulate, 0.8–1 mm. long below the longest tooth, 1.2–1.8 mm. long below the shorter teeth; teeth ovate, the longest 1.3–1.7 mm., the others 1–1.2 mm. long); pales membranous-scarious, oblong or oblong-ovate, rounded or emarginate, glabrous, erose, white with 2 brown vittae, 5–6 mm. long, partly enfolding the achenes and falling with them; achenes narrowly oblong, obcompressed, somewhat thickened, slightly incurved, 3–3.8 mm. long, 1–1.3 mm. wide, the typically blackish body at maturity densely tuberculate all over (the tubercles coarser on the outer face), glabrous, not winged or margined; pappus awns 2, equal, 1–1.2 mm. long, rigid, narrowly triangular, trigonous, persistent, normally erect and densely antrorse-hispid-ciliate, occasionally widespreading and retrorsely hispid-ciliate; style branches with rather abrupt subulate tips shorter than the remainder of the appendage.

Mexico: In dry heavy alkaline soil, one mile south of Hermanas, road from Piedras Negras south to Monclova, Coahuila, 22–24 Aug. 1938, *Johnston* 7059 (type, Gray Herb.; duplicate, Nat. Arb. Herb.).

Nearest *Thelesperma simplicifolium* Gray, a coarser plant with the apparently solitary or few stems leafy throughout, the heads radiate and normally much larger, the inner phyllaries more broadly white-margined, and the pappus much reduced or obsolete.

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PROCEEDINGS

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AN UNDESCRIBED WOODPECKER FROM THE PARAGUAYAN CHACO.

BY PIERCE BRODKORB.

Two virtual topotypes of *Trichopicus cactorum cactorum* (D'Orbigny),[1] from Ele-Ele, Rio Mizqué, Bolivia, differ markedly from a series from the Paraguayan Chaco. The latter are herewith named.

Trichopicus cactorum parvus, subsp. nov.

Type.—Univ. Mich. Mus. Zool., No. 92852; male; Kilometer 265, west of Puerto Casado, Paraguay; September 18, 1936; A. Schulze, No. 2057.

Characters.—Differs from true *cactorum* in being smaller but with a proportionately longer as well as more slender and attenuate bill. The white area on the back and the white tips of the greater wing coverts are much more extensive. The rump and upper and under tail coverts also have decidedly more white, and besides the markings on these parts are usually sagittate or in the form of spots instead of regular bars. The white bars on the lateral rectrices are more broadly interrupted along the shaft. The dark bars on the flanks are usually fewer in number and less pronounced, sometimes almost entirely gone. The underparts of the body are paler buff.

Measurements.—Wing, males, 102, 102.5, 103, 105.5, 106 mm. (in *cactorum* 113.5); females, 98.5, 102, 103, 106.5 mm. (in *cactorum* 114). Tail, males, 58, 60.5, 62.5, 62.5, 62.5 mm. (in *cactorum* 68.5); females, 59.5, 60.5, 62.5, 65.5 mm. (in *cactorum* 72). Culmen from base, males, 22.5, 23, 24, 24, 25.5 mm. (in *cactorum* 21.5); females, 20.5, 21, 21, 21.5 mm. (in *cactorum* 21.5).

Remarks.—The type locality of *cactorum* is "près de Chaluani et de Chilon, province de Mizqué (Bolivia)." The type is evidently a female, not a male as supposed by the author, who believed that the red spot on the head belonged only to the female sex, whereas the reverse is the case. The original measurements show that it was a large bird with a small bill—wing 115 mm., tail 65 mm., bill 18 mm. The plate illustrates a specimen with boldly barred upper tail coverts.

[1] *Picus cactorum* D'Orbigny, Voyage Amér. Mérid., 4, p. 378, pl. 62, fig. 2, 1844–1847.

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PROCEEDINGS

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DESCRIPTIONS OF NEW BEETLES OF THE GENUS PHYLLOPHAGA FROM NEOTROPICAL REGIONS.

BY LAWRENCE W. SAYLOR,
Washington, D. C.

The types of the new species described herein, unless otherwise indicated, are in the Saylor Collection.

Phyllophaga (Listrochelus) almada, new species.

Male.—Oblong, color shining, rufocastaneous, the head and thorax rufous, elytra subpruinose; nude above except for very minute elytral hairs. Clypeus quite long, the apex truncate, entire and somewhat reflexed, the side margins straight and slightly convergent apically, the angles narrowly rounded; disc flat and with very dense, fine punctures. Front flat, with fine and very dense punctures; transverse carina of vertex well marked. Antenna 10-segmented, rufous; club testaceous, subequal to funicle; segment 3 slightly longer than the others in the funicle. Thorax widely dilated, the sides crenate, ciliate, and straight before and behind the dilation; front and hind angles very obtuse; base completely margined; disc with very dense, fine, and regularly placed punctures separated by about their own diameters. Scutellum punctate at sides. Elytron with four narrow discal striae besides the sutural, each weakly indicated; disc with fine and dense punctures and very minute hair. Pygidium very convex; apical third polished and very sparsely punctate, basal two-thirds pruinose and finely, densely punctate, with short, suberect hairs; apex wide, truncate, and not ciliate. Abdomen pruinose and very widely flattened at middle, disc with dense though very fine punctures and very short erect hairs; 5th sternite in apical half very shallowly foveate and hardly punctate; with a patch of long and erect hairs near the sides; 6th sternite longer than the 5th, becoming at each side a strong, acute tooth perpendicularly to the segment, each tooth as long as the 5th sternite; the two teeth are separated from each other by a distance equal to half the length of the hind tibia, and the area between them is smooth and nearly flat, the segment being punctured and hairy only along a narrow band at the apex. Front tarsus long, mid and hind tarsi shorter than their respective tibiae. All claws short,

robust, and with a double row of short, pectinate teeth, without larger intercalated teeth. Hind tibia slightly more pilose within than usual; the tarsus rather densely hairy beneath and the first two segments subequal in length. Middle tarsus not unusually hairy. Mentum concave. Length 12.5 mm.

The unique male *Holotype* is from "Cuidad Obregon, Sonora, Mexico, July, 1940, R. G. Almada." I take pleasure in naming the species after Señor Almada who collected and presented this and other valuable melolonthine species to me. The species can be confused only with *L. trochanter* Saylor from Arizona but differs especially in the much more obvious teeth of the 6th abdominal sternite, in the normal-sized trochanters, and in being smaller.

Phyllophaga (Phyllophaga) temascalis, new species.

Male.—Robust, oblong-oval; color piceocastaneous and somewhat dull; slightly pruinose above. Clypeus long and flat, apex hardly or not reflexed, and but very faintly sinuate at middle; disc coarsely and densely punctate, with short erect hair. Front densely and scabrosely punctate, with erect hairs. Antenna 10-segmented and rufotestaceous; club testaceous, about one-fourth longer than funicle but shorter than the entire stem. Thorax with sides dilated, nearly straight, ciliate and somewhat crenate; front and hind angles obtusely angulate; disc pruinose, with a median, longitudinal impunctate area, the punctures at sides and basal half small, irregularly placed, and somewhat dense, especially near the front angles, the punctures a little larger at middle; all punctures with short erect hairs and with some much longer hairs intermixed. Elytra ecostate other than sutural; disc finely, evenly punctate, with short to minute suberect hairs, and with some very long and coarse bristly hairs near the scutellum. Pygidium slightly convex, dull, densely and coarsely punctate, with short erect hairs and a few longer intercalated hairs; apex narrow, subtruncate and finely thickened. Abdomen somewhat shining, flattened and very faintly, longitudinally impressed, and sparsely setigerously punctate at middle; 5th sternite declivous in apical half, with a large, central triangular patch of coarse, setigerous granulate punctures; 6th sternite three-fifths as long as the preceding, the apical and basal margins thickened, subcarinate, and slightly interrupted at the middle; disc of 6th transversely flattened or foveate, with sparse punctures and long and erect hairs. First segment of hind tarsus much shorter than second; spurs free and very slender, shortest one as long as the first tarsal segment. Tarsal claws long and slender, the basal tooth very short and triangular, and placed slightly basad of the middle; base not dilated. Genitalia much as in *P. integra*, bilaterally symmetrical and of the complete ring-shaped type; in lateral view both the lateral angles and the median underpiece are extended and of nearly the same length. Length 16–17 mm.

The *Holotype* and three paratypes, all males, were taken at "Real de Arriba, Temascaltepec, Mexico, D. F.," and were presented to me by the collector, Dr. H. E. Hinton. The species is most closely related to *P. integra* Bates but may be distinguished by the color and the puncturation of the thorax.

Phyllophaga (Phyllophaga) onita, new species.

Male.—Oblong-ovate, color rufocastaneous to piceocastaneous, slightly to distinctly pruinose above; dorsal surface completely haired. Clypeus moderately long, flat, the apex truncate and entire, hardly reflexed; disc coarsely, densely and setigerously punctate. Front coarsely, cribrately punctate, with long erect hair. Antenna 10-segmented, rufotestaceous; club small, ovate, and subequal to segments 3–7 combined. Thorax with sides dilated and straight, margin slightly to coarsely crenate, and ciliate; front angles obtusely angulate or subrectangular, hind angles obtusely angulate; disc with fine, dense punctures, those on disc separated by one and a half to twice their diameters, and somewhat closer at sides, all the punctures with very fine erect hair of moderate length and with some much longer hair intermixed. Elytra except for the sutural costa practically ecostate; disc with fine dense punctures separated by from 2–4 times their diameters, all with very short suberect hairs, with several much longer hairs near and at base. Pygidium slightly convex, partly pruinose; disc finely and moderately densely punctate, with short and long hairs intermixed. Abdomen subpruinose, flattened, slightly longitudinally impressed and finely, sparsely setigerously punctate at middle; 5th sternite slightly declivous behind, basal three-fourths with a broad triangular patch of granules; 6th slightly shorter than 5th, the basal margin thickened and subcarinate, the middle base reflexed towards the apex of the segment, thickened and bilobate, the two lobes very short, blunt and obtuse; disc of 6th transversely flattened, sparsely punctate, with erect hairs. Claws long, basal tooth short, triangular, and situated a little basad of the middle; base of claw hardly dilated. First segment of the hind tarsus shorter than second; spurs free and graceful. Front tarsal segments each with a short blunt spine at the inner side of apex. Genitalia bilaterally symmetrical, of the complete ring-shaped type; in enface view the lateral angles are moderately separated and acute, the median underpiece bidentate and the teeth fairly long.

Female.—Thorax less densely punctate; antennal club very ovate and equal to segments 4–7 combined; pygidium a little more narrowed apically than in male; abdomen polished and slightly convex, the 5th and 6th sternites plane and sparsely and setigerously punctate; claw tooth a little more median in position; otherwise similar to male. Length 14.5 to 16.5 mm.

The *Holotype* male, *Allotype* female and two male paratypes are from "C. Valle, Temascaltepec, Mexico, D. F., collected at light in June and July 1930 by G. B. Hinton." The species resembles *P. abdominalis* Moser but differs in the non-sinuate sides of thorax and in abdominal structure. From *P. integra* Bates, this new species is distinguished by the antennal and abdominal characters.

Phyllophaga (Phyllophaga) hintonella, new species.

Male.—Elongate oval; color usually dark piceocastaneous to piceous, varying to nearly rufocastaneous in a few individuals, in the latter, how-

ever, the thorax and head always piceocastaneous; polished above and elytra nude, or with but very minute hairs. Clypeus moderately long, and the angles very broadly rounded; apex not reflexed and very narrowly though noticeably emarginate at the middle; disc very convex and exceedingly scabrose, the entire surface very rugosely, densely and contiguously punctate, and with very long erect hairs. Front densely, coarsely, and contiguously punctate, somewhat rugose, with very long and erect hairs. Antenna 10-segmented, rufous; club small and ovate, hardly equal to segments 3–7 combined. Thorax noticeably dilated at sides, the margins usually crenate, ciliate and straight, at times the sides behind the dilation are slightly sinuate; angles distinct but obtuse, the front angles at times nearly subrectangular; disc with very coarse punctures separated by from 1–2 times their diameters on the disc, smaller and closer at the sides, and also with many scattered, very small, intermixed punctures, these large punctures with long, coarse and erect hairs, and the small punctures without hairs; side margins and the area near the hind angles usually smooth and impunctate; disc at times with a small irregularly-shaped median impunctate area. Scutellum impunctate or with one or two small punctures. Elytra with costae other than the sutural not well marked; disc finely, densely and rugosely punctate, sometimes with very minute discal hairs. Pygidium subshining, very smooth, the punctures rather sparse, extremely fine, and hardly discernible, and with a little short, erect hair; apex subrounded, reflexed and ciliate. Abdomen very convex and especially so near the apex, the middle highly polished, glabrous and very finely punctate, and with a very slightly impressed, median longitudinal sulcus (frequently carried over onto the basal half of the 5th sternite); 5th sternite declivous in apical half, base smooth or sparsely punctate and the apex with a patch or transverse band of fine, granules and setigerous punctures; 6th sternite longer than the 5th and much flattened though the center is slightly convex and the apical margin is carinate, ciliate and narrowly interrupted at the middle; disc of the 6th dull, somewhat rugulose, with sparse, round, fine granules rather evenly spaced, and a little short, erect hair. First two segments of hind tarsus equal in length; spurs free. Disc of hind femur impunctate, except for the submarginal rows of setiferous punctures. Mentum shallow, longitudinally concave. Claw short and robust and very widely cleft; the basal tooth median in position and twice or more wider at middle, and very slightly longer than, the apical tooth; apical side of the basal tooth obliquely truncate at apex and the point quite sharp; base of claw distinctly angulately dilated, though still somewhat obtuse, and very narrowly separated from the basal tooth. Genitalia bilaterally symmetrical; in enface view the lateral lobes though free are in close contact at the apex, and an erect spoon-like structure arises from each apical point, these parts each long, narrow, parallel-sided and each with a small, round, flat top scarcely larger than the stem; the two structures are in contact for their entire length.

Female.—Antennal club scarcely equal to segments 4–7 combined. Pygidium very smooth and flat on disc, with extremely fine and very sparse punctures with short hairs; the disc declivous on each side from the flat

area and just before the apex the flat area is raised slightly and then drops abruptly to the apical margin (so that in lateral view it appears that part of the disc is pushed lobately forward and over the apical margin). Abdomen glabrous, highly polished and less convex than the male, with middle longitudinally impressed; 5th sternite faintly transversely impressed at apex and the latter densely and finely punctate, the base sparsely punctate; 6th slightly convex and punctate. Otherwise as in the male. Length, 14–17 mm.

The *Holotype* male and *Allotype* female are from "Temascaltepec, Mexico, D. F., April, 1931, G. B. Hinton Collector." Numerous paratypes are from the same localities and also from: "Tejulpilco, July, 1932, altitude 3960, Temascaltepec, Mexico, H. E. Hinton Collector," and "Real de Arriba, Temascaltepec, altitude 6300 feet, H. E. Hinton Collector." Named for Dr. Howard E. Hinton who, with his father, collected and presented the specimens to me. The species is near *P. hirticollis* Moser but the thorax is not confluently punctate, and the pygidial punctation is different; Moser's description of the latter makes no mention of the two sizes of thoracic puncturing. From *P. rufithorax* Moser this new species differs especially in the pygidial puncturation.

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PROCEEDINGS
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NEMATODES PARASITIC ON AND ASSOCIATED WITH ROOTS OF MARIGOLDS (TAGETES HYBRIDS).

BY G. STEINER.

In 1933 an examination of the plants of two outside beds located between the greenhouses of the U. S. Department of Agriculture in Washington, D. C., revealed that of the various ornamentals grown there the following 19 were infested with the root-knot nematode, *Heterodera marioni* (Cornu 1879) Goodey 1932:

Acalypha virginica L.
Alsine media L.
Amaranthus (*caudatus?*) var. Sunrise
Begonia var. Christmas Cheer
Begonia rex Putz.
Browallia viscosa HBK.
Chrysanthemum frutescens L.
Coleus blumei verschaffeltii Lem.
Convolvulus japonicus Thunb.
Cuphea ignea DC. = (*Cuphea platycentra* Lem.)
Fuchsia sp. (probably hybrid)
Impatiens balsamina L.
Iresine lindenii Van Houtte = (*Iresine lindeni* Lem.)
Lobelia erinus L.
Peristrophe angustifolia Nees (? var. *Aurea variegata*)
Petunia hybrids (var. Ruffled giant)
Phlox drummondii Hook.
Torenia fournieri Lind.
Verbena sp. (grower's label given as *V. luminosa*, but its botanical identity uncertain)

Seven additional ornamentals, however, were found free of this pest; these were:

Artemisia stelleriana Bess.
Chenopodium ambrosioides L.
Lantana camara L.
Plantago (*rugelii?*)
Pelargonium (*zonale?*) var. Madame Soleroi
Tagetes patula L. (hybrids)
Vinca rosea L.

In the spring of 1934 the soil of these beds was given a treatment of ammonium thiocyanate (NH_4CNS) which, however, proved not to be a satisfactory nematocide.

Tests made during 1937 to determine more accurately the relationship between the root-knot disease and marigolds (covering some 40 horticultural varieties of *Tagetes*) showed that large numbers of root-knot nematode

larvae enter the roots, but usually fail to develop at all, very few growing to the adult stage and producing eggs. It is not the purpose of the present paper, however, to discuss this relationship of root-knot nematode to marigold roots in any detail, but to report on some taxonomic findings made at that time. As early as 1933 large numbers of a new nematode belonging to the Criconematinae were found living ectoparasitic on these marigold roots. Subsequently this species was described as *Criconemoides mutabile* by A. L. Taylor.[1] In 1934 the situation was the same; again only marigold roots were attacked by this *Criconemoides* species. In 1937 resistance tests with the various marigold varieties against root-knot were made inside one of the above-mentioned greenhouses. Again *C. mutabile* was found on these marigold roots. It appears either that this nematode is a specific parasite of marigolds or that the population under observation represented a strain highly specialized on marigolds. Unfortunately no further attention could be given this host specialization.[2] For further investigations the question may be raised as to an interrelationship between such apparent host specialization and the length of the buccal stylet of the nemic ectoparasite. Each of the various species of the Criconematinae has a buccal stylet of a fixed length, but this length varies much between the different species. Obviously these nemic ectoparasites in order to reach their food must be able to reach and puncture certain cells in the roots of the host plant. In the present case, the length of the buccal stylet of *C. mutabile* is given as 52 μ. Measurements on roots of the marigolds here involved showed the central cylinder to be 108 to 115 μ from the root surface. *C. mutabile* would therefore not be able to puncture the cells of the axial cylinder of these marigold roots from the surface unless it would penetrate the root ecto- and endodermis with the anterior portion of the body. This seems unlikely on the basis of observations which always show these ectoparasites very loosely attached to the root surface of their host plants. It is therefore assumed that *C. mutabile* feeds on the cells of the endodermis of marigold roots and not on cells of the axial cylinder. These remarks may serve to stimulate further observations and investigations on the host-parasite interrelations in this group of nematodes, a field of study hitherto entirely neglected.

The two new species, the descriptions of which follow, were also found in these marigold roots. In connection with the new *Paraphelenchus* the statement may be made that past observers have paid too little attention to the morphology of the posterior portion of the esophagus, particularly the position of the esophageal glands in the various species of this genus. The same also is true for the representatives of *Aphelenchoides*, the other genus here dealt with. Unfortunately these morphological features are often difficult to observe and analyze.

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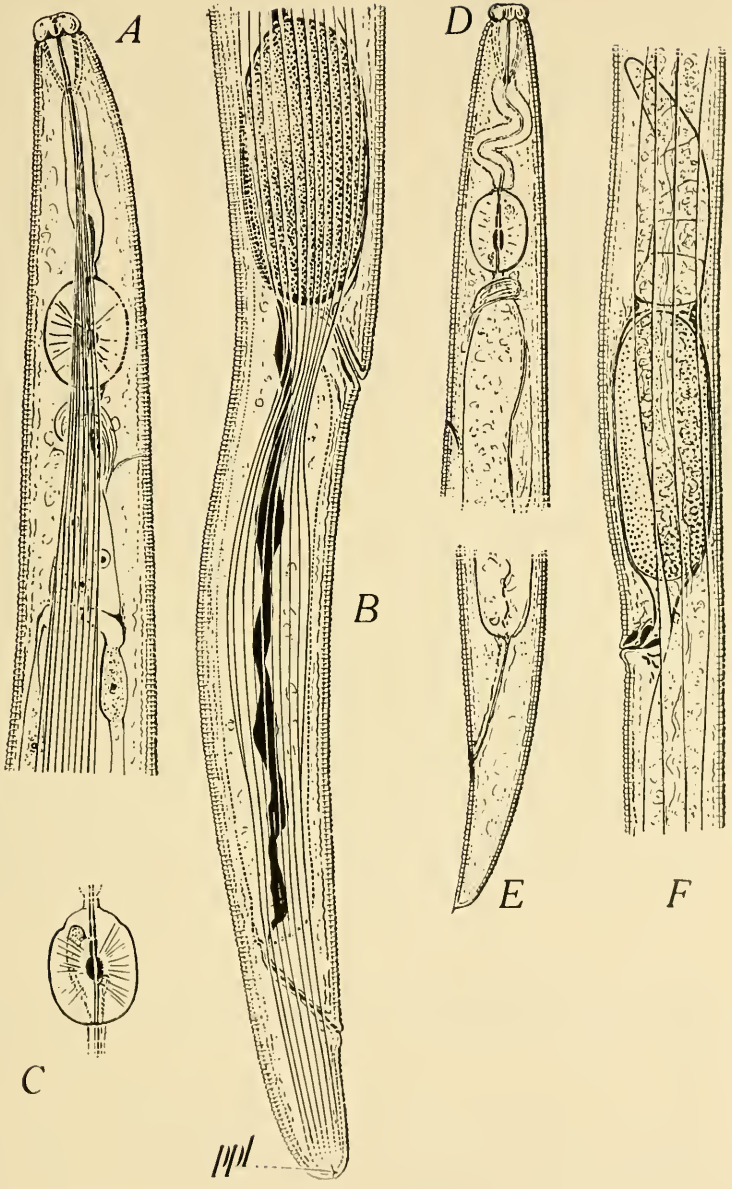
[1] The genera and species of the Criconematinae a subfamily of the Anguillulinidae (Nematoda). Trans. Amer. Microscopical Soc. LV (4) : 391–421, 1936.

[2] In a paper just received (Oliveira, J. M.: Plant-parasitic and free-living nematodes in Hawaii, Occasional Papers of the Bernice P. Bishop Museum, Honolulu, Hawaii, Vol. XV, pp. 361–373, 1940) *C. mutabile* is recorded from Oahu, "about roots of dry land and pineapple field vegetation."


A
B
C
D
E
F

Paraphelenchus micoletzkyi, n. sp.

(Plate II, A–C.)

This new species closely resembles the type *P. maupasi* Micoletzky 1922, which was originally erroneously described by Maupas under the name of *Aphelenchus agricola* de Man.

Description.—Body cylindrical with a gradual regular tapering anteriad of the intestine, a gradual constriction in the region of the vulva and a slight tapering from halfway between vulva and anus caudad to the broadly obtuse terminus. Cuticular annulation distinct, interrupted by wide lateral fields, which begin at the latitude of the proximal end of the buccal stylet. These fields very narrow here but posteriad increase rapidly in width, reaching a width of more than 1/3 body diameter in the latitude of the anterior end of the intestine. In middle region of body, width of lateral fields over ½ body width, but in vulvar region a gradual contraction to almost ¼ body width, again a widening to over ½ body width in the mid-region between vulva and anus and then a slight gradual narrowing toward the tail end. Where widest these lateral fields with about 12 longitudinal striae but number of striae reduced where fields contract or taper. Striae apparently not reaching terminus but fading out slightly in front of it. Tail with single slightly subterminal papilla on each lateral side. Head slightly set off, broad obtuse, with 4 submedial papillae. Buccal stylet without distinct basal knobs, a character apparently typical of all members of this genus. Procorpus cylindrical, rather narrow, about 1½ times as long as the large metacorpus bulb and set off from the latter by a collar-like constriction (Plate II, C). Isthmus of esophagus short and gradually widening into a broadly conical terminal bulb. Latter well set off from intestine and completely enclosing the esophageal glands (Plate II, A). Outlets of these glands in metacorpus bulb and arranged as in all other related forms. Wall of intestine apparently consisting of 3 to 4 series of rather flattish cells surrounding a rather wide intestinal lumen. Rectum about 1 1/3 times as long as anal body diameter. Porus excretorius ventrad and slightly posteriad of the nerve ring. Vulva leading into vagina, which is directed obliquely forward; eggs oblong, about twice as long as the body width at vulva. Only females seen.

Measurements.— ♀ : total length = 0.82 mm.; $\alpha = 25$; $\beta = 10.5$; $\gamma = 26.1$; $\nu = 78\%$.

Diagnosis.—*Paraphelenchus* resembling *P. maupasi* but with lateral fields contracted in vulvar region, with a large terminal esophageal bulb that encloses all three esophageal glands; a papilla on each side of obtuse tail end.

Type location.—Washington, D. C.

Type association.—Roots of *Tagetes* hybrids.

Remarks.—In comparing the present species with *P. maupasi* as originally described by Maupas under the name of *Aphelenchus agricola* de Man, it becomes evident that the two forms, however similar they appear, are fundamentally different in the structure of the terminal esophageal bulb and the position of the esophageal glands. In his fig. 4, Pl. XXV Maupas

draws a much more slender bulb than is seen in the present species. Furthermore, in *P. maupasi* the esophageal glands are drawn as situated outside the terminal bulb and as extending backwards over the intestine. With the other differences, these features characterize the present form as a new species.

Aphelenchoides tagetae, n. sp.

(Plate II, D–F.)

This new species belongs to those forms of the *Aphelenchoides parietinus*-group that have no postvulvar uterus.

Description.—Cuticle finely, though distinctly, annulated (annules 0.8μ), with lateral fields 2μ wide at 13μ corresponding body diameter; only 2 wings. Stylet 10μ long. Procorpus only 1½–2 times longer than large bulbous metacorpus. Esophageal glands apparently free on dorsal side of intestine. Excretory pore about 1¼ body width behind metacorpus bulb. Female sexual apparatus without postvulvar uterus; ovary short, with less than 10 oöcytes. Egg in uterus 12μ by 40μ. Vagina with cuticularized, thickened walls.

Measurements.—(of a single female). ♀: total length = 0.366 mm.; $a = 28$; $\beta = 9.3$; $\gamma = 16.6$; $v = 71\%$.

Diagnosis.—*Aphelenchoides* of the *parietinus*-group, of small size, with short, straight ovary, without postvulvar uterus; lateral fields of 2 μ or about 1/6 body width, with two wings. Procorpus only about 1½–2 times longer than bulbous metacorpus; excretory pore 1¼ body width behind metacorpus. Esophageal glands free in body cavity dorsal of intestine.

Type association.—Roots of *Tagetes* hybrids.

Type locality.—Washington, D. C.

Remarks.—This new form resembles *Aphelenchoides minor* (Cobb 1893) Steiner & Buhrer 1933 but differs from it by: first, being less slender (a = 28 as against 34–44 in *A. minor*), second, having a procorpus that is only 1½–2 times longer than the metacorpus bulb (as against 3 times in *A. minor*), third, having its tail not set off by sudden constriction posterior to the anus, and fourth, having a buccal stylet with distinct shaft and basal knobs.

Explanation of Figures, Plate II.

Plate II, A–C. *Paraphelenchus micoletzkyi* n. sp. A—Head end; X—625 B—Tail end; note the contraction of the lateral field in the region of vulva; *ppl*, caudal papilla; X 520. C—Metacorpus bulb showing the arrangement of the outlets of the esophageal glands; X 520. D–F. *Aphelenchoides tagetae* n. sp. D—Head end; X 875. E—Tail end of female; X 875. F—Female sexual apparatus; X 875.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NEW RACES OF FLYCATCHER, WARBLER AND WRENS FROM MEXICO.

BY ROBERT T. MOORE.[1]

The following new forms have appeared in recent accessions to our collections from Mexico, and are herewith described.

Megarhynchus pitangua tardiusculus,[2] subsp. nov.

Type.—Male adult, No. 12726, collection of Robert T. Moore; Rancho Santa Barbara, 20 miles northeast of Rosario, Sinaloa, Mexico; altitude 2500 feet; December 23, 1934; collected by Chester C. Lamb.

Subspecific characters.—Nearest to *Megarhynchus pitangua caniceps* of southern Jalisco, but differs in winter plumage by having back, rump and sides of neck posterior to black auricular area much richer green (Yellowish Olive[3] instead of Grayish Olive); pileum darker gray; outer margin of rectrices buffy green, less cinnamon; bill longer and much wider. Compared with the type of *Scaphorhynchus mexicanus* Lafresnaye, now in the Museum of Comparative Zoology, Cambridge, and a series from eastern Mexico, Oaxaca and Guerrero, the upper parts are much purer green, less bronzy; pileum grayer instead of nearly pure black; wing and tail shorter; culmen much longer and wider. In nuptial plumage the differences with *mexicanus* are relatively the same, but no comparison can be made with nuptial plumage representatives of *caniceps*, as they are apparently non-existent in museum collections.

Range.—The lower mountains of southeastern Sinaloa, west of the main Sierra Madre (Carrizo, Rancho Picacho, Rancho Santa Barbara, Juan Lisiarraga Mt. and "Presidio"), south to Sauta in western Nayarit at lower altitude.

Remarks.—When Ridgway described *M. p. caniceps* he had only two specimens, the male Type in collection of the United States National Museum, from Barranca Veltran, southern Jalisco, and one female. Since that time no other specimens have been taken, not even from the Central

[1] Contribution from the California Institute of Technology.

[2] *Tardiusculus* refers to characteristic slow movements of this bird.

[3] Names of colors in this paper, when capitalized, are taken from Ridgway's "Color Standards and Color Nomenclature," 1912.

Plateau country of Mexico, neither by Batty, Bailey, Chester Lamb nor myself. Indeed, Jouy (Proc. U. S. N. Mus., XVI, 1894, p. 783) remarks that, although he found it "common in the tree tops at the bottom of the barranca (Veltran)," it was "not taken elsewhere." He describes this barranca, which is mentioned as "neighboring" San Marcos on the "east base of the Volcano Colima" as one of "tropical luxuriance" as compared with the "barren plateau." *Caniceps* may be confined to the barrancas of the Vol. Colima and nearby areas and absent from the more arid plateau region. At any rate, the meteorological conditions are quite different from those of the mountains of Sinaloa, west of the Plateau, where we have obtained *tardiusculus* only in a narrow altitudinal strata between 2500 and 3200 feet.

Two specimens of *tardiusculus*, taken previous to ours, have been recorded from Sinaloa, a male from Presidio by Salvin and Godman (Bio. Cen. Amer., Pt. 2, p. 52) and one individual from Juan Lisiarraga Mt. by Miller (Bull. Amer. Mus. N. H., XXI, Art XXII, p. 339). This last bird, as well as another from the same locality, are now in the American Museum of Natural History, both too worn to be comparable with our fresh individuals. The Moore Collection fortunately has an adequate series of recently-collected specimens, nine from Sinaloa, two from Sauta, Nayarit, an unworn March 20th bird from Veracruz, 1 male from Oaxaca and six individuals from Costa Rica and Honduras. Comparison of these birds with specimens in the same winter plumage in the Museum of Comparative Zoology, Cambridge, taken from twenty to forty years ago, reveal there is little or no postmorten change in this species.

It is unfortunate no representative of *caniceps* in nuptial plumage exists. The Type was secured on March 25th in slightly worn winter plumage, with which our April 18th female from Carrizo is comparable. Two specimens taken in May at Isgusgilite, Guerrero, are intermediate between *mexicanus* and *caniceps*, having the gray head of the latter.

All of our birds have been obtained in the upper portion of the Arid Tropical Zone in the lower mountains of southeastern Sinaloa, except for two at low altitude at Sauta, western Nayarit, about one hundred miles to the south. But we have not found it on the coastal plains of Sinaloa, where Forrer is reported by Salvin and Godman (loc. cit.) to have secured an individual near sea level at Presidio about thirty-two miles in a direct line due west of our collecting station at Santa Barbara. This may have been taken in the near-by mountains to the east of Presidio. The "Juan Lisiarraga Mt.," reported as "5500 ft." in altitude (loc. cit.) seems from our investigation to be a locality south of our Santa Barbara collecting station near Lat. 23° north. Miller especially noted the large size of the bill and the authors of the Biologia the gray crown of the Sinaloa birds. The Sauta birds are nearly true *tardiusculus*.

Specimens examined.—Tardiusculus—Sinaloa: Carrizo 1 ♀ (April 18, eggs in oviduct), Rancho Picacho 4 ♂ 1 ♀ (Aug. 4–18), Rancho Santa Barbara 2 ♂ 1 ♀ (incl. Type, Dec. 12–23), Juan Lisiarraga Mt. 2 ? (Apr. 27); Nayarit: Sauta 1 ♂ 1 ♀ (May 2, 3, breeding). *Caniceps*—Jalisco: Barranca Veltran 1 ♂ (Type, Mar. 25), 1 ♀. *Mexicanus*—"Mexico"

1 ? (Type); Veracruz: near Jalapa 1 ♀ (Mar. 20), Orizaba 1 ♂ 1 ♀, Pasa Neuva 1 ♀ (Apr. 22), Antigua 1 ♂ (Mar. 15), Papantla 1 ♂ (Mar. 16), Motzorongo 1 ♂ (Feb. 28); Puebla: Metlaltoyuca 1 ♂ (Feb. 16); Yucutan: Chichen Itza 1 ♂ 1 ♀ (Feb. 6), LaVega 1 ♂ 1 ♀ (Mar. 16); Tabasco: Frontera 1 ♂ (March 8); Oaxaca: Santa Domingo 2 ♂ (June 15–16), Escuilapa 1 ♂ (Feb. 25), Chivela 4 ♂ 2 ♀ (March 6–May 9); Tapanatapec 2 ♂ 2 ♀ (July 25–Sept. 1), Tehuantepec 3 ♀ (Nov. 20–Dec. 2–Feb. 16); Chiapas: Huehuetan 2 ♂ 1 ♀ (Feb. 23–Mar. 2), Ocilapa 1 ? (Aug. 27); also three large series in the American Museum of Natural History, U. S. National Museum, and Museum of Comparative Zoology from Yucutan, Guatemala, Honduras, Costa Rica, and Panama (including two specimens of *M. p. deserticola* Griscom from Guatemala). The Moore collection also has specimens from:—Costa Rica: Villa Quesada 1 ♀ (Dec. 24), San Carlos 1 ♂ (March 14), Zarcero 1 ♂ (Sept. 18); from Honduras: Plan del Rancho 1 ♂ 1 ♀ (June 30, July 2), San Marcos de Guaymas 1 ♂ (June 29).

Measurements.—The measurements of specimens of the new form average very slightly smaller in wing and tail then those of *mexicanus* or *caniceps*. Moreover, the wing of the type of *mexicanus* is much larger than others, being nearly 7 mm. longer than the average of either Ridgway's or my measurements for *mexicanus*. Contrasting with the shorter wing, the bill of *tardiusculus* is longer, and ten per cent wider at anterior margin of nostril, than either *caniceps* or *mexicanus*.

Average Measurements in Millimeters of Races of *Megarhynchus pitangua:*

Males	*Ex. Culmen*	*Width Cul. at Anterior Margin Nostril*
7 ads. *tardiusculus*	32.0 (31.1–34)	14.9 (14.4–15)
1 ad. Type *caniceps*	30.7[4]	13.5
5 ads. (incl. Type) *mexicanus*	29.2 (28.4–30.2)	13.2 (12.9–13.5)

Vermivora superciliosa sodalis, subsp. nov.

Type.—Male adult in slightly worn breeding plumage, No. 9048, collection of Robert T. Moore; between Chiricahui and Churo, S. W. Chihuahua, Mexico; May 14, 1934; altitude about 7200 feet; collected by Robert T. Moore.

Subspecific characters.—Differs in early nuptial plumage from *Vermivora superciliosa mexicana* (Bonaparte) of eastern Mexico, by having pileum, auriculars and side of neck paler gray; patch on back brighter (more yellowish-green); abdomen averaging whiter; size slightly smaller. Differs from *V. s. palliata* of Guerrero in the same characters as from *V. s. mexicana* and, in addition, yellow of abdominal area less restricted. It differs from true *superciliosa* of Guatemala in being still paler in the gray coloration, par-

[4] Ridgway (Bull. U. S. N. M. No. 50, Pl. IV, p. 667, gives this measurement, based on one specimen of each sex, 32.5 mm. for each sex. Presumably one was the type.

ticularly in the auricular region. The birds in winter plumage differ in the same way.

Range.—Sierra Madres of northwestern Mexico from an altitude of 6000 to 10,000 feet ranging from southwestern Chihuahua through western Durango and eastern Sinaloa to the vicinity of Tepic in Nayarit.

Specimens examined.—In Moore Collection—*Sodalis*— S. W. Chihuahua: Guasagota 1 ♂ (May 11), between Chiricahui and Churo 1 ♂ (May 14 Type), Mt. Mohinora 3 ♂ 2 ♀ (May 12–25 breeding), San Feliz 1 ♂ 1 ♀ 1 im. (Aug. 24); Durango: Muertocito 6 ♂ 3 ♀ (June 6–18, breeding), Rancho Guasimal 2 ♂ 1 im. ♂ (Oct. 27–Nov. 15), Nievero 4 ♂ (March 29–Apr. 3 breeding), Piedra Gorda 3 ♂ (March 8–20); Sinaloa: Santa Gertrudis 3 ♂ 4 ♀ (May 23–27), near Rancho Alisitos 1 ♀ (Aug. 23), Babizos 10 ♂ 1 Im. ♂ 6 ♀ (June 19–July 12, breeding; Dec. 8–15), Rancho Batel 1 ♂ 2 ♀ (April 9, 10, Nov. 9); Nayarit: near Tepic 2 ♀ 2 Im. ♀ (July 1–29, breeding). *Mexicana*—Puebla: El Venerable, 26 mi. N. W. Texmelucan, 2 ♂ 1 ♀ (March 31–Apr. 2, breeding); District Federal 1 ♂ (June 25); Mexico: San Bartolo 1 ♀ (Jan. 22), Temascaltepec 1 ♂ 1 ♀ (July 16–Aug. 5); Guanajuato: near Xichu 3 ♂ (Apr. 20–26, breeding). Intermediates nearer to *mexicana*—Jalisco: Tapalpa 4 ♂ (Apr. 6–15, breeding). *S. superciliosa*—Honduras: Las Ventañas 1 ♂ (July 24), Monte Verde 1 ♂ 1 ♀ 1 ? (July 20–25), Montaña El Chorro 1 ♀ 1 ? (June 20). Also all specimens of the races of *Vermivora superciliosa* in the Museum of Comparative Zoology, American Museum of Natural History and British Museum.

Comparative Measurements of Adult Males and Females of *V. s. Mexicana* and *V. s. sodalis.*

	WING	TAIL
MALES		
4 ads. *mexicana*	66.0 (65.4–66.5)	48.7 (47–50)
26 ads. *sodalis* incl. Type	63.3 (58.2–66.1)	46.9 (42.5–49.2)
FEMALES		
3 ads. *mexicana*	61.2 (60.9–61.8)	47.5 (45.5–49.3)
12 ads. *sodalis*	59.6 (57.5–61.8)	44.2 (41.6–47.2)

Remarks.—That an undescribed race of Hartlaub's Warbler exists in northwestern Mexico has been known for a number of years to taxonomists, working on Mexican material, but the form has not been differentiated by formal description because of lack of adequate series of fresh specimens, taken at critical localities during the same seasons of the year. Miller and Griscom (Amer. Mus. Nov., No. 183, July 18, 1925, p. 8) noted the smaller size of Jaliscan birds. Recently van Rossem, who previously had discussed the probable characters of the northwestern bird (Bull. Mus. Comp. Zool., Vol. LXXVII, p. 469, 1934) described a new form *V. s. palliata, not* from northwestern Mexico, but from the southwestern state of Guerrero (Proc. Zool. Soc. Wash., Vol. 52, pp. 11–12), differentiating it from *mexicana* by "paler coloration" and adding an additional character—the more restricted "yellow abdominal area." I have inspected apparently the same material, and in addition a large series of seventy-nine individuals in the Moore

Collection, all freshly taken during the past few years from nearly all portions of Mexico, nearly doubling the total available to van Rossem and filling the large gaps, from which specimens were unknown. This fine series reveals that the ancient specimens in the British Museum, collected about fifty years ago, like those in the museums of eastern United States, are badly and unevenly faded, obscuring the important character of the amount of intensity of the yellow patch on the back, as well as the relative degrees of paleness, as we proceed from the northwestern Sierras south. Being careful to compare birds of the same months and equivalent amount of wear, we find the new race exhibits its characters best in the northern part of its range throughout southwestern Chihuahua, northwestern Durango and northeastern Sinaloa. Farther south in Durango we find an occasional specimen, where the gray of the pileum is darker and approaches the coloration of *mexicana*. This is true of the lower elevation groups, such as a series from Rancho Guasimal at 5500 feet elevation from central-western Durango. However, they have the whiter abdomens of *sodalis* and are nearer to it in size and brighter yellow coloration of back. This species occasionally gets its under parts badly soiled as is true of several from Santa Gertrudis in extreme northeastern Sinaloa. The soot can readily be detected with a microscope and may result from the frequenting of pine trees scorched by forest fires. However, two specimens from this locality have pure white unsoiled abdomens. Much farther south at Nievero at an altitude of 8000 feet in western Durango, the birds are larger in size, but still closer in coloration to *sodalis*, as are those of Piedra Gorda, Durango (7000 feet) and Rancho Batel, Sinaloa (6200 feet). The individuals from Tepic, Nayarit, although slightly intermediate, are also closer to *sodalis*. My series from Tapalpa, in west-central Jalisco, represent intermediates between *mexicana* of eastern Mexico and *sodalis*. Miller and Griscom (loc. cit.) found the size of the western bird smaller. Measurements of my series confirm this, but the extremes overlap and the differences are not great. I have not measured specimens in other collections. Zimmer (Field Mus. Nat. Hist., Zool. Ser., XVI, pp. 68–69, 122, 1926) and Hellmayr (Field Mus. Nat. Hist., Pub. 347, Zool. Ser., XII, Part VIII, p. 346, footnote) expressed their belief that Bonaparte's account appear to have priority over Cabanis' description in the "Museum Heineanum." It is assumed that Bonaparte's type came from eastern Mexico, presumably from Veracruz. As my specimens from five widely separated localities (El Venerable in extreme northwestern Puebla; Desierto de Leones; District Federal; San Bartolo and Temascaltepec in the State of Mexico; and Xichu in extreme northeastern Guanajuato) are all the same, it seems reasonably certain they represent *V. s. mexicana*, whether Bonaparte's or Cabanis' type is recognized.

This bird is a rather common warbler of the higher Sierra Madres. None of our specimens come from an altitude lower than 6000 feet and it nests on Mount Mohinora in extreme southwestern Chihuahua at the 10,000 foot level. Although Mr. Lamb found it at Santa Gertrudis, close to the border of Sonora in northeastern Sinaloa, I have not taken it on any of our expeditions to that state, nor does it seem to have been recorded by any one else.

It does not seem to visit the arid coastal plains of Sonora or Sinaloa. From the latter state it has not been recorded previously.

Cistothorus platensis tinnulus, subsp. nov.

Type.—Male breeding adult; No. 23743, collection of Robert T. Moore; Rancho La Cofradia, 4 miles east of Uruapan, W. Michoacan, Mexico; altitude about 5200 feet; July 2, 1939; collected by Chester C. Lamb.

Subspecific characters.—Nearest to *Cistothorus platensis elegans* of Guatemala, but differs in having the pileum paler and more rufous; rump brighter cinnamon and immaculate; median rectrices much paler; pale bars of outer rectrices much more cinnamon; size larger. It differs even more in the same characters from the geographically closer birds of Chiapas, generally recognized as *elegans*, which are darker on the pileum and tail than either. Although resembling the birds of Veracruz, also currently recognized as *elegans*, in the bright cinnamon rump, it lacks their generally obscure streakings and is also a very much paler bird on pileum and tail and much larger.

It differs, of course, even more from *stellaris* of eastern United States, lacking the heavy streakings on the rump, which is much brighter (cinnamon), while the pileum is much paler.

Range.—Known only from western Michoacan, the type locality.

Specimens examined.—Tinnulus—Michoacan: Rancho La Cofradia 1 ♂ (July 2 Type). *Elegans*—Guatemala: San Antonio 1 ♂ (May 23); Nicaragua: near San Rafael del Norte 1 ♂ (Apr. 5); Chiapas: Juncaná 2 ♂ 1 ♀ (Sept. 4–Oct. 7); Veracruz: Jalapa 3 ♂ (Apr. 9–15), Orizaba 1 ♂ 1 ♀ (?). *Stellaris*—United States: large series in American Museum Natural History.

Remarks.—Although the type is unique, it is so obviously paler and larger than any of its congeners, that I do not hesitate to describe it. The sex organs were marked by the collector as fully developed and this and the date would indicate it as a true breeding bird. Accretions to the Moore collection are three recently-taken specimens from Chiapas, Mexico, which are close in coloration and size to the Guatemalan bird, true *C. p. elegans*. Whereas the Veracruz series is slightly smaller than Guatemalan birds, the Michoacan type is markedly larger.

Average Measurements in Millimeters of *Cistothorus p. tinnulus and C. p. elegans.*

Males	wing
Type (Michoacan)—*tinnulus*	47.7
4 ads. (Veracruz)—*elegans*	42.6 (41.8–43.8)
4 ads. (Chiapas to Nicaragua)—*elegans*	44.2 (43.4–44.9)

Salpinctes obsoletus sollicitus, subsp. nov.

Type.—Female adult in fresh winter plumage, No. 20996, collection of Robert T. Moore; Juncaná, Comitán, Chiapas, Mexico; altitude reported by collector as 1400 meters; September 15, 1937; collected by Mario del Toro Avilés.

Subspecific characters.—Differs from all of the three forms nearest to it geographically, *S. o. neglectus* of Guatemala, *o. notius* of eastern and southern Mexico and *o. obsoletus* of northwestern Mexico and the United States, in having the upper parts pure gray (less brownish); white spots on posterior upper parts much larger and more numerous; spots on pileum more numerous and whiter; spots below fewer and finer than the least spotted of the Guatemalan variables, resembling in this respect the more immaculate individuals of true *obsoletus*.

Range.—Chiapas (Juncaná).

Specimens examined.—*S. o. obsoletus*—large series in Museum of Comparative Zoology and American Museum of Natural History, ranging from Colorado through Arizona, California, Chihuahua, to Jalisco and Volcan de Colima. *Notius*—adequate series in the same museums, ranging from Veracruz to Guerrero. *Neglectus*—very large series in the same museums from Guatemala. In addition, the following in Moore collection: *Obsoletus obsoletus*—Mexico: Sonora: Guirocoba 1 ♂ (Jan. 20); Sinaloa: Los Leones 1 ? (Mar. 27), Surutato 1 ♂ 2 Im. ♂ 2 Im. ♀ (July 17, Sept. 7–13); Durango: Ojito 1 ♂ 2 Im. ♂ (Aug. 19–24). *Notius*—Guanajuato: 6 mi. N. E. Irapuato 1 ♀ (Mar. 23), Rancho Enmedio, 17 mi. N. E. Guanajuato 1 ♀ (Jan. 24), Puerto de Guadalupe 4 ♂ 2 ♀ (May 12–24 breeding); Hidalgo: Portezuelo 3 ♂ (Dec. 14–18); District Federal: Tlalpan (=Tlalpam) 2 ♂ 1 ♀ (June 21, Feb. 15, Aug. 17); Morelos: Ocotopec 1 ♂ 1 ♀ (June 19). *Sollicitus*—Chiapas: Comitán: Juncaná 2 ♀ (Sept. 15–17, includ. Type).

Remarks.—The under parts of the new form are intermediate, connecting *S. o. obsoletus* and *S. o. notius* of northwestern and eastern Mexico with *S. o. neglectus* of Guatemala, having faint spots, connected by faint streaks on under parts, but neither so heavily streaked as true *obsoletus* or *notius*, nor so heavily spotted as *neglectus*. The coloration on the upper parts is not intermediate, but a distinctly purer gray than any of these three races. Of the specimens in the eastern museums, I have used for criteria the following adults: *Obsoletus*—3 (Sept.) Ogden, Utah; 1 (Oct. 13) Toquerville, Utah; 1 (Sept.) 2 (Oct.) California; 1 (Oct. 17) Tucson, Arizona; 4 (Sept.–Oct. 8–17) Chihuahua. *Notius*—1 (Nov. 10) Guerrero. Of *neglectus* there were also available 6 (Nov. and Dec.) San Lucas, Guatemala. I have not seen the individual recorded from Cacoprieto, Tehuantepec, on the authority of Sumichrast by Salvin and Godman (Biologia Centrali-Americana, Aves, I, p. 71). The individual from the same place mentioned by Bangs and Peters (Bull. Mus. Comp. Zool., Vol. LXVIII, No. 8, p. 399) is so badly abraided it can not be determined absolutely, but has faint spots on the belly, seeming to be slightly intermediate, but closer to *notius*.

Griscom (Bull. Mus. Comp. Zool., Vol. 75, No. 10, p. 395) reiterates a previously made statement (Bull. Amer. Mus. Nat. Hist., Vol. LXIV, p. 297) that he can not recognize *S. o. notius* Ridgway of Veracruz. Two recently-taken immatures, secured June 19, 1935, at Ocotepec, Morelos, and a June 1, 1931, specimen in the Museum of Comparative Zoology, collected at Chilpancingo, Guerrero, are identical, contrasting strongly with a series of immatures from Colorado (2), Chihuahua (2), Arizona (4),

Jalisco (2) and showing exactly the characters claimed by Ridgway (Birds North & Mid. Amer., pt. III, pp. 648–649), which he stated could be observed only in the immatures.

Ridgway includes Jalisco in the range of *notius*. But two young from Jalisco in the American Museum of Natural History are like those of true *obsoletus*, being paler, more snuff-gray on the median rectrices; and an immature from Guerrero in the Museum of Comparative Zoology is exactly like my two from Morelos, indicating the range of *notius* extends through Jalisco to Guerrero. Unfortunately there seem to be no immatures from Chiapas. Lacking immatures from Guanajuato and following the usual affinities of plastic races I assign birds of eastern Guanajuato to *notius*. This is not the place to discuss the possibility of the priority of *Troglodytes latifasciatus* Lichtenstein over Ridgway's *S. o. notius*.

I am greatly indebted to Mr. James L. Peters and the Museum of Comparative Zoology, to Mr. John T. Zimmer and the American Museum of Natural History, to Dr. Alexander Wetmore, Dr. Herbert Friedmann and the United States National Museum, to Dr. Harry C. Oberholser and the Biological Survey, to Mr. N. B. Kinnear and the British Museum, to Mr. George Willett and the Los Angeles Museum, and to Dr. Louis B. Bishop for permission to inspect material in their respective collections.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NEW SPECIES, NAMES, AND COMBINATIONS OF GRASSES.

BY JASON R. SWALLEN.

Recent studies on grasses have made necessary the new names and species contained in this paper.

Panicum lithophilum Swallen, sp. nov.

Annuum; culmi 10 to 30 cm. alti, erecti, ramosi, glabri vel sparse hispidi; vaginae papilloso-hispidae pilis adscendentibus; ligula ciliata, 1 mm. longa; laminae 6 to 8 cm. longae, 2 to 4 mm. latae, erectae, purpureae, papilloso-hispidae, marginibus scabris; paniculae erectae, 7 to 15 cm. longae, pauciflorae, ramis solitariis late adscendentibus, infimis usque ad 10 cm. longis; pulvini glabri vel sparse pilosi; spiculae 2.1 to 2.2 mm. longae, appressae, solitariae vel binae ad apices ramulorum; gluma prima 0.6 to 0.8 mm. longa, obtusa; gluma secunda et lemma sterile aequalia, acuta, glabra; fructus 1.6 mm. longus, fuscus, lucidus.

Annual; culms 10 to 30 cm. tall, erect, in small tufts, glabrous or sparsely hispid, branching at the lower nodes; sheaths about as long as or a little shorter than the internodes, papillose-hispid with ascending hairs; ligule ciliate, 1 mm. long; blades 6 to 8 cm. long, 2 to 4 mm. wide, erect, rather conspicuously tinged with purple, papillose-hispid especially toward the base, the margins scabrous; panicles erect, the primary ones 7 to 15 cm. long, the branches solitary, rather distant, stiffly but widely ascending, the lowermost as much as 10 cm. long; pulvini glabrous or sparsely pilose; spikelets 2.1 to 2.2 mm. long, short-pedicellate, appressed, solitary or usually paired toward the ends of the stiffly spreading branchlets; first glume 0.6 to 0.8 mm. long, rounded, obtuse, or very broadly acute, clasping; second glume and sterile lemma equal, acute, pointed beyond the fruit, rather strongly nerved; fruit 1.6 mm. long, blackish-brown at maturity, smooth and shining, the nerves white.

Type in the U. S. National Herbarium no. 932898, collected on rocky slope, Stone Mountain, Georgia, August 23, 1905, by A. S. Hitchcock (Amer. Gr. Nat. Herb. no. 24).

In the revision of Panicum by Hitchcock and Chase,[1] two specimens

[1] Contrib. U. S. Nat. Herb. 15 : 59. 1910.

(Hitchcock no. 439 and Harper no. 184) of this species from Stone Mountain were cited under P. philadelphicum Bernh. Since then, additional material from Stone Mountain and also from granite outcrops near Eatonton, Putnam County, has been collected. These plants are so uniform in their characters that it is much better to consider them as a distinct species. The stiffer panicles with larger spikelets arranged in pairs at the ends of the branchlets and the shorter, narrower, erect, purple blades distinguish it from P. philadelphicum.

So far as known, this species is confined to granite outcrops of Georgia. The specimens examined are: Dekalb County: Stone Mountain, Hitchcock 439 (Amer. Gr. Nat. Herb. no. 24); Harper 184. Putnam County: Eatonton, McVaugh 5164.

Chrysochloa Swallen, nom. nov.

Bracteola Swallen, Amer. Journ. Bot. 20 : 118–120. 1933.

Some time ago the author described a new genus of African grasses, naming it Bracteola. According to the International Rules of Botanical Nomenclature, Article 67, the name is illegitimate because it "coincides with a technical term currently used in morphology . . ." The name was used because in Latin it means a small plate of gold, in this case, alluding to the golden shining glumes of the spikelets. Chrysochloa, from the Greek, chrysos, gold, and chloe, grass, has therefore been selected to take the place of Bracteola.

C. lucida (*Swallen*) *Swallen,* comb. nov.

Bracteola lucida Swallen, Amer. Journ. Bot. 20 : 118. 1933.

C. subaequigluma (*Rendle*) *Swallen,* comb. nov.

Chloris subaequigluma Rendle, Cat. Afr. Pl. Welwitsch 2 : 222. 1899.
Bracteola subaequigluma Hubbard, Kew Bull. Misc. Inf. 1934 : 117. 1934.

C. orientalis (*Hubbard*) *Swallen,* comb. nov.

Bracteola orientalis Hubbard, Kew Bull. Misc. Inf. 1934 : 117. 1934.

Hesperochloa (*Piper*) *Rybd.*[2]

This monotypic genus has been referred at various times to both Poa and Festuca. It was first described as a subgenus of Festuca by Piper,[3] based on Poa kingii S. Wats., but later was raised to generic rank by Rydberg. In recent years it has been retained in Festuca (F. confinis Vasey; F. kingii Cassidy), although the characters are not those of this genus. As pointed out by Rydberg, the stigmas are hispidulous all around, while in both Festuca and Poa they are plumose, that is, hispidulous only on two sides. Further, no species of Festuca is known to be dioecious, a fact which in itself is of considerable significance. The coarseness of the plants is also unlike species of Poa and the blades do not have boat-shaped tips, a character which is universal in that genus. Considering the doubtful

[2] Bull. Torrey Bot. Club 39 : 106. 1912.
[3] Contrib. U. S. Nat. Herb. 10 : 10, 40. 1906.

affinities of this grass with Festuca and Poa, it is much better to consider it as a distinct genus rather than an anomalous species of either of these genera.

During the past summer, the author had the opportunity of seeing and studying this grass in the field during the height of its flowering period. Its appearance is very striking and distinctive. The staminate and pistillate plants could easily be distinguished at a distance, the former having larger, more open panicles of usually larger spikelets, and the latter a narrow, rather compact panicle of smaller spikelets. This difference is not so apparent in plants growing at high altitudes. The size of the spikelets and the relative length of the glumes, however, are highly variable in both the staminate and pistillate plants.

There is a little known form which differs from the typical species in having involute blades and short-awned lemmas:

Hesperochloa kingii var. *rabiosa* (*Piper*) *Swallen*, comb. nov.

Festuca confinis rabiosa Piper, Contrib. U. S. Nat. Herb. 10 : 41. 1906.
Festuca kingii var. rabiosa Hitchc. Amer. Journ. Bot. 21 : 128. 1934.

Bromus purgans var. *laeviglumis* (*Scribn.*) *Swallen*, comb. nov.

Bromus ciliatus var. laeviglumis Scribn. in Shear, U. S. Dept. Agr., Div. Agrost. Bull. 23 : 32. 1900.
Bromus purgans forma glabriflorus Wiegand, Rhodora 24 : 92. 1922.
Bromus laeviglumis Hitchc., Biol. Soc. Wash. Proc. 41 : 157. 1928.

A study of the type specimen of this variety shows very clearly that the relationship is with B. purgans L. rather than B. ciliatus L. The first glume of the former is broad near the base but is rather abruptly narrowed from near the middle to an acuminate or subattenuate apex. On the other hand, the first glume of B. ciliatus is gradually narrowed from the base to an acute or rarely subacuminate apex. The florets in the spikelets of B. purgans are also more imbricate, the spikelets therefore appearing narrower and more rounded than those of B. ciliatus. The pubescence on the lemmas of B. purgans is more variable, less conspicuous, and without pattern, which would tend to indicate the greater possibility of a glabrous form of this species than of B. ciliatus. No specimen has been seen with entirely glabrous or even sparingly pubescent lemmas which could be referred definitely to B. ciliatus.

Agrostis scabra var. *geminata* (Trin.) Swallen, comb. nov.

Agrostis geminata Trin., Gram. Unifl. 207. 1824.
Agrostis hiemalis var. geminata Hitchc., U. S. Dept. Agr., Bur. Plant Indus. Bulll. 68 : 44. 1905.

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PROCEEDINGS

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A NEW SPECIES OF *XENOSAURUS* FROM GUATEMALA.

BY L. C. STUART.

Early in 1940, while completing my investigations upon the herpetofauna of the Alta Verapaz which were sponsored by the University of Michigan in cooperation with the Carnegie Institution of Washington, I secured a specimen of the saurian genus *Xenosaurus* Peters. As might be expected of an individual taken some 500 miles beyond the known range of the genus, examination showed that it represents an undescribed species. I take pleasure in dedicating this new form to the memory of Mr. Horace H. Rackham, whose bequests made possible the endowment for research in the University of Michigan, from which has come the support for my investigations in Guatemala. The species may be known as

Xenosaurus rackhami, sp. nov.

Type.—Museum of Zoology, University of Michigan, No. 89072. An adult male collected by L. C. Stuart at Finca Volcán (49 kilometers due east of Cobán), Alta Verapaz, Guatemala, at an altitude of about 4000 feet, on March 27, 1940.

Diagnosis.—Differing from *Xenosaurus grandis* (Gray) in possessing smaller gular scales, fewer longitudinal rows of abdominal scutes, less conspicuous lateral folds, and lower and broader auricular tubercles.

Description.—Head subtriangular, the snout covered above with conical scales. Three rows of slightly-differentiated interorbital scutes, and three transversely-elongated, supraorbital scales surrounded by minute conical granules. Scales on back of head irregular and much flatter than those of the snout; pineal scute undifferentiated. On either side of the head a row of large flat scales extending from the orbit to the back of the head. Nostril in a single nasal. Supralabials 9/11, separated by a row of scales from the suboculars; infralabials, 9. Scales of temporal region large and subconical, interspersed with numerous granular scales. A row of enlarged subconical scutes along the anterior border of the tympanic depression. Gular scales small, in about 30 irregular rows from the anterior gular fold to the post-mental. Two prominent gular folds.

The body covered dorsally with enlarged, slightly-projecting ovoid scutes interspersed among many, small, granule-like scales and tending to be arranged in longitudinal series mid-dorsally. A trace of a dermal fold ventro-laterally extending from axilla to groin. The belly covered with flat, squarish scales arranged in about 32 transverse rows from axilla to groin. The limbs covered dorsally with numerous, enlarged, subconical scutes among which are interspersed small granular scales, and ventrally with convex, plate-like scales. Scales of the tail similar to those of the belly and arranged in whorls. Digits long and slender, compressed, and swollen at the articulations. The measurements are total length, 222 mm.; head length, 27 mm.; head width, 23 mm.; body length, 83 mm.; tail length, 112 mm.; fore leg, 24 mm.; fore foot, 20 mm.; hind leg, 35 mm.; hind foot, 27 mm.

The ground color dorsally, light brown. A few black mottlings on the surface of the head and a dark streak extending along the enlarged scutes between the orbit and the back of the head. Dorsally on body, five white bars bordered posteriorly and anteriorly with black, and intervening ground color mottled with black. Limbs showing irregular white and black bars or dark and light mottlings. Tail banded with black and white with traces of the brown ground color breaking up the black bands. Undersurfaces white, the belly spotted with black and brown.

Relationships.—Whether this new form will eventually be shown to be a subspecies of *grandis* awaits exploration of the highlands of Chiapas and northwestern Guatemala. Certainly the two are very close, but their differences, though slight, are distinct. Compared with a series of almost topotypic *grandis* the most prominent feature of separation lies in the size of the gular scales. In *grandis* these average about 37, as compared with 30 in *rackhami*. Though this is numerically a slight difference, a visual comparison of the two is most striking. The number of rows of abdominal scutes is less evident and a large series of *rackhami* might indicate an overlapping of this character. The range is 34–39 in *grandis*, while *rackhami* has but 32. The prominence of the lateral folds may be the result of differences in preservation. Another character of separation is the form of the enlarged tubercles not only along the anterior temporal border but over the entire body. In *grandis* these are relatively high and narrow, in *rackhami* low and broad. On the upper surface of the fore-arms the broader tubercles almost obliterate the intervening granules in *rackhami*, whereas in *grandis* the granules are far more abundant owing to the narrow bases of the tubercles. Certainly the above differences are such that subspecificity may eventually be proven.

Habits.—Nothing is known of the habits of this form. It was collected on the ground in an abandoned *cafetal* at the base of the cloud forest and under conditions identical to those occurring in the cloud forest proper a thousand feet higher. This would indicate that the form is a cloud forest inhabitant, occupying a similar habitat at a lower level rather than a lowland form at the upper level of its range. It was repeatedly observed in the Alta Verapaz that the boundary between lowland and highland types corresponded roughly with the 4000 foot contour.

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DESCRIPTIONS OF TWO NEW RACES OF BIRDS FROM SOUTH CHINA.

BY THE MARQUESS HACHISUKA, PH. D.

During the early summer of 1940 I had the opportunity of visiting Nanning, the capital of Kwangsi, in southwest China. Nanning has a local natural history museum which exhibits about a hundred specimens of birds collected in that province. As observed both from airplane and car the major part of the ground in this province is well cultivated. Although most of the hills are denuded of trees the interior mountains still preserve their original forest. In these regions avifauna is rich, and many Burmese, Tonkinese and Yunnanese species occur which are unknown in the well explored Fukien and Kwangtung areas. The dates and localities written on Chinese labels attached to the Nanning collection are in most cases brief but a majority of them seem to have been collected at Yaoshan, a very interesting mountain where Prof. Yen obtained many novelties.[1]

A portion of the collection was brought back to Japan, and as a result of my careful examination the following two races are here proposed.

Rhipidura albicollis nigritinctus, subsp. nov.

Type.—Adult, unsexed, in Hachisuka Collection, Tokyo; Kwangsi Province, probably Yaoshan, N. E. of Nanning, 1938.

Subspecific characters.—The present race differs from *R. a. albicollis* in having the sooty-brown of the typical race replaced by a much darker colour. A short but broad superciliary stripe; throat feathers, except the base, and large portion of the tips of rectrices (except the median pair), pure white. The remainder of the body is pure black except that the back and rump are slightly lighter. Wing-coverts and wings are deep sooty-brown but darker than the typical race.

[1] Stresemann, *Journ. fur. Orn.*, LXXVII, Heft 2, 323–337, 1929. Yen Kwok Yung, Bull. of the Dept. of Biol., No. 5, Birds from Yaoshan, Kwangsi, Canton, 1930.

Measurements.—Wing, 72; tail, 101; bill, 11; tarsus, 20.

Range.—So far only known from mountains of Kwangsi Province, S. W. China.

Remarks.—Some members of *Rhipidura* are open country birds and familiar with human habitation while others are confined to high mountain forest. The present species has the habitat of the latter and is not common where found. Yen is the only ornithologist who previously collected this species, an adult male in Loshiang, in Yaoshan range, in April, 1929. Therefore, it must be an exceedingly rare bird. This is the second record of genus *Rhipidura* from China.

Siva cyanouroptera yaoshanica, subsp. nov.

Type.—Adult, unsexed, in Hachisuka Collection, Tokyo; Kwangsi Province, most probably Yaoshan, N. E. of Nanning, 1938.

Subspecific characters.—The present race is closely related to *S. c. wingatei* but the back, rump and wing-coverts are more earthy-brown and have no shade of olive. The crown is conspicuously streaked like *wingatei* but the general shade of head and nape is more indigo blue than either *wingatei* or typical *cyanouroptera.* Wing quills have no white tips; under part of the body is more soiled vinous-grey, particularly on the flanks.

Measurements.—Wing, 65; tail, 67; bill, 14; tarsus, 25 mm.

Range.—So far only known from mountains of Kwangsi Province, S. W. China.

Remarks.—Genus *Siva* is now recorded for the first time from Chima.

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DESCRIPTION OF A NEW SPECIES OF BIRD FROM THE PHILIPPINE ISLANDS.

BY THE MARQUESS HACHISUKA, PH. D.

There is a large cocoanut plantation known as Atong Atong Estate facing a beautiful sandy beach situated in the San Raphael Bay at the northwestern corner of the island of Basilan. This estate is only a short distance from Isabela where Dr. Steere and other well-known ornithologists made collections, and which has become one of the best known type localities for the Philippine birds.

Dr. Shinjiro Yamamura, managing director of the estate, is much interested in natural history and with his son and daughter made extensive collections of birds, fishes, insects, shells, and corals. The finest collection was gathered from May, 1925, to April, 1926, chiefly through the activity of Miss Yaeko Yamamura, who is a qualified field naturalist.

The Yamamura's collection of birds have been presented to and worked out by Dr. Kuroda, and the results were published in Tori, 1927. This paper enumerates twenty-three species of birds newly added to the list of Basilan avifauna and one race of oriole then newly described. Miss Yamamura kept a few mounted beautiful birds for herself, but those she turned over to me thinking they might be helpful in the preparation of my book, "The Birds of the Philippine Islands." As these mounted birds bore no adequate labels I put them aside and paid no attention to them until recently. The specimen of sunbird here described as a new species was among them. Because of its extraordinary colour pattern, it has been relaxed and carefully examined by Mr. Otsuka, taxidermist of the Bureau of Agriculture, to determine whether it is composed entirely of one individual bird or whether some other beautiful feathers or skins were put together, because it was mounted for ornamental purposes by a commercial taxi-

dermist. The result was that all the feathers proved to belong to one individual bird. The specimen was further x-rayed at the St. Luke International Hospital and the result was also satisfactory in support of Mr. Otsuka's view. The Marquis Kuroda, who examined the specimen, also came to the same conclusion that the specimen proves to be an undescribed species of *Nectariniidae.*

Cinnyris[1] picta, sp. nov.

Type.—Male, only specimen, in Hachisuka Collection, Tokyo; Atong Atong plantation, N. W. Basilan, May, 1925–April,, 1926; collected by Miss Yaeko Yamamura.

Specific Characters.—

Structure: Bill and head about equal (18 mm.) like *Æthopyga* and *Cinnyris;* tail shorter than length of wing, rounded and slightly graduated, 10 tail-feathers (only 8 present and others missing), each feather wide and not narrow like *Æthopyga.* Like *Æthopyga* nasal operculum naked, not covered with short feathers.

Colour pattern: Rump is not yellow like *Æthopyga,* nor has loose yellow feathers like *Eudrepanis.* Having metallic coloured chin, throat, and forebreast it must be considered as a member of *Cinnyris* in this respect. Upper surface is olive, the characteristic of *Cinnyris,* but in addition the back is brilliantly metallic.

Description of plumage: Upper part of the body yellowish olive like *C. frenatus* except the back where feathers are metallic green and are loose at the tips. A few feathers, apparently in fresh condition, are bottle green but the majority have metallic bronze wash when the light is behind the observer. Superciliary stripe and a line from lores to malar region lemon-yellow, darker in the former and paler in the latter; chin, throat and upper breast metallic violet and with a purple sheen like *C. frenatus;* lower breast and flanks poppy-red, and long feathers cover over abdomen. The abdominal feathers and under tail-coverts are light straw yellow; wing earthy brown; tail black with large portion of tip white, merely indicated on the two central pairs.

Bill black; legs, in dry skin, dark flesh colour.

First primary short, 3d, 4th and 5th about equal and longest. (In *Æthopyga* 1st short, 3d, 4th, 5th and 6th about equal.)

Measurements.—Wing, 56; tail, 56; bill, 17; tarsus, 16.

Range.—So far only known from type locality.

Remarks.—Only Cinnyrine species somewhat resembling this are the yellow-vented, olive-backed, *jugularis, sericea,* and *frenatus* group but the new species is distinctly different by having red under-parts instead of yellow, and the back metallic green instead of yellowish olive. Although yellow and red under-parts are obviously different I have good reason to believe that they are not systematically distant. The much smaller Philippine species, *C. s. sperata,* found on 24 islands, has poppy-red under-parts while *C. s. juliae,* of much restricted range (only five islands) has

[1] If one refuses to use *Cinnyris* for the Asiatic birds *Leptocoma* will have to be applied.

yellow under-parts. These two sunbirds are found on geographically different islands except Mindanao. My expedition collected a series of about forty skins from south Mindanao and found the majority to be of the red type while a few are intermediate with *juliae* type mixed with abundant red feathers on yellow breast. After discovering this fact I consider *juliae* and *sperata* conspecific and recognize that an intermediate series occur at certain portions of Mindanao. Members of *Cinnyris* found in Basilan are one large *C. j. jugularis* and one small *C. sperata juliae*, both yellow breasted. Therefore, the discovery of this large red breasted third species is truly astonishing. These three species have been collected at Atong Atong plantation where cocoanuts are extensively grown. The unique type has not been anatomically sexed but in view of the strong sex dimorphism existing among members of the present family the specimen is considered as male.

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NEW HETEROMYID RODENTS FROM NEVADA.

BY E. RAYMOND HALL,

Museum of Vertebrate Zoology, University of California, Berkeley, California.

In preparing an account of the mammals of Nevada, six heretofore unrecognized geographic races of species belonging to the Family Heteromyidae have been found. Names and descriptions for these are provided below.

Perognathus longimembris gulosus, new subspecies.

Type.—Female, adult, skin with skull, no. 78764, Mus. Vert. Zool.; near [¼ mi. S.] Smith Creek Cave, 5800 feet, Mount Moriah, White Pine County, Nevada; June 4, 1937; collected by Lee W. Arnold; original no. 259.

Range.—Known from western margin of the basin of the Pleistocene Lake Bonneville in eastern Nevada and western Utah.

Diagnosis.—Size medium for the species; upper parts Pinkish Buff (capitalized color terms after Ridgway, 1912), overlain with dark brownish and blackish; underparts with hair white all the way to base; tail bicolored, dusky above; skull broad across mastoids but mastoidal bullae of moderate length; maxillary tooth row short.

Comparisons.—From *P. l. nevadensis*, this form differs in having the hair of the underparts pure white all the way to the base rather than plumbeous basally and tipped with buffy. From *P. l. arizonensis*, *gulosus* differs in much paler (more grayish, less reddish) sides and upper parts. From *P. l. virginis*, *gulosus* differs in lighter (less blackish and less reddish) upper parts and sides and in smaller skull, especially the smaller mastoidal bullae. From *P. l. panamintinus*, *gulosus* differs in less ochraceous sides and shorter upper tooth rows.

Measurements.—Average and extreme measurements of 5 adult females from the vicinity of the type locality are: Total length, 132 (125–137); length of tail, 72 (70–74); length of hind foot, 17.8 (17–19); weight in grams, 7.5 (6.1–8.9); occipitonasal length, 21.1 (21.0–21.2); frontonasal length, 14.4 (14.0–14.6); mastoidal breadth, 12.5 (12.3–12.6); length of bulla (from posteriormost part to anteriormost part lateral to zygomatic arch), 8.2 (8.1–8.3); interorbital breadth, 5.2 (5.1–5.3); alveolar length of upper molariform tooth row, 3.0 (2.9–3.1).

Remarks.—Among named races, *gulosus* most closely resembles *P. l. panamintinus.* The only differences, so far as I can see, are the Pinkish Buff rather than Light Ochraceous Buff color, less extensive area of "reddish" color on sides, and shorter tooth row. The ranges of the two forms are not known to meet, apparently being separated by the ranges of *P. l. nevadensis* and *P. l. virginis;* the range of *nevadensis* in central Nevada extends southward to southern Lander County and the range of *virginis* in southeastern Nevada extends northwest through Lincoln County into Nye County.

Specimens examined.—Total number, 26, as follows: **Nevada:** *Elko Co.:* 13 mi. N. Montello, 5000 ft., 3; 8 mi. S. Wendover, 4700 ft., 12. *White Pine Co.:* near [¼ mi. S.] Smith Creek Cave, Mt. Moriah, 5800 ft., 2; 1 mi. S. E. Smith Creek Cave, Mt. Moriah, 5800 ft., 1; 2 mi. E. Smith Creek Cave, Mt. Moriah, 5600 ft., 3; 4 mi. E. Smith Creek Cave, 1. **Utah:** *Box Elder Co.:* Kelton, 4225 ft., 1. *Millard Co.:* 5 mi. S. Garrison, 5400 ft., 2.

Perognathus formosus incolatus, new subspecies.

Type.—Female, adult, skin with skull, no. 78855, Mus. Vert. Zool.; 2 mi. W. Smith Creek Cave, 6300 ft., Mt. Moriah, White Pine County, Nevada; June 18, 1937; collected by Lee W. Arnold; original no. 360.

Range.—Known only from the type locality but judged to occur in suitable habitat over much of the basin of the Pleistocene Lake Bonneville.

Diagnosis.—Size medium; color grayish and pale, the upper parts a mixture of white, light buffy and reduced amount of blackish; sides with buffy markings faintly indicated; hind feet and underparts white; tail bicolored, buffy below and colored like upper parts above; skull with large tympanic bullae, maxillary arms of zygomata inclined posteriorly and width across zygomatic arches less anteriorly than posteriorly.

Comparisons.—From *P. f. formosus,* this race differs in lighter color and in the shape of the interparietal which has the anterior border more nearly straight; in *formosus* the suture between the interparietal and the parietals has the form of an open, inverted V. From *P. f. mohavensis, incolatus* differs in the same way as from *formosus* but the difference in color is less.

Measurements.—Average and extreme measurements, of 4 adult females, are: Total length, 185 (177–190); length of tail, 102 (97–106); length of hind foot, 22.8 (22–23); weight in grams, 18.9 (16.8–21.5); occipitonasal length, 26.8 (26.0–27.3); frontonasal length, 18.1 (17.7–18.3); mastoidal breadth, 13.9 (13.7–14.4); length of bulla, 8.9 (8.8–9.1); interorbital breadth, 6.7 (6.4–6.9); alveolar length of upper molariform tooth row, 3.7 (3.7–3.7).

Remarks.—The taking of the specimens here recorded was the first evidence, that I know of, showing that this species ranges northward into the basin of the Pleistocene Lake Bonneville. Like races of other species from this area, the pallor of the coloration is noteworthy.

Specimens examined.—Total number, 5, all from Nevada, as follows: *White Pine Co.:* 2 mi. W. Smith Creek Cave, 6300 ft., Mount Moriah, 6300 ft., 2; near Smith Creek Cave, 5800 ft., Mount Moriah, 3.

Perognathus formosus melanurus, new subspecies.

Type.—Female, adult, skin with skull, no. 73442, Mus. Vert. Zool.; 40° 28′ N., 6 mi. E. California Boundary, 4000 ft., Washoe County, Nevada; July 7, 1936; collected by E. Raymond Hall; original no. 5070.

Range.—Smoke Creek Desert and vicinity: from S. W. Humboldt County, Nevada, south to Truckee River and from near Toulon, Pershing County, Nevada, west to vicinity of Stacy, eastern Lassen County, California.

Diagnosis.—Size large; color blackish over upper parts with faint tinge of buffy; underparts white, or buffy and white; hind feet buffy; tail black above, and below buffy or rarely with a black stripe; skull with small tympanic bullae, long frontonasal region, and widespread maxillary arms of zygomata causing jugals to be nearly parallel.

Comparisons.—From *P. f. mohavensis*, *melanurus* differs in larger size on the average, always in darker color of upper parts including dorsal tail stripe, and in smaller tympanic bullae. From *P. f. formosus* and *P. f. incolatus*, *melanurus* differs in the same way as from *mohavensis* although the color difference is less in comparison with *formosus* and more in comparison with *incolatus*. Furthermore, *formosus* and *incolatus* have the maxillary arm of each zygoma inclined more posteriorly, resulting in the zygomatic breadth being less anteriorly rather than about equal anteriorly and posteriorly as in *melanurus*.

Measurements.—Average and extreme measurements of 10 adult males and 11 adult females, from Washoe and Pershing counties, Nevada, are: Total length, ♂, 199 (187–211), ♀, 196 (185–211); length of tail, 107 (100–115), 108 (97–118); length of hind foot, 24.7 (23–26), 24.9 (23–26); weight in grams, 21.9 (19.8–24.7), 20.2 (19.2–23.3); occipitonasal length, 27.2 (26.5–28.2), 26.8 (25.5–27.3); frontonasal length, 18.8 (18.0–19.6), 18.5 (17.6–19.4); mastoidal breadth, 14.3 (13.9–14.7), 14.0 (13.4–14.7); length of bulla, 9.0 (8.7–9.3), 8.8 (8.6–9.0); interorbital breadth, 6.9 (6.7–7.4), 7.0 (6.6–7.5); alveolar length of upper molariform tooth row, 4.0 (3.6–4.3), 3.8 (3.7–4.0).

Remarks.—Although the species *formosus* inhabits principally the Lower Sonoran Life-zone, the range of *melanurus* lies entirely within the Upper Sonoran Life-zone, albeit within the lower part of this zone. This is where *Sarcobatus* and *Atriplex* predominate, in many places to the exclusion of the zonally higher *Artemisia tridentata*. Like several other mammalian species which live mainly in the Lower Sonoran Life-zone, *P. formosus* occurs farthest north here in the low country along the eastern base of the Sierra Nevada.

Intergradation with the race *mohavensis* is suggested by specimens from several localities in Mineral County, Nevada, which, although darker than the average for *mohavensis*, are referable to that subspecies. So far as known, mice of the species *Perognathus formosus* do not occur in central Nevada or in most of eastern Nevada; hence the range of *melanurus* probably does not meet that of *P. f. formosus* or *P. f. incolatus*.

Specimens examined.—Total number, 45, as follows: **California:** *Lassen*

Co.: 4½ mi. W. N. W. Stacy, 3; 3 mi. N. W. Warm Spring, 1. **Nevada:** *Washoe Co.:* 1 mi. N. E. Gerlach, 4000 ft., 2; 40° 28′ N., 6 mi. E. Calif. Boundary, 4000 ft., 8; 4 mi. N. W. Pahrum Peak, 4200 ft., 1; 2½ mi. E. Flanigan, 4250 ft., 4; 8 mi. E. Reno, 4500 ft., 1; N. side Truckee River, 10 and 11¾ mi. E. Reno, 4500 ft., 8. *Humboldt Co.:* 10½ mi. W. and 6 mi. N. Sulphur, 4000 ft., 1. *Pershing Co.:* 3 mi. S. W. Vernon, 4300 ft., 8; 30 mi. W. and 4 mi. N. Lovelock, 4300 ft., 1; 30 mi. W. and 3 mi. N. Lovelock, 4300 ft., 1; 3½ mi. N. E. Toulon, 3950 ft., 1; 1 to 3½ mi. W. Toulon, 4100 to 4500 ft., 5.

Dipodomys ordii inaquosus, new subspecies.

Type.—Male, adult, skin with skull, no. 73580, Mus. Vert. Zool.; 11 mi. E. and 1 mi. N. Jungo, 4200 ft., Humboldt County, Nevada; July 26, 1936; collected by Ward C. Russell; original no. 5026.

Range.—Southeastern Humboldt County and northern Lander County, Nevada.

Diagnosis.—Size large excepting tail, which is relatively short; color pale; upper parts Pinkish Buff, lightly marked with dusky; white supraorbital spots large; dark arietiform facial markings almost obsolete; skull large; nasals long.

Comparisons.—From *Dipodomys ordii columbianus* (Merriam), *inaquosus* differs in relatively shorter tail, markedly lighter color, large rather than small supraorbital white spots, and lighter and less extensive arietiform facial markings. From *Dipodomys ordii monoensis* (Grinnell), the one other race whose range meets that of *inaquosus*, it differs in larger size in all parts measured and lighter color.

Measurements.—Average and extreme measurements of 5 adult males, from 8 and 11 miles to the eastward of Jungo, are: Total length, 246 (233–261); length of tail, 136 (125–142); length of hind foot, 39.7 (38–41); basal length (measured from anterior face of incisor), 25.6 (25.2–26.0); length of nasal, 13.7 (13.2–14.1); greatest breadth, 24.0 (23.1–24.8); maxillary breadth, 20.2 (19.8–20.6); interorbital breadth, 11.8 (11.6–12.0).

Remarks.—The pallor of coloration in this race almost equals that of *Dipodomys ordii celeripes* of the Bonneville Basin in western Utah and extreme eastern Nevada. The relatively short tail of *inaquosus* is found also in the actually smaller race *monoensis* to the southward. *D. o. inaquosus* resembles *monoensis* also in that the dorsal outline of the skull is more convex in longitudinal axis than in *columbianus*. The convexity is less in most specimens than in *monoensis*.

Specimens examined.—Total number, 50, all from Nevada, as follows: *Humboldt Co.:* 7 mi. N. Winnemucca, 4400 ft., 4; 1 mi. N. Winnemucca, 4600 ft., 8; 5 mi. N. E. Golconda, 7; 1 mi. W. Golconda, 3; 3 to 5 mi. S. W. Winnemucca, 4500 to 4600 ft., 4; 8 mi. E. and 1 mi. N. Jungo, 4200 ft., 6; 11 mi. E. and 1 mi. N. Jungo, 4200 ft., 8; 10 mi. S. W. Winnemucca, 4500 ft., 1; 23 mi. N. W. Battle Mountain, 4. *Pershing Co.:* 15 mi. S. W. Winnemucca, 1. *Lander Co.:* Izenhood, 2; 3 mi. S. Izenhood, 2.

Microdipodops megacephalus sabulonis, new subspecies.

Type.—Male, adult, skin with skull, no. 49381, Mus. Vert. Zool.; 5 mi. S. E. Kawich Post Office, 5400 ft., Kawich Valley, Nye County, Nevada; September 27, 1931; collected by Robert T. Orr; original no. 384.

Range.—Sandy and gravelly soils from eastern Esmeralda County eastward across Nye County to western Lincoln County, Nevada.

Diagnosis.—Tail and hind foot short; upper parts brownish with much reddish; distal fourth to sixth of tail dark brown or black; supraorbital and postauricular patches light buffy; feet light gray; underparts white but plumbeous basally; skull narrow; auditory bullae relatively uninflated; incisive foramina widest posteriorly.

Comparisons.—From *Microdipodops megacephalus megacephalus*, this race differs in more reddish, less blackish, colored upper parts, white rather than buffy tipping of hairs of underparts, and wider skull as measured across the auditory bullae. From *M. p. albiventer*, *sabulonis* differs in larger average size of all parts measured except greatest breadth of skull, which is about the same, and maxillary breadth which is less. In *sabulonis* the tail is relatively longer, the upper parts are darker, the tail is more extensively tipped on the upper surface with black and the hair of the underparts is ordinarily plumbeous basally rather than white all the way to the base. Comparison with *M. p. ruficollaris* is made in the account of that race.

Measurements.—Average and extreme measurements of 4 adult males and 5 adult females from the type locality are: Total length, ♂, 153 (150–158), ♀, 155 (150–159); length of tail, 84 (81–86), 85 (81–88); length of hind foot, 24.6 (24–25), 23.6 (22.3–24.0); basal length (measured from anterior face of incisor), 18.1 (17.3–19.1), 18.3 (17.5–19.0); nasal length, 9.8 (9.5–10.1), 10.0 (9.7–10.3); greatest breadth, 18.9 (18.1–20.0), 19.0 (18.3–19.5); maxillary breadth, 11.6 (11.2–12.4), 11.8 (11.3–12.1); least interorbital breadth, 6.6 (6.3–6.8), 6.4 (6.1–6.8).

Remarks.—Intergradation with *M. m. megacephalus* to the northward is shown by several series of specimens referred to that race, as for example those from Ralston Valley, 5800 ft., 15½ miles northeast of Tonopah and some from Old Mill, north end Reveille Valley, 6200 ft., both places in Nye County.

Specimens examined.—Total number, 413, all from Nevada, as follows: *Esmeralda Co.:* 13½ mi. N. W. Goldfield, 4850 ft., 22. *Nye Co.:* 4 mi. S. E. Millett, 5500 ft., 17; 5 mi. S. E. Millett, 5500 ft., 4; 4 mi. S. Millett, 5500 ft., 5; 11½ to 13 mi. N. E. San Antonio, 5700 to 6700 ft., 26; 4¾ to 6 mi. N. E. San Antonio, 5640 to 5700 ft., 29; 17 mi. W. Sunnyside, White River Valley, 12; 9 mi. W. and 3 mi. S. Tybo, 6200 ft., 43; 15 to 16½ mi. W. S. W. Sunnyside, White River Valley, 5500 ft., 11; 14 to 15 mi. N. E. Sharp, Garden Valley, 23; 8½ mi. N. E. Sharp, Garden Valley, 28; 34 mi. E. and 1 mi. N. Tonopah, 5650 ft., 6; N. shore Mud Lake, S. end Ralston Valley, 5300 ft., 2; 1½ to 3-2/5 mi. S. Silverbow, Kawich Mountains, 6200 to 6400 ft., 19; 5 to 6½ mi. S. W. Silverbow, Cactus Flat, 5700 to 6000 ft., 18; 11½ mi. S. W. Silverbow, Cactus Flat, 5400 ft., 9; 14 mi. S. E. Goldfield, Stonewall Flat, 4700 ft., 2; 7½ mi. E. Cliff Spring, 5900 ft., 37; 4½ mi. N. W.

Indian Spring, Kawich Valley, 5700 ft., 6; 5 to 5-7/10 mi. S. E. Kawich P. O., Kawich Valley, 5400 ft., 12. *Lincoln Co.:* 14 mi. N. Seeman Pass, 4850 ft., E. side Coal Valley, 26; 10 mi. N. Seeman Pass, 4650 ft., Coal Valley, 14; 17 mi. N. Groom Baldy, Penoyer Valley, 14; 14 to 15 mi. N. N. W. Groom Baldy, Penoyer Valley, 8; 9 mi. W. Groom Baldy, 5500 ft., 13; 11½ mi. E. Johnnies Water, 1; 14½ to 15 mi. S. Groom Baldy, 6.

Microdipodos pallidus ruficollaris, new subspecies.

Type.—Female, adult, skin with skull, no. 49254, Mus. Vert. Zool.; 5 mi. S. E. Kawich Post Office, 5400 ft., Kawich Valley, Nye County, Nevada; September 25, 1931; collected by Robert T. Orr; original no. 367.

Range.—Fine sands of valleys from western Nye County eastward to western Lincoln County, Nevada.

Diagnosis.—Tail and hind foot long; upper parts near (*e*) Light Pinkish Cinnamon mixed with blackish, with a broad collar of more nearly cinnamon color; tail bicolor, corresponding to body and without black or dark brown at tip; supraorbital spots white or white with wash of faint buffy color; postauricular patches white; feet white; fur of underparts everywhere white to base; skull broad; auditory bullae much inflated; incisive foramina parallel-sided.

Comparisons.—From *M. p. pallidus, M. p. dickeyi,* and especially from *M. p. lucidus,* this race differs in more reddish upper parts and presence of the cinnamon colored collar. From *M. p. albiventer, ruficollaris* differs in more reddish color, presence of the collar, larger size of all parts measured, relatively longer tail, absence of the dusky or blackish markings on the tip of the tail, and in narrower incisive foramina.

From *M. m. sabulonis, ruficollaris* differs in longer hind foot, lighter coloration of upper parts, top of tail distally white rather than black, presence of the cinnamon collar, hair of underparts white to base rather than basally plumbeous, greater breadth across auditory bullae, greater maxillary breadth, greater interorbital breadth, upper incisors less recurved, premaxillae extending farther behind nasals, and incisive foramina parallel-sided rather than widest posteriorly.

Measurements.—Average and extreme measurements of 3 adult males and 7 adult females, from the type locality, are: Total length, ♂, 157 (156–158), ♀, 161 (154–164); length of tail, 85 (83–88), 89 (85–91); length of hind foot, 25.0 (25–25), 25.2 (25–26); basal length, 18.2 (18.1–18.2), 18.4 (18.0–18.7); nasal length, 9.7 (9.5–9.9), 10.0 (9.7–10.3); 19.3 (19.2–19.4), 19.7 (19.4–20.1); maxillary breadth, 12.0 (11.8–12.1), 12.3 (12.1–12.7); least interorbital breadth, 6.7 (6.7–6.8), 7.0 (6.7–7.3).

Remarks.—This race, like the other named races of the species *Microdipodops pallidus,* occurs in fine sand whereas *M. m. sabulonis,* like *M. m. megacephalus,* lives often in coarse sand or gravelly soil. At the eight localities where *ruficollaris* and *sabulonis* have been taken together, there was sharp segregation of the two kinds of mice according to the difference in soil just described. At these places the skins-alone or skulls-alone are readily distinguished by the differences mentioned under the heading of comparisons.

Specimens examined.—Total number, 165, all from Nevada, as follows: *Nye Co.:* 9 mi. W. and 3 mi. S. Tybo, 6200 ft., 2; 34 mi. E. and 1 mi. N. Tonopah, 5650 ft., 39; N. shore Mud Lake, S. end Ralston Valley, 5300 ft., 10; 1½ to 3-2/5 mi. S. Silverbow, Kawich Mts., 6200 to 6400 ft., 3; 11½ mi. S. W. Silverbow, Cactus Flat, 5400 ft., 5; 6 mi. W. Kawich P. O., Gold Flat, 5100 ft., 5; 5 to 5½ mi. W. Kawich P. O., Gold Flat, 5100 to 5200 ft., 8; 5 to 5-7/10 mi. S. E. Kawich P. O., Kawich Valley, 5400 ft., 46; 6 mi. S. W. Kawich P. O., Gold Flat, 5100 ft., 12. *Lincoln Co.:* 17 mi. N. Groom Baldy, Penoyer Valley, 25; 14 to 15 mi. N. N. W. Groom Baldy, Penoyer Valley, 10.

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PROCEEDINGS

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BIOLOGICAL SOCIETY OF WASHINGTON

ON FIVE NEW POLYDESMID MILLIPEDS FROM MEXICO.

BY RALPH V. CHAMBERLIN,
University of Utah.

The new millipeds described in this paper are based upon material forming part of collections made by Harry Hoogstraal and Kenneth Knight in the states of Nuevo Leon and Michoacan during June and July, 1940. Types are in the author's collection.

Family RHACHODESMIDAE.

Pararachistes nuevus, new species.

Green throughout, including antennae and legs. Body with width nearly uniform over most of length. Keels of anterior segments wider than in *P. vertebratus* and conspicuously narrowing from base distad; moderately extended caudad of middle portion of segment, considerably less so than in *P. elevatus;* curved upward, more strongly so on posterior segments; posterior angles typical. Dorsal surface of metazonites smooth except for the usual transverse series of minute, nearly obsolete, tubercles. Repugnatorial pores looking upward, not outwards as described for *P. vertebratus,* minute denticle of anterior corner of keels barely detectable.

Genital process of second legs of male as shown in Fig. 1.

Apparently quite distinct from *P. elevatus,* the genotype, in the proportions and details of the male gonopods. The femoral division is notably larger in relation to the distal division, with the seminal cavity especially large and conspicuous. See further Fig. 2.

Length of male holotype, about 30 mm.; width, 3.2 mm.

Locality.—Mexico: Nuevo Leon: Sabinas Hidalgo, Ojo de Agua. Elevation, 1500 ft. Male holotype and female allotype taken by K. Knight under stones on escarpment, June 14, 1940. "Arid semi-desert scrub."

Family XYSTODESMIDAE.

Rhysodesmus brachus, new species.

Dorsum appearing cross-banded from the circumstance that the prozonites are paler and the metazonites darker brown. Keels yellowish, or yellowish brown, but no light band across caudal border of segments.

Cauda similar to keels. Antennae characteristically dark brown throughout, much darker than the head. Legs yellowish.

Collum much more attentuated over the lateral end portions than in, e. g., *leonensis*. Surface smooth, without trace of tubercles.

Body relatively broad. Dorsum rather strongly convex, the keels rising a little from the line continuing the dorsal slope. Metazonites free of all tubercles, smooth and shining. All keels from second caudad with posterior angles produced caudad, the production slight on anterior segments and becoming gradually more pronounced in going caudad. Pores on thickened lateral margin directed dorsad.

Sterna typical. Legs with joints and spines also as usual.

Gonopod of male as drawn (Fig. 3).

Length of male holotype, 35 mm.; width, 10.5 mm. Length of female allotype, 38 mm.; width, 10 mm.

Locality.—Mexico: Nuevo Leon: Sabinas Hidalgo, Ojo de Agua. Male holotype and two females taken by K. Knight on June 14, 1940, "under rocks on escarpment." Elevation, 1500 feet. "Arid semi-desert scrub."

Readily distinguishable from *R. leonensis*, found in the same locality, by its greater proportionate breadth, characteristic coloring, and details of gonopods.

Rhysodesmus eusculptus, new species.

Color uniform brown over both prozonites and metazonites, the keels paler on lateral border. Head and antennae brown, the latter apically darker, the legs brownish yellow.

Antennae long and cylindrical.

Middle portion of anterior margin of collum weakly convex, the lateral portions evenly convex to the rounded end on each side; posterior margin arcuate, the middle part being widely incurved. Surface smooth except for a well developed series of 8–10 tubercles across posterior border and typically 4 well-separated tubercles across anterior border.

Body of but moderate relative width, the keels for the most part not overlapping. Keels not continuing evenly, the convexity of the dorsum, being a little more nearly horizontal. Anterior margin forming an even curve with the rounded anterior corner and the moderately convex lateral margin; posterior margin also convex; caudal corners not at all produced excepting on the posterior segments. Surface of metazonites with three transverse series of mostly distinct and moderately coarse tubercles, the first and second series more widely separated than the second and third.

Sterna with posterior margin widely but weakly notched.

Legs with ultimate article much longer than the penult; distal spine of second article conspicuous, none present on first article.

Gonopod of male as figured. (Fig. 4.)

Length of male holotype, 38 mm.; width, 7 mm. Length of female allotype, 37 mm.; width, 8 mm.

Locality.—Mexico: Tancitaro in State of Michoacan. Elevation, 6500 feet. Two males, of which one is freshly moulted, and two females taken by Hoogstraal, July 20, 1940, under rocks in moist woods.

Apparently a lighter colored species than *R. arcuatus* Pocock of the ad-

joining State of Guerrero, with body more slender and keels not overlapping as in latter species. Different also in details of male gonopods.

Rhysodesmus knighti, new species.

Dusky brown, with keels and a connecting stripe across caudal border yellow. Legs and antennae yellow, the latter somewhat darker distally.

Anterior margin of collum with its lateral margins forming a somewhat semicircular, even line a little flattened at middle. Posterior margin subarcuate. Surface subdensely covered throughout with small, low, not usually sharply defined, granules.

Body of moderate relative width. Keels of anterior region overlapping, continuing evenly the convexity of the dorsum. Elsewhere the keels become somewhat more elevated and do not overlap. On typical segments of the middle region, the keels have the anterior corner widely rounded with margin evenly continuous with the moderately convex lateral margin; caudal corner subrectangular, narrowly rounded, not produced; caudal margin moderately convex. Metazonites wider across caudal border than across the anterior. In the posterior region the keels become moderately produced as usual. Surface of metazonites with numerous small, low, and in part obscure granules like those of collum, these in part longitudinally elongate.

Sternites wide; caudal margin widely concave, ending on each side in an acute process or tooth.

Gonopods of male as shown in Fig. 5.

Length of male holotype, about 20 mm.; width, 4.5 mm.

Locality.—Mexico: State of Nuevo Leon: Villa Santiago (Hacienda Vista Hermosa, Horsetail Falls.) Altitude, 1500 ft. Mesic temperate forest. One male taken on ground by Hoogstraal and Knight on June 16, 1940.

This species is similar to *R. pusillus* in size but is readily distinguished from that species in color, form of collum and keels, as well as in the gonopods.

Rhysodesmus leonensis, new species.

Prozonites and metazonites above black. Keels yellow with a continuous band of the same color across caudal border of metazonites. Cauda yellow. Collum yellow across anterior and posterior border. Antennae yellow proximally, brown distally. Legs yellow.

Collum of characteristic form, the anterior margin being straight except at ends, which bend back to join curve of widely rounded ends; posterior margin convex, the line mesally somewhat flattened. Dorsal surface coriariously marked but with no obvious tubercles.

Keels of usual general outline; the posterior border extending caudad of the caudal margin of median portion of metazonite. Dorsal surface nearly smooth; with a few small, obscene tubercles on each side. Metazonites broader across caudal borders than across anterior.

Caudal margin of sternites weakly incurved.

Legs with joints of usual proportions as in *eusculptus*, etc. Spine of second article of moderate length.

Gonopods of male as shown in Fig. 6.

Length of male holotype, about 37 mm.; width, 8 mm.

Locality.—Mexico: State of Nuevo Leon: Sabinas Hidalgo, Ojo de Agua.

One male taken by K. Knight, June 14, 1940, under rocks on escarpment. Elevation 1500 feet. "Arid semi-desert scrub."

A more slender form than *R. brachus*, differing also in being banded in light across the metazonites.

EXPLANATION OF FIGURES.

Fig. 1. *Pararachistes nuevus*, new species. Processes of coxae of second and third legs of male.

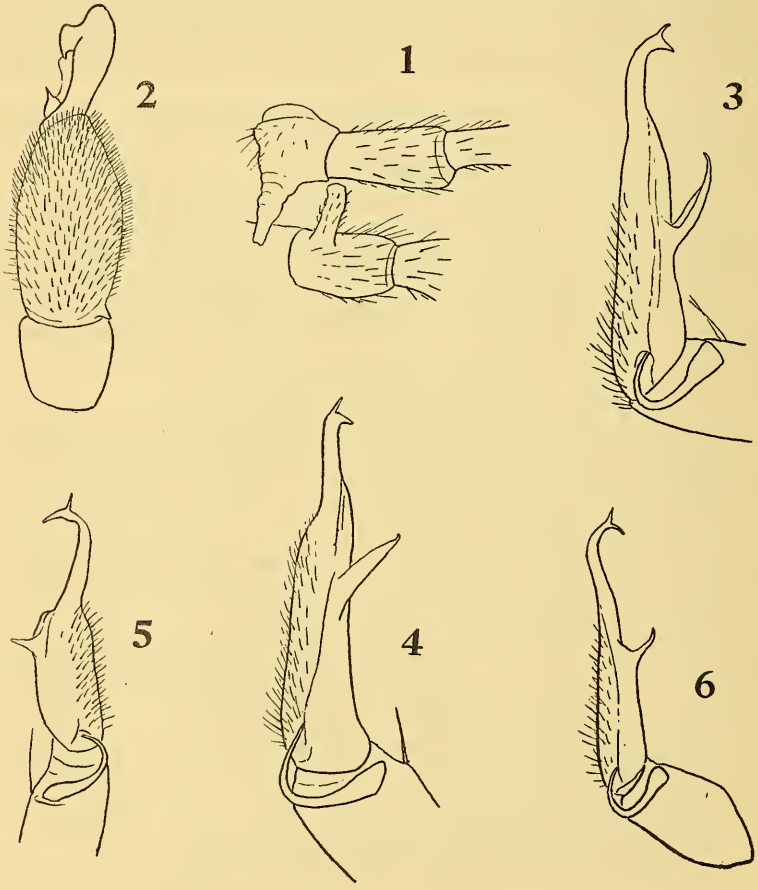
Fig. 2. *Pararachistes nuevus*, new species. Right gonopod of male, anterior view.

Fig. 3. *Rhysodesmus brachus*, new species. Right gonopod of male, mesal view.

Fig. 4. *Rhysodesmus eusculptus*, new species. Right gonopod of male, mesal view.

Fig. 5. *Rhysodesmus knighti*, new species. Left gonopod of male, mesal view.

Fig. 6. *Rhysodesmus leonensis*, new species. Right gonopod of male, mesal view,



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PROCEEDINGS
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A NEW MEXICAN SCARAB BEETLE.

BY LAWRENCE W. SAYLOR,
Washington, D. C.

The species of *Phyllophaga* described in this paper is a very interesting one inasmuch as its closest relationship appears to be with the recently described and unusual *P. gigantissima* Saylor; both these species will be included under a new generic name in a paper now in press.

Phyllophaga (*Phyllophaga*) **lalanza,** new species.

Male.—Rather large, robust, slightly broader behind. Color yellow-ochreous, the prothorax, head, and legs rufous to rufocastaneous. Dorsal surface apparently glabrous. Head with fine, dense, and variolate punctures. Clypeus narrowly, triangularly, and somewhat deeply incised at the apex, the apical margin hardly reflexed, and the angles broadly rounded; clypeal suture well indicated though not impressed, and *straight* or very nearly so. Antenna 10-segmented, and unicolorous; segments 3–7 progressively smaller; club small, subequal to segments 3–7 combined. Labrum widely and deeply cleft. Mentum flat and broad, and obliquely tumid near each side margin. Prothorax strongly transverse; the lateral margins nearly arcuate and not dilated, though ciliate and faintly crenate; both base and apex are furnished with a strong and *complete* marginal line; front angles nearly rectangular, the hind angles obtusely rounded; disc with punctures similar in size to those of head, and separated by once to twice their diameters. Elytra without costae other than the sutural; disc rugosely wrinkled, the punctures of about the same size and arrangement as those of the prothorax. Propygidium with a moderately wide, well-marked, median longitudinal *sulcus*, the sides of which are reflexed and slightly overhanging; entire surface of the propygidium with extremely fine punctures and short, dense, procumbent hairs. Pygidium somewhat polished, surface slightly convex at base, the apical half flattened, disc rugosely wrinkled, with fine, moderately dense but somewhat irregularly placed punctures. Abdomen polished, without obvious sexual characters; sternites flattened at middle and sparsely punctate, 5th sternite flat and

with sparse, irregularly-placed punctures, and a few erect hairs; 6th sternite half the length of 5th, flat, punctured like the 5th, and with the apex ciliate. Mid and hind tibiae *without* complete transverse carinae, and *with* the outermost margin strongly serrate. First segment of hind tarsus longer than the second; spurs free, slender, unequal in length. Claws of all the tarsi with a strong median tooth, and also with a small triangular tooth midway between the median tooth and the dilated claw base. Genitalia bilaterally symmetrical, the basal half somewhat tubular.

Female.—Antennal club slightly shorter than in male; abdomen slightly convex at middle, the 6th sternite also slightly convex; otherwise very similar to the male in all respects. Length 21–26 mm. Width 11–13 mm.

The Holotype male, Allotype female, and a good series of paratypes, all from "Guadalajara, Mexico, collected by Lawrence W. Saylor and Morgan M. Saylor, June 26, 1940," remain in the Saylor Collection. My father and I collected 8 of these specimens flying around the lighted bandstand in the center of town. The other specimens were taken from a large pond in a part just outside the town; the beetles had been attracted to several lights overhanging the pond and had fallen into the water.

This new species can be confused only with the more northern *P. gigantissima* Saylor from Sonora, Mexico, but is readily separable by its much smaller size, dorsal punctation, and the characters of the male genitalia. The species is named for my good friend Senor Ing. Manuel Fdez. de la Lanza, the Delegado de Defenso Agricola, of Culiacan, Sinaloa, Mexico, as a slight token of my appreciation for the many favors he extended me on a recent trip to Sinaloa and other Mexican states.

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PROCEEDINGS

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REMARKS ON VOLES OF THE GENUS *LEMMISCUS*, WITH ONE DESCRIBED AS NEW.

BY E. A. GOLDMAN.

The American voles of the genus *Lemmiscus*,[1] until recently regarded as a subgenus under the Old World genus *Lagurus*, form a small group known to range in more or less isolated sections of the Transition Zone, from the eastern slopes of the Sierra Nevada in California east to the Rocky Mountains in northern Colorado and northward on the mountains and hills rising from semi-arid plains of the interior east of the Cascade Range to Calgary, Alberta. The altitudinal range is from about 2,000 feet on hills in western North Dakota to 10,500 feet in the White Mountains of eastern California, as recorded by Hall (Jour. Mamm., vol. 9, No. 3, p. 201, 1928). Knowledge of the group is very incomplete, as distribution is interrupted and collections, except in a few places, have not been extensive. The present remarks are based on the examination of 134 specimens in the U. S. National Museum, including the types of *Arvicola curtata* Cope, *Arvicola pauperrima* Cooper, and *Arvicola* (*Chilotus*) *pallidus* Merriam. General comparisons of adults reveal that these names represent populations differing mainly in the minor cranial details that commonly characterize geographic races or subspecies. Maturity, in the group, is reliably indicated by the full size of the cranium and the tendency to develop a slight median ridge on the frontals. Specimens representing a number of localities are of young individuals, and as only those of adults are very satisfactory for comparative purposes much

[1] Raised by Davis (Recent Mammals of Idaho, 1939, p. 325) to full generic rank. I have not examined *Lagurus*, but the differential characters as set forth by Davis seem to be ample.

remains to be learned concerning the distribution and intergradation of races.

The animal now recognized as *Lemmiscus pauperrimus* is evidently very closely allied to *Lemmiscus curtatus*, the principal difference noted being the usually larger, more fully distended auditory bullae. Even this slight character is subject to considerable variation. *Lemmiscus pallidus* averages very slightly paler than *curtatus* and *pauperrimus*. The skull of *pallidus* is very similar in size to those of *curtatus* and *pauperrimus*, but the zygomata are more widely spreading, the auditory bullae smaller, and the molar tooth rows longer than in either. No topotypes of *Microtus* (*Lagurus*) *curtatus artemisiae* Anthony, from Ironside, Malheur County, Oregon, or of *Microtus* (*Lagurus*) *intermedius* Taylor, from the Pine Forest Mountains, Humboldt County, Nevada, have been examined by me, and their relationship to near geographic neighbors may be subject to revision. The three forms considered are, however, regarded as subspecies with type localities as follows:

Lemmiscus curtatus curtatus (Cope)..... Pigeon Spring, Mount Magruder, Nevada.

Lemmiscus curtatus pauperrimus (Cooper)..... Plains of the Columbia, near Snake River, Washington.

Lemmiscus curtatus pallidus (Merriam)..... Fort Buford, Williams County, North Dakota.

A hitherto unrecognized subspecies may be known by the following description:

Lemmiscus curtatus levidensis, subsp. nov.

ROCKY MOUNTAIN PYGMY VOLE.

Type.—From sandhills 5 miles east of Canadian River, at west base of Medicine Bow Range, east of Walden, North Park, Jackson County, Colorado (altitude about 8,000 feet). No. 148168, ♀ adult, skin and skull, U. S. National Museum (Biological Survey collection); collected by Merritt Cary, August 6, 1906. Original number 733.

Distribution.—Rocky Mountain region, from northwestern Colorado northwest through northwestern Utah, and southwestern Wyoming to eastern Idaho (Salmon River Mountains) and southwestern Montana.

General characters.—A small race of *Lemmiscus curtatus;* skull slender and flattened, with frontal region notably depressed. Closely resembling *Lemmiscus curtatus curtatus* of western Nevada, *Lemmiscus curtatus pauperrimus* of southwestern Washington, and *Lemmiscus curtatus pallidus* of northwestern North Dakota in color, but decidedly smaller; skull slenderer and flatter.

Color.—Type (summer pelage): Upper parts in general near "wood brown" (Ridgway, 1912), with a "cinnamon-buff" suffusion, darkened on top of head and back by a fine admixture of dusky-tipped hairs; under

parts dull whitish; ears edged with "cinnamon-buff"; feet white; tail brownish along a narrow median line above, white on sides and below. In some adults the "cinnamon-buff" suffusion is more pronounced. *Young:* Similar to adults, but darker in general tone.

Skull.—Similar to those of *curtatus*, *pauperrimus* and *pallidus*, but smaller, slenderer, more flattened, the brain case decidedly lower, and the frontal region more depressed or concave in upper outline than in any of them; auditory bullae small; dentition relatively heavy.

Measurements.—Type: Total length, 120 mm.; tail vertebrae, 20; hind foot, 17. An adult male and female from Elk Springs, 8 miles south of Lily, Moffat County, Colorado, respectively: 115, 122; 21, 19; 18, 18. *Skull* (type): Occipitonasal length, 23.1; condylobasal length, 23.4; basicranial depth (over auditory bullae), 7.8; zygomatic breadth, 13.7; interorbital constriction, 3.2; width across squamosals (at mastoids), 10.9; length of nasals, 5.9; upper molar tooth row, 5.6. An adult male topotype: Occipitonasal length, 22.9; condylobasal length, 23.3; basicranial depth, 7.8; zygomatic breadth, 14; interorbital constriction, 3.6; width across squamosals, 11.1; length of nasals, 6.4; upper molar tooth row, 5.7.

Remarks.—The specimens here assigned to this small race were formerly referred to *pauperrimus*, of which only young examples were available, and comparisons were therefore apt to be misleading. The best distinguishing character is the shallow depth of the cranium, compared with the neighboring geographic races.

Specimens examined.—Total number, 47, as follows:

Colorado: Canadian River (5 miles east), 4 (1 skull without skin); Elk Springs, 8 miles south of Lily (6,500 feet), 6; Fort Collins, 1; Toponas, Egeria Park, 8; Two Bar Springs, Moffat County, 12.[2]

Idaho: American Falls, 1; Salmon River Mountains, 6; Silver City (45 miles southeast), 1 (skin only).

Montana: Donovan, Beaverhead County, 2.

Utah: Uintah Mountains (10,000 feet), 2.

Wyoming: Fort Bridger (20 miles south), 4.

[2] Col. Mus. Nat. Hist.

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PROCEEDINGS
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A NEW NAME FOR THE MEXICAN SNAKES OF THE GENUS *DENDROPHIDION*.

BY HOBART M. SMITH.[1]

The Mexican snakes belonging to the genus *Dendrophidion* have generally been associated with *dendrophis*, a name based upon two cotypes with entire anals (*fide* Bocourt) from Cayenne, French Guiana. One of these has 140 ventrals and 196 caudals (*fide* Schlegel).[2] Three Mexican and eleven Central American specimens in the U. S. National Museum, the Museum of Comparative Zoology, the Philadelphia Academy of Sciences, and the University of Michigan Museum of Zoology, as well as three others reported by Bocourt from Guatemala, indicate that such a disposition is not correct. They agree with *dendrophis* in having entire anals, but they have higher ventral counts (149 to 174) and lower caudal counts (about 100 to 126). Moreover they are characterized by the absence posteriorly on the body of any clear evidence of a striped pattern (the tail, however, is distinctly striped), and the presence of 38 to 44 maxillary teeth (five specimens).

Aside from specimens referred to *dendrophis*, the only others now known from Central America are placed in *clarki* and *paucicarinatus*. Neither of these is the same as the form which occurs in Mexico. The former is green anteriorly (even in the young) and has a different hemipenial structure (much enlarged basal spines). *D. paucicarinatus* has only the median scales (five rows) keeled, the anal divided (in type), and the ventrals apparently more numerous (183 in type).

The only other name available for Central American specimens is *percarinatus* Cope (Proc. Amer. Philos. Soc., vol. 31, 1893, p. 344), based upon a specimen from Boruca, Costa Rica, with 155 ventrals, anal divided, 145 caudals, and the posterior fourth of the body striped. To this form

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2 It should be noted that Traill, in his translation (1843) of Schlegel's work, says that the caudal number "probably should be 106" (p. 152).

belong all Central American "*dendrophis*" with divided anals, as indicated by 16 specimens examined by me from various localities between Panamá and Honduras. These have 149 to 169 ventrals, 142 to 163 caudals, anal divided, and all are striped posteriorly. Seven have 35 to 39 maxillary teeth.

Accordingly, four forms appear to exist in Central America and Mexico, to none of which is applicable the name *dendrophis*. The one extending into Mexico may be known as

Dendrophidion vinitor, sp. nov.

Holotype.—U. S. National Museum No. 110662, a young female, Piedras Negras, Guatemala. *Paratypes.*—Thirteen. In the U. S. National Museum, No. 46589, Teapa, Tabasco; No. 7099, "Mexico"; Nos. 14215, 14220, "Nicaragua." In the Museum of Comparative Zoology, Nos. 17117, 9561, Matagalpa, Nicaragua; No. 19342, Suretka, Costa Rica; No. 19344, La Loma Mts., Panamá; Nos. 42782–3, Pequeni-Esperanza Ridge, Panamá. In the Philadelphia Academy of Natural Sciences, Nos. 22863–4, eastern Nicaragua. In the University of Michigan Museum of Zoology, No. 79766, Río Mico, Recero, Nicaragua.

Diagnosis.—Differing from all other members of the genus in having the anal consistently entire; subcaudals about 100 to 126; pattern of cross-bands on all of body, those on posterior part not showing any clear evidence of formation of longitudinal stripes; maxillary teeth 38 to 44; basal spines of hemipenis not conspicuously enlarged. Scales strongly keeled, in 17–15 rows; dorsal scales with two apical pits.

Description of holotype.—Rostral much broader than high, portion visible from above a third length of internasals; frontal pentagonal, longer than its distance from tip of snout or length of median parietal suture; nasal large, completely divided; loreal large, a little longer than high; one large preocular, upper portion largest, not in contact with frontal; two postoculars, upper largest; temporals in two rows, lower anterior elongate, twice as long as upper anterior; nine supralabials, 3rd, 4th and 5th entering orbit; eye very large, its vertical diameter three times its distance from labial border, longitudinal diameter a little less than distance of eye from snout; nine infralabials, five in contact with anterior chinshields, two with posterior; anterior chinshields a little larger than, and subequal in length to posterior chinshields.

Dorsals strongly keeled (except outer row), with two apical pits, in 17–17–15 rows; ventrals 160; anal entire; caudals more than 96, extreme tip of tail missing. Total length 510 mm., tail 169 mm.

Color in life described in field notes as follows. Dorsal surface of head brownish gray, the sutures darker and with a slightly reddish tinge; upper parts of four preocular labials with a reddish tinge; dorsal head color extending laterally in temporal region to (and including) upper edges of two postocular labials, including all of posterior labial; lower edge of this color dark brown, mixed with dull, brownish brick-red; lower parts of 7th and 8th labials, all of 5th and 6th, and lower parts of 3rd and 4th labials pure

white; 59 bands on body, 54 on tail; band on neck covering one scale length, brownish gray laterally, yellow dorsally; size of yellow dorsal area in light bands decreasing posteriorly, the color disappearing near posterior part of body; light bands margined anteriorly or posteriorly (or both) by narrow, irregular areas of black; light bands gradually disappearing posteriorly, becoming practically indistinguishable on posterior part of body; tail bands and those on posterior part of body black; black borders of light bands interspersed or themselves bordered by brick-red, this color especially prominent medially; central ground color between bands brownish gray anteriorly, becoming light brown tinged with red on middle and posterior part of body; dorsal color extending onto ends of ventrals; no stripes on body; tail with a lateral stripe of dark brown (black) interspersed with brick-red, involving edges of subcaudals and lower half of outer scale rows; medially it is bordered by a light line two half scale rows wide; these two light stripes enclose two series of transverse, short (less than one scale length) dark spots separated from each other by a series of vague light spots; gular region white; belly yellow; subcaudal surface yellow, lighter posteriorly.

Remarks.—In the largest specimen (No. 14220, total length 1453 mm., body 948 mm., tail incomplete) the cross-bands are still visible, though dim. The supralabials are 9–9, preoculars 1–1, postoculars 2–2, temporals 2–2, scale rows 17–15 in all.

The only other data on variation in *vinitor* are furnished by Bocourt (Miss. Sci. Mex., 1890, p. 730), who states that one Petén and two Vera Paz specimens have entire anals. Günther (Biol. Centr. Amer., 1894, p. 127) and Boulenger (Cat. Snakes Brit. Mus., vol. 2, 1894, p. 16) give data on other specimens from "Guatemala" and "Vera Paz," some of which may be *vinitor*, but the discrepancies between their counts are so great that it seems best not to rely upon any of them. Not only are errors in counts indicated, but each author apparently confused other species (perhaps *Drymobius chloroticus* among them) with "*dendrophis*."

Scale counts of *vinitor*.

Museum	*Number*	*Sex*	*Ventrals*	*Caudals*	*Infralabials*	*Teeth*	*Locality*
USNM	7099	♂	160	122	9–9	—	Mex.
MCZ	9561	♂	151	117	10–10	41	Nic.
UMMZ	79766	♂	168	118	—	—	Nic.
MCZ	19344	♂	161	126	10–10	—	Pan.
MCZ	42782	♂	149	—	10–10	38	Pan.
USNM	14215	♀	—	—	9–9	—	Nic.
USNM	14220	♀	174	—	11–11	42	Nic.
USNM	46589	♀	—	115	9–9	—	Mex.
USNM	110662	♀	160	100+?	9–9	44	Guat.
ANSP	22863	♀	160	—	9–9	—	Nic.
ANSP	22864	♀	157	118	9–9	—	Nic.
MCZ	17117	♀	163	121	10–10	—	Nic.
MCZ	19342	♀	161	126	10–10	40	C.R.
MCZ	42783	♀	155	114	10–10	—	Pan.

The species perhaps most closely related to *vinitor*—at least that with which it has been confounded—is *percarinatus*, whose range is overlapped by that of the former. The sixteen specimens examined of this are as follows: *Honduras:* Lancetilla (MCZ 29677). *Nicaragua:* Comoapa (MCZ 9550; Río Mico, 10 miles above Recero (UMMZ 79764).[3] *Costa Rica:* Tilaran, Guanacaste (USNM 70663). *Panamá:* Cana (USNM 50123); Playa Grande, Tres Hermanos Ridge (MCZ 42760); Torres (MCZ 19343). *Canal Zone:* Gatun (USNM 54080); Chiva Chiva (MCZ 24002); Barro Colorado (MCZ 18902, 34882); Gatun, Ft. Davis (MCZ 22255); Red Tank (MCZ 24000); Ft. Clayton (MCZ 25124); Juan Mina (MCZ 26646); Salamanca, Hydrographic Station (MCZ 39978); Ft. Randolph (MCZ 20552). These have the posterior part of the body distinctly striped, while the specimens with single anals (*vinitor*) do not. The two species may be compared as follows.

	vinitor	*percarinatus*
Anal	single	double
Caudals	100 to 126	142 to 163
Posterior Body Pattern	barred	striped
Teeth	38 to 44	35 to 39
Range	Mex. to Panamá	Honduras to Panamá

Scale counts of *percarinatus*

Museum	*Number*	*Sex*	*Ventrals*	*Caudals*	*Infralabials*	*Teeth*	*Locality*
MCZ	29677	♂	153	163	11–11	—	Hond.
MCZ	9550	♂	154	155	11–11	39	Nic.
UMMZ	79764	♂	156	152	———	—	Nic.
USNM	70663	♂	149	152	10–10	—	C.R.
USNM	50123	♂	162	143+	10–11	38	Pan.
MCZ	42760	♂	169	——	11–11	—	Pan.
MCZ	18902	♂	158	150	11–11	—	C.Z.
MCZ	22255	♂	159	142	11–12	—	C.Z.
MCZ	24000	♂	158	137+	11–11	—	C.Z.
MCZ	25124	♂	155	118+	11–11	36	C.Z.
MCZ	34882	♂	158	136+	10–11	—	C.Z.
MCZ	19343	♀	161	150	10–10	—	Pan.
MCZ	20552	♀	163	146	10–10	36	C.Z.
MCZ	24002	♀	156	147	11–11	—	C.Z.
MCZ	26646	♀	158	143	11–11	37	C.Z.
MCZ	39978	♀	161	——	11–11	35	C.Z.
USNM	54080	♀	161	144	11–11	35	C.Z.

I am much indebted to Dr. E. R. Dunn for very helpful criticisms and suggestions, to Mr. Benjamin Shreve for loan of material, and to Dr. L. C. Stuart for certain data on specimens not examined by me.

[3] Data for this and for No. 79766 (*vinitor*) are from Gaige, Hartweg and Stuart, Occ. Papers Univ. Mich. Mus. Zool., no. 357, 1937, p. 12. Dr. L. C. Stuart has verified that No. 79764 has a divided anal, No. 79766 an entire anal.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW PLETHODONT SALAMANDER FROM NEW MEXICO.

BY EDWARD H. TAYLOR,

Department of Zoology, University of Kansas.

A single specimen of a plethodontid salamander was caught at an elevation of about 9000 ft., in the Sacramento Mountains, at Cloudcroft, New Mexico, by Mr. D. E. Hardy, of the Department of Entomology of the University of Kansas, while collecting insects in that region. It was found under the bark of a rotten pine log, in heavy pine forest.

Two plethodontids have been reported from this general region: *Bolitoglossa bellii* in Arizona; *Eurycea multiplicata* in New Mexico. Since both of these records are far out of the normal range of the respective species it seems wiser to disregard them. The records are old and are very probably due to error in locality data.

The Eastern Rocky Mountains, so far as known endemic species of amphibians are concerned, is, relatively speaking, a faunal desert. The finding of this form suggests the possibility that the mountains have been inadequately explored and that other species and, not impossibly, genera, await discovery.

Plethodon hardii, sp. nov.

Type.—EHT–HMS No. 23656, adult male. Collected in Sacramento Mountains (9,000 ft.) at Cloudcroft, New Mexico, June 29, 1940, by D. E. Hardy.

Diagnosis.—Fourteen costal grooves, the adpressed limbs separated by about 3½ costal folds; a well-defined median sulcus from between eyes to neck. Reduced number of mandibular, maxillary and premaxillary teeth, not exceeding 15 in either side of lower or upper jaw. Vomerine teeth, 5–6, the series separated from each other by a distance nearly as great as half the length of a single series, separated from parasphenoid teeth by a distance nearly equal to length of one series.

Description of type.—A rather small species of the genus, the snout to

vent measurement, 29 mm.; nostrils small; length of eye about 1/5 to 1/6 longer than snout; distance between nostrils about 1/5 greater than distance from eye to nostril; two rather prominent ridges rise in interorbital region and extend to neck where they join; these are separated by a well-defined sulcus; snout truncate, smooth, unpitted; no swelling below nostril; nasolabial groove distinct; no canthus rostralis; narrowest interorbital width 1/3 greater than the width of an eyelid; orbits prominent, seen in profile; line of mouth slightly sinuous; a slight fold across throat between angles of the jaws; a groove from this fold across jaw angle passes up and joins a sinuous groove which extends back from the eye to the nuchal groove (fold); latter very distinct; a continuation of the nuchal groove curves up on side of neck to the dorsal surface but fails to connect with its fellow from the opposite side.

Tongue apparently somewhat boletoid but attached in front (the tongue has been fully extruded and is attached by a narrow bit of tissue with evidence that some tearing of the tissues has taken place so that the normal condition can not be ascertained).

Maxillary-premaxillary teeth 12–12 which vary in size; vomerine teeth 6–7, in very slightly curved, diagonally placed series; outer tooth of each series behind the outer edge of the choanae, the series separated medially by a space equal to half the length of one series; parasphenoid teeth in two elongate series so closely approximated as to appear as a single group, somewhat pointed anteriorly, widened posteriorly and somewhat notched behind; separated from the vomerine teeth by a distance very slightly less than the length of a vomerine series; mandibular teeth 13–14 confined to anterior part of jaw; choanae small, subcircular, the diameter equal to about half the distance between vomerine series; a small circular pit in middle of palate slightly in advance of the choanae; apparently 14 costal grooves continuing almost to the median dorsal line, and ventrally some can be traced across abdomen; no linear middorsal groove.

Limbs well developed, the ascending order of size of fingers, 1, 4, 2, 3, the first very short and save for tip is included in membrane; no webbing between digits beyond ends of the metacarpals; digits not tapering; no metacarpal tubercles; ascending order of size in toes, 1, 5, 2, 3=4; first toe wholly included in membrane; a slight web between bases of three outer toes beyond ends of the metatarsals; toes not tapering or only slightly so; no metatarsal tubercles; subterminal pads on all digits only very moderately developed; adpressed limbs separated by about three and one half costal folds.

Due to preservation in strong alcohol the normal character of the skin is somewhat in doubt; some pitting is evident and in places the skin shows some minute corrugation; the costal folds are slightly wrinkled; cloaca papillate.

Measurements in mm.—Snout to anterior part of vent, 39; anterior part of vent to tip of tail, 42; tip of snout to nuchal fold, 9.8; width of head, 6; arm, 8.2; hind leg, 9.2; axilla to groin, 24.2.

Color.—Back brownish, the sides, gray; edge of upper lip and ventral surface of body somewhat dirty yellowish-white. There are certain dark

spots on abdomen but these may be due to discoloration; ventral part of tail lighter than upper part, the extreme tip whitish.

Remarks.—The type locality of this species is in a region, for the most part, too arid to support plethodont salamanders. However, the higher mountain tops have clouds and fog, as well as more rainfall, and in such a habitat the present species was discovered. The present distribution of the genus shows a number of apparent discontinuities, the greatest gap being between New Mexico and the States of Washington and Oregon. Whether the discontinuity is real or only apparent can be known when careful exploration has been made in the intervening regions.

When further specimens are available a description of skeletal characters, as well as more correct descriptions of the tongue and skin characters, can be given. I suspect that females will show a larger series of mandibular, and maxillary-premaxillary teeth than the male type.

When the above characters are certainly known it will be possible to discern the relationships with other species of the genus.

The species is named for its discoverer. (Since the above was written, *Plethodon idahoensis*, Slater and Slipp, has been described from northern Idaho.)

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PROCEEDINGS
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TWO NEW SPECIES OF MEXICAN PLETHODONTID SALAMANDERS.

BY EDWARD H. TAYLOR.

Of the two species described here one was obtained from a locality near Galeana, Nuevo León, by Mr. Radclyffe Roberts in 1938, and presented to me. Certain other specimens were obtained by Dr. Hobart M. Smith in 1939, in the same general locality. The second species was obtained independently by Dr. Smith and myself in 1940. These specimens are from a locality about twenty miles north of Totalco, in the mountains which lie between Perote and Tezuitlán in Veracruz.

Bolitoglossa melanomolga, sp. nov.

Type.—EHT-HMS No. 24626, about 20 km. north of San Antonio Limón (Totalco), Veracruz, June 24, 1940, Richard C. Taylor and Edward H. Taylor, Colls.

Paratypes.—U. S. N. M. Nos. 110641, Topotype, E. H. Taylor Coll., 110640, 17 kms. N. E. Limón, Mar. 23, 1940, Hobart M. Smith Coll.

Diagnosis.—A member of the *Bolitoglossa bellii* group, most closely related to *B. gadovii* (Dunn) but differing in being black with a paired series of light spots on back and a few spots scattered on sides; the limbs longer, touching or overlapping when adpressed with more elongate digits. The interorbital width is less, the width of an eyelid greater; axilla to groin distance less, and larger series of maxillary-premaxillary, vomerine, and mandibular teeth. Toes with web not extending but slightly beyond metacarpals and metatarsals; 11 costal grooves; a sublingual fold; parasphenoid teeth in two series.

Description of the type.—A rather large salamander; the length, snout to anterior edge of vent, 72 mm.; head large, not or scarcely wider than neck; eye large, prominent, its length (4.8 mm.) greater than the length of the snout (4 mm.); width of head (11.4 mm.) contained in head-body length (72 mm.) 6.3 times; head length to gular fold (18.5 mm.) contained 3.89 times; distance between orbits (2.7 mm.) less than width of an eyelid (3.4 mm.); nostril small, its groove forming a right angle; subnarial swell-

ings scarcely discernible; posterior part of eyelids inserted under a well-defined fold; occipital region very slightly raised, lacking a trace of a medial depression; no canthus rostralis; slight transverse gular fold, the groove arising on each side can be traced on sides of neck to the middorsal line; none or only a faint trace of a groove crossing jaw angle (it can not be discerned on throat); a groove from behind upper part of eye runs back and joins the end of the gular fold; head with moderately large pits; remainder of body very smooth and shiny, the pits very tiny; groove below eye terminates above lip; line of mouth almost straight, diagonal; when arm is brought forward it reaches anterior corner of eye; pads on tips of digits thickened, prominent; digits not widened; order of length in fingers, 1, 3, 2, 4; of toes, 1, 5, 2, 4, 3; when limbs are adpressed they overlap about 1–1½ folds; a slight glandular area posterior to insertion of femur; depth of body a little less than width; 11 distinct costal grooves with no trace of the axillary or inguinal; tail missing (the wound scarcely healed); cloaca with the walls folded; skin between costal grooves not folded or puckered.

Tongue boletoid, relatively large; a semicircular sublingual fold; maxillary-premaxillary teeth, 32–34; vomerine teeth 14–15, the two series separated medially by a space equal to that between two teeth, the two series not maintaining the same level but forming an angular arch (in *gadovii*, outer and inner part of tooth series maintains the same elevation across palate); mandibular teeth 28–30; parasphenoid teeth in two rather narrow series, widely separated posteriorly, more or less contiguous anteriorly; separated from the vomerine teeth by a distance half of that between the large choanae; diameter of choana (.65) is contained about 4.4 times in distance between choanae (2.9 mm.).

Color in life.—Above purplish-black, somewhat lighter on the ventral surfaces; paired whitish flecks dorsally on each costal fold, anteriorly diagonal but posteriorly they have the form of parallel dashes which are separated by a distance equalling their combined length; a few scattered flecks on sides; a rather prominent fleck on the lateral ends of the gular fold; a few minute light flecks on chin; a white line follows the gular fold across the throat; the costal grooves are more or less whitish; under surface of digits light.

Measurements in mm.—(Of *Bolitoglossa melanomolga* Nos. 110641 yg. and 24626, type; and two topotypic *Bolitoglossa gadovii*.) (Sex (yg), ♀, ♀, ♀; snout to anterior end of vent, 33, 72, 73, 71; tail, 20, ?, 80, 71; snout to gular fold, 9.5, 18.5, 18.5, 17.8; snout to foreleg, 11.3, 24.7, 23.3, 23; length of snout, 2.1, 4, 4.1, 4; width of head, 6.8, 11.4, 11, 10.2; interorbital width 2, 2.7, 3.2, 2.8; eyelid, 2, 3.4, 3, 2.9; arm, 9.5, 20.5, 17.2, 16; leg, 10, 22.2, 20, 20; axilla to groin, 16.5, 37.5, 41.5, 40. The counts of maxillary-premaxillary teeth for the same series are, ?, 32–34, 28–24, 23–21; vomerine teeth, ?, 14–15, 7–8, 8–9; mandibular teeth, ?, 28–30, 24–24, 23–23 (in the young specimen the teeth have scarcely penetrated the gums).

Variation.—The paratypes agree very well, save that they are very young. They are dark and the backs are spotted as in the type. In the

young, the tail length is less than head and body, but this is probably due to its age. In older specimens it is probable that the tail would equal or exceed the length from snout to vent.

Remarks.—Topotypic *Bolitoglossa gadovii*, from Mt. Orizaba (Citlaltepetl), are lavender above; all ventral surfaces and lower half of the sides of body and tail are yellow or cream. Specimens taken from Mt. Malinche (Malintsin) have a similar coloration. The species seems to be absent on Cofre de Perote, the high mountain lying to the southeast, and nearer to the type locality of the newly described species than are the other two mountains.

Bolitoglossa melanomolga is a member of the *bellii* group of the genus, but within the group it is a member of a subgroup which includes *B. smithi*, *B. unguidentis*, and *B. gadovii*. In these, the premaxillary teeth of the males are curiously bifid, the posterior part forming a rounded knob, the anterior part, a hooked claw. It is presumed that the males of the present form will show a similar modification. The three above mentioned species have the skull curiously elevated above the otic capsule in the adult. In *smithi*, the limbs are shorter, and when adpressed are separated by 3½ to 4 costal folds. In *unguidentis* the width of head is contained in snout to vent length about 7 times. In this species the limbs are large, well-developed, touching when adpressed; the maxillary and mandibular teeth are fewer than in *smithi*.

The elevation of the type locality is between 7,000 and 8,000 ft. All three of the specimens were taken from under rocks in a pine forest.

Bolitoglossa galaenae, sp. nov.

Type.—EHT–HMS No. 17146. Collected near Galaena, N. L., 7,000 ft. elevation July 10, 1938, by Radclyffe Roberts.

Paratypes.—EHT–HMS No. 17145, topotype; collector Radclyffe Roberts; EHT–HMS Nos. 25762–25763, and USNM Nos. 110642–110658, Galeana, N. L., elevation 5,200 ft., H. M. Smith Coll.

Diagnosis.—A member of the *bellii* group of *Bolitoglossa*, more closely related to a subgroup including *cephalica* and *manni*. Differentiated from these two species in being considerably larger (maximum length from snout to anterior end of vent, 70 mm.; vent, 5 mm.) and with (usually) large white spots on tail (occasionally also on body); pads of the tip of toes better developed, while the narial swellings and submental gland are reduced; more numerous teeth in full grown adults; maxillary-premaxillary, 59–59; vomerine, 20–18; mandibular, 64–66.

Description of type.—A rather large salamander with a snout to anterior end of vent measurement of 70 mm.; head large, wider than neck or body; eye moderately large, prominent, its length (3.9 mm.) less than length of snout (4.3 mm.); width of head (11.5 mm.) contained in the head body length 6 times; head length to gular fold (17 mm.) contained in same distance 4.1 times; distance between orbits (3.6 mm.) greater than the width of an eyelid (2.7 mm.); nostril small, the groove runs straight down from the posterior edge; subnarial swellings (♀) small but distinct; pos-

terior edges of eyelids inserted under a diagonal fold; no canthus; head generally flat, the occipital region not, or but slightly, raised; the grooves arising from sides of the gular fold vertical, but these can not be traced to middorsal line; a groove by the angle of jaw can be traced across throat, and dorsally the groove is more or less distinct to middorsal line; the groove behind eye very indistinct anteriorly, but is more evident where it joins the gular groove; skin on dorsal surfaces smooth, shiny, the pits small; groove under eye not distinct; line of mouth forming a straight diagonal line anteriorly, and a slight curved arch posteriorly; arm brought forward, the fingers reach to middle of eye; rounded pads of tips of digits well defined; digits flattened, webbed at base, the web including all of the proximal phalanges; the first finger with tip emergent from web; the fourth has about half of distal phalanx free; order of length of fingers, 1, 4, 2, 3; of toes, 1, 5, 2, 3=4; web between toes does not include completely the proximal phalanx; adpressed limbs separated by two costal folds; a distinct glandular spot behind insertion of femur; depth of body less than its width; 13 costal grooves, the inguinal and axillary scarcely distinguishable, the skin between the costal grooves longitudinally folded or puckered; tail shorter than body; about 23 grooves on tail. Tongue boletoid, of average size; a sublingual fold; maxillary-premaxillary teeth 58–60; vomerine teeth in transverse curves, 18–20, separated medially by a distance equal to the diameter of a choana, the series extending about two-fifths of their length beyond (lateral) choanae; parasphenoid teeth in two more or less parallel series, 86–83, the series not in contact anteriorly, separated from the vomerine teeth by about a fourth of the distance between choanae; choanae small; mandibular teeth, 64–66; diameter of choana contained in distance between choana about 6 times.

Color.—Body slaty to purplish black; a few rather large scattered irregular white spots; the ventral surfaces are only a shade lighter than the dorsal; chin a little lighter than abdomen; tips of digits lighter, contrasting with under surface of foot.

Measurements in mm.—Nos. 17146 (type), 110649, 25762, 110650, 110647, 110642; sex, ♀, ♀, ♀, ♀, ♂, ♂; snout to anterior end of vent, 70, 67, 59, 56, 52, 50; width of head, 11.5, 11, 10, 9.8, 9, 9; length of head to gular fold, 17, 15, 14.6, 13.2, 13.5, 12.5; snout to forearm, 22, 18.5, 17.8, 16.3, 16, 16; tail, 60.2, 54, 47.5, 41, 46, 46.5; axilla to groin, 41, 40.1, 35.2, 33.2, 28.8, 27.5; head length in length, 4.1 times; head width in length, 6 times; arm, 18.2, 17, 16, 13.8, 15.3, 13, 13; leg, 19.6, 18.8, 17, 15.5, 16, 14.3; maxillary-premaxillary teeth, 58–60, 48–48, 50–50, 43–44, 42–44, 40–40; vomerine teeth, 18–20, 18–18, 14–15, 16–16, 18–16, 11–12; mandibular teeth, 64–66, 45–?, 52–52, 45–45, 45–42, 41–42.

Variations.—Variation in the paratype series is largely a matter of size (age). The teeth are more numerous in older specimens. The sex differences are the actually longer limbs, shorter axilla to groin measurement in males, and the much greater subnarial swelling and fewer teeth. A submental gland is present.

Some of the specimens have the spotting obsolete, while others have the

spots on body and sides as well as on tail. Certain young specimens have the vomerine teeth irregularly placed.

The digits are flat, broad, rather rounding on the tip. If slightly dehydrated they appear to have the web continued as a fringe to the tips. The gular groove can be traced to the dorsal surface in some specimens.

Specimens captured by Mr. Roberts were found under stones above Pablillo, Galeana, N. L. Dr. Smith states, "The elevation at the Galeana locality is 5,200 ft. It was raining here when we got the salamanders, but the region has a semiarid appearance, with cactus and thorny scrubby shrubs. There is no grass."

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PROCEEDINGS

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SOME MEXICAN FROGS.

BY EDWARD H. TAYLOR.

Herpetological collections made in Mexico during the summer of 1940, by my son Richard C. Taylor and myself, disclose the presence of two new Eleutherodactylid frogs in southern Mexico. The collections also show that the form *Hylodes calcitrans* Günther synonymized with *Eleutherodactylus mexicanus* (Brocchi) should be recognized as a distinct species; and furthermore that *Borborocoetes mexicanus* Boulenger is specifically distinct from *Eleutherodactylus mexicanus* (Brocchi), but generically the same. Since the specific name is preoccupied, a new name is being proposed for the species.

Microbatrachylus lineatissimus, sp. nov.

Type.—EHT–HMS No. 24289, adult male, Cerro San Felipe, near Oaxaca, Oaxaca; elevation between 7,000 and 8,000 ft., July, 1940; E. H. Taylor and R. C. Taylor, Colls.

Paratypes.—EHT–HMS Nos. 24287, 24288, 24290. Same data as type.

Diagnosis.—Tibiotarsal articulation reaching beyond tip of snout; vomerine teeth present, but extremely small, sometimes concealed, widely separated; no inner tarsal fold or tubercle; inner metatarsal tubercle rather large; inguinal gland very large, distinct, yellowish; two pairs of dorsal glandular folds continue nearly to end of the body; a fold from above tympanum continues some distance on the sides; between the middle pair of dorsal folds a faint median ridge present; between each middle fold and the dorsolateral fold another more or less discontinuous fold; first finger shorter than second.

Description of the type.—Adult male. Head length (9.6 mm.) greater than width (8.5 mm.); interorbital distance (2 mm.) about equal to width of an eyelid (2.05 mm.); diameter of tympanum (2.95 mm.) greater than diameter of eye (2.65 mm.); eye to nostril, 2 mm.; eye to tip of snout, 3.95 mm.; distance between nostrils, 3 mm.; canthus well defined; lores sloping, slightly concave behind nostrils; length of snout, 3.8 mm. A faint

median ridge from snout to rump; beginning on top of eyelid at a large pustule is a glandular fold which passes with its fellow to rump where they may continue somewhat farther as a series of irregular tubercles; beginning on top of eyelid at a second tubercle is another less distinct, more or less discontinuous ridge, which parallels the other ridge and which can be traced to the sacral region; back of, and somewhat higher than the posterior corner of eye, a third lateral fold begins as a series as two or three tubercles and continues to the lumbar region where it terminates, its posterior end being elevated and curving outwards almost to groin; a heavy supratympanic fold continues above arm and may be traced some distance on side as a row of irregular tubercles; the flat inguinal gland that borders the thigh is about 2.5 x 2.5 mm., the outline not circular; axillary gland small, scarcely discernible from other tubercles save by the yellowish color; ventral disk distinct, smooth; the posterior border (seemingly) minutely in front of femur (attached on femur in paratypes); chin and throat smooth; postympanic fold not close to tympanum, thickened greatly above arm; a strong, elongate tubercle between tympanum and arm insertion; sides with numerous pustular tubercles; tympanum with a continuous, strongly raised rim, save on the upper edge, its distance from eye less than one-third of its diameter; choanae small, partially concealed by overhanging flange of jaw when seen from below; vomerine tooth patches faintly discernible, their distance from choanae greater than distance between them; tongue somewhat oval behind, not emarginate, narrowing in front; no vocal sacs.

Arm moderately long, the subarticular tubercles well developed, and several supernumerary palmar tubercles; median palmar tubercle largest, confluent with the posterior part of the outer palmar tubercle; first finger shorter than second; a row of indistinct tubercles on under surface of arm; tips of digits thickened but only very slightly expanded; leg long, the tibio-tarsal articulation reaching much beyond the tip of snout; no inner tarsal fold or tubercle; a row of four tubercles on outer edge of tarsus; inner metatarsal tubercle large, oval, its length three-fourths to four-fifths the length of first toe; outer tubercle, nearly half size of inner, well defined, salient; third toe larger and very slightly longer than fifth; a few traces of supernumerary tubercles, but these are obsolete for most part; none or only faintest trace of web between digits; tibia and femur irregularly tubercular above, the larger granules forming irregular transverse rows when limbs are folded; when limbs are folded at right angles the heels overlap 2½ mm.; ventral and inner posterior surface of femur largely granular.

Coloration.—Gray to gray-brown above, with series of dim linear markings, the most conspicuous being between the middle dorsal folds and separated by a hair-fine, lighter line; the outer edge of the dorsolateral fold is dark, with spots or flecks; a blackish line from snout to eye, and several black spots above and behind tympanum; lips with irregular darker spots; hind legs barred with darker; a white spot on dorsal surface of heel; sole and palm purplish, the tubercles whitish; chin, throat, and part of

abdominal surfaces with scattered dark pigment; groin and part of anterior femoral surface without pigment.

Variation.—The paratypes agree in all essential details. Some differences in the shade of color are discernible and some of the specimens show faint dermal ridges on either side of the median line of the snout. In females the tympanum is a little smaller than eye, and the rim is less elevated. The inguinal glands may be a little smaller in females; the axillary gland is not discernible in one case.

Measurements (in mm.): *Microbatrachylus lineatissimus*, sp. nov.

Number—EHT–HMS	24289	24288	24290	24287
Sex	♂	♂	♂	♂
Snout to vent	20	19	21	18.8
Width of head	8.5	8	8.8	8.5
Length of head	9.6	9	9.5	9
Diameter of eye	2.65	2.5	3	2.3
Diameter of tympanum	2.95	2.65	2.9	2.6
Eye to nostril	2	2.1	2	1.9
Length of snout	3.8	3.4	4	3.3
Arm	11	12	12	12
Leg	39	35	39	34
Tibia	13.1	11.3	12.8	11.2
Foot	16	16.2	15.8	16.1

Remarks.—This form agrees generically with *Microbatrachylus* save for the appearance of minute teeth. The presence or absence of teeth is variable in various Eleutherodactylid genera (notably *Syrrhophus latodactylus* where they are probably normally absent but occur occasionally, and *Eleutherodactylus calcitrans* where teeth are normally present but may be absent). The presence of vomerine teeth should not invalidate the recognition of the form as a member of the genus *Microbatrachylus*. In the absence of the tarsal fold, the presence of a large inguinal gland, the character of the ventral disk and the absence of vocal sacs, and presence of the heavily pigmented testicular sac, it agrees with other species of the genus.

It is probable that the female will be found to be larger than the male and the tympanum will be proportionally smaller than in the male.

Specimens were obtained in the edge of a cultivated field about sundown. They had apparently just entered the field from the adjoining forest. Two other species were found here, *Microbatrachylus oaxacae* Taylor and *Eleutherodactylus mexicanus* (Brocchi).

Eleutherodactylus saltator, sp. nov.

Type.—EHT–HMS No. 24301; adult female; Omilteme, Guerrero, about 8,000 ft.; August 2, 1940; E. H. Taylor Collector.

Paratypes.—EHT–HMS Nos. 24293, 24298, 24299; same data; August 2–4, 1940.

Diagnosis.—Related to *Eleutherodactylus calcitrans* but differing in

having much longer legs, the tibiotarsal articulation reaching much beyond tip of the snout instead of to eye or nostril; in having the inner metatarsal tubercle less than half the size; when the limbs are folded at right angles, the heels overlap much more; the terminal digital pads are larger than in *calcitrans*. No tubercle or fold on inner part of tarsus; length of body much less than length from vent to heel.

Description of the type.—Adult female. Width of head (18.3 mm.); a little greater than length (16.5 mm.); tympanum a little higher than wide, its greatest diameter (vertical, 4 mm.) less than diameter of eye (4.7 mm.); distance of eye to nostril (4 mm.) less than eye; eye to tip of snout 7 mm.; distance between nostrils 4.9 mm.; length of snout 6.3 mm.; interorbital distance (4.9 mm.) greater than width of an eyelid (3.5 mm.).

Skin above generally smooth with practically no trace of dorsal folds, but with very minute granules visible (under lens) posteriorly; a fold above tympanum continues to above arm; a downward branch of this fold continues down and back, terminating above arm; fold covers upper edge of tympanum; two small tubercles between tympanum and arm; canthus distinct, moderately sharp; the lores sloping somewhat, concave behind nostril; snout oval, rather pointed; sides of body with some rugosities; ventral surfaces of chin and venter smooth; inguinal gland distinct, yellowish.

Choanae rather large, not concealed by overhanging shelf of jaw; vomerine teeth in two small diagonal groups separated by a distance greater than half their length; they lie behind, and within level of choanae and send a slight ridge toward their inner edge; tongue large, somewhat subcircular, lacking posterior emargination; vocal sacs apparently absent in males; membranes of mouth show much grooving; palate with minute granules or papules.

Arm relatively short, the wrist not reaching beyond tip of snout; no tubercles under forearm; the large median palmar tubercle partially confluent with the smaller outer palmar tubercle, the inner nearly as large as middle one; supernumerary palmar tubercles low; subarticular tubercles large; digital dilations of finger less than toes, the transverse terminal grooves probably indistinct or wanting (unless digit is slightly dried); first finger slightly shorter than second; leg very long, when folded at right angles to body the heels overlap 4 mm.; tibiotarsal articulation reaches beyond tip of snout, a distance equal to the length of the snout; no inner tarsal fold or tubercle; four very dim outer tubercles on tarsus; third and fifth toes reach forward same distance; inner metatarsal tubercle elongate, oval, its length contained once and a half in length of the first toe; subarticular tubercles prominent; a single supernumerary tubercle indicated (under magnification two or three can be discerned in some of the paratypes); part of ventral and posterior surfaces of femur granular; ventral disk strongly indicated, but the posterior limit is not distinct.

Color.—Above variegated lavender, growing more dense and darker on head; loreal region dark, with some spots below canthus and on lips; a dark stripe from eye follows the supratympanic fold; arms and legs barred dimly; surface of hands and feet purplish, the edges of the digit slighter;

tubercles on digits purplish; flesh-white below, with a scattering of pigment, heaviest on chin; posterior surface of femur well pigmented.

MEASUREMENTS OF *Eleutherodactylus saltator* IN MM.

Number	24301	24299	24293	24298
Sex	♀	♀	♀	♂
Snout to vent	44	29	32	22
Width of head	18.3	12	12.8	9
Length of head	16.5	12.9	13.5	10
Diameter of tympanum (vertical)	4	3	3	3
Diameter of eye (long.)	4.7	3.8	4	3
Eye to nostril	4	3	3.5	2.5
Length of snout	6.3	5	5.2	4
Arm	26.2	18.5	19	14.5
Leg	86	58	63	42.2
Tibia	28	20	21	14
Foot	37	24	27	19.6

Remarks.—This very distinctive form, resembling superficially the *Eleutherodactylus calcitrans* was taken near the mountain summits (8,000 ft.) in the region about Omilteme. The very long limb, and the reduced inner metatarsal tubercle will serve readily to distinguish the two forms.

I thought at first that the *Syrrhophus omiltemanus* Günther might be identified with this form. The fact that the abdomen is described as "coarsely granular" and "one metatarsal tubercle," "disks of fingers and toes exceedingly small" point to the strong probability that it is a young *E. calcitrans*. Kellogg, Bull. 160, U.S.N.M., p. 108 states, regarding *S. omiltemanus* that "the hind limb being carried forward along the body, the tibiotarsal joint reaches to between eye and end of snout," showing a shorter leg than this species.

I strongly suspect that the genus *Microbatrachylus* approaches the genus *Eleutherodactylus*, through this form. The testes of the male are black, and the position of the termination of the ventral disk can not be determined. It may be necessary when more is known about this form to refer it to *Microbatrachylus*.

Eleutherodactylus occidentalis, nov. nom.

Borborocoetes mexicanus Boulenger (nec. *Leuiperus mexicanus* Brocchi). Proc. Zool. Soc. London, June 7, 1898, pp. 477, 481, pl. 39, fig. 2, 2 a (Type description; type locality, Hacienda el Florencio, Zacatecas, México, A. C. Buller Coll.); Günther, Biologia Centrali-Americana, Rept. Batr., April, 1900, p. 215 (part).

Eleutherodactylus mexicanus Kellogg (*part.*), Bull. U. S. Nat. Mus., No. 160, 1932, pp. 98–99, 108–112.

This group of Eleutherodactylid frogs is somewhat confused, owing to the fact that two of the species have been named *mexicanus* and placed in two

different genera. That the two species in question are closely related, has been noted by various authors, who have realized that the presence or absence of vomerine teeth was a poor character for the establishing of generic groups.

Unfortunately the exact type locality of *Leuiperus mexicanus* Brocchi is not known. The collector, M. Boucard was known to have collected in southeastern Mexico, so it seems likely that the type came from southern Veracruz, Oaxaca, or Chiapas. A comparison of the western Mexican forms of this group with those from the southeast show very distinct differences, chief of which are that the western specimens have the first finger much longer than second; the vomerine teeth well developed; the inner metatarsal tubercle very large and strongly compressed; and vocal sacs present.

None of these characters are true of the type description of *Leuiperus mexicanus* nor of specimens from Oaxaca which I have referred to the species. In these, the first finger is equal to or shorter than, the second; the metatarsal tubercle is rounded or oval and not compressed; vomerine teeth small or absent, and the limb relatively longer than in the preceding species.

In consequence of these differences I am proposing a name for the western form since the name it now bears is preoccupied.

The following key will serve to distinguish the four species of the *mexicanus* group:

Mexicanus Group of the Genus *Eleutherodactylus.*

This group of four species is characterized by a rather large inguinal gland; a very large inner metatarsal tubercle; the almost complete absence of supernumerary tubercles on sole (save in *occidentalis*); complete absence of webs; no trace of inner tarsal fold or tubercle; vocal sacs usually absent (present in *occidentalis*); vomerine teeth present or absent, usually present but weak.

Key.

A. First finger longer than second; inner metatarsal tubercle strongly compressed, nearly equal to length of first toe; outer tubercle small, about one-fifth size of inner; tibio-tarsal articulation reaches to near nostril; when limbs are folded, heels overlap about two or three millimeters; some supernumerary tubercles on sole and palm; no outer palmar tubercle or pad; tubercles, including those under digits white or cream in color; fifth toe shorter than third, not reaching so far forward; vomerine teeth well-developed; males with vocal sacs; belly smooth, generally; posterior buccal membranes grooved and more or less papillate; testicular membrane white; States of Michoacán, Jalisco, and Nayarit, in Mexico ..... *E. occidentalis nov. nom.*

AA. First finger shorter than (rarely equal) to second; inner metatarsal tubercle not compressed.

B. Tibiotarsal articulation reaches to eye; heels separated two or three millimeters when limbs are folded; fifth toe much shorter than third, reaching forward a shorter distance; inner metatarsal tubercle large, broad and oval, a little shorter than first toe; outer metatarsal tubercle one-fifth of inner; supernumerary tubercles obsolete, on sole, some present on palm; a small outer palmar tubercle touching the median; subarticular tubercles on hand and inner metatarsal tubercle, cream or white, others purplish or dark gray; belly and (sometimes) chin, granular; vomerine teeth present, small, weak; testicular membrane white; buccal membranes grooved or folded strongly, papillate posteriorly; no vocal sacs; skin minutely granular, with some traces of folds; ventral disk distinct; Omilteme, Guerrero (probably also higher parts of the western part of the Sierra Madre del Sur range).

E. calcitrans (Günther)

BB. Tibiotarsal articulation reaching much beyond tip of snout.

C. Inner metatarsal tubercle much smaller than in *calcitrans* or *occidentalis*, oval, less than three-fourths the length of first toe; outer tubercle about one-third size of inner; supernumerary tubercles on palms, none on feet; outer palmar tubercle distinct but fused to the middle one; vomerine teeth small or moderately distinct; palatal membranes folded and papillate posteriorly; metatarsal and subarticular tubercles dark gray to purplish; fifth toe extends as far forward as the third; when limbs are folded, the heels overlap four or five millimeters; belly smooth; disk more or less distinct; tips of digits somewhat more dilated than in *calcitrans;* inguinal gland yellowish; testicular membrane black; male lacking a vocal sac; skin generally smooth with practically no trace of dorsal folds, but traces of granulation posteriorly seen under lens; Omilteme, Guerrero (probably also the higher parts of the Sierra Madre del Sur range in Guerrero).....

E. saltator, sp. nov.

CC. Inner metatarsal tubercle large, double the size of that in *saltator*, and somewhat differently shaped; outer tubercle also relatively

large, about one third inner; heels overlap slightly when limbs are folded; a large outer palmar tubercle or callosity in contact, or partially fused with the middle one; no trace of transverse grooves at tip of digits; skin finely granulate or corrugated; ventral disk slightly areolated on outer edge, with some posterior wrinkling; a row of small tubercles on outer edge of tarsus; vomerine teeth reduced or absent; no trace of transverse terminal grooves on digital pads; vocal sacs absent?; Oaxaca and probably Southern Veracruz and Chiapas.....*E. mexicanus* (Brocchi)

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INSULARITY IN THE GENUS SOREX ON THE NORTH COAST OF BRITISH COLUMBIA.[1]

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During the summers of 1937, 1938 and 1939 Mr. and Mrs. T. T. McCabe, together with, in the latter year, I. McT. Cowan and P. W. Martin, conducted an extensive reconnaissance of the mammalian inhabitants of certain of the islands off the coast of British Columbia between Queen Charlotte Sound and Dixon Entrance, that is, roughly, between 51° and 54° north latitude.

The field work was devoted primarily to securing specimens of *Peromyscus*, but many other species were obtained, and among these two hundred and eighty-seven shrews. These shrews display certain features of significance in a study of insularity that are reported upon here.

The geologic history, fauna, flora and climatic features of the area are being dealt with fully in the report upon the *Peromyscus* obtained. However, in brief, the inner islands collected upon lie close to the coast, often separated from the continent by straits of a mile or two in width, and seldom more than five or six miles. The outer islands may be twice that distance from the mainland. The climate is mild and excessively humid, rainfall varies from sixty to two hundred or more inches per annum, and snow is almost unknown at sea level. The islands are heavily timbered marginally and sometimes throughout but more often there are large muskegs in the interiors. For the most part the small mammal fauna is confined to the beaches.

So far as has been established the islands were completely glaciated and this until a comparatively recent date. Geologists agree that ten thousand years is probably a useful approximation of the time that has elapsed since the islands and adjoining coast became habitable again.

It is possible that certain of the islands were populated by glacier transported debris containing small mammals. Mountain glaciers descending

[1] A contribution from the British Columbia Provincial Museum.

to salt water must have persisted long after the area in general was inhabited by the reinvading mammal populations. However, our observations tend to support the theory that colonization was by means of the huge rafts of logs and debris that annually slip from the precipitous and water sodden hillsides and float out to sea.

Investigations of the oceanic and in-shore currents and residual surface drift carried out by the International Fisheries Commission (1936) have revealed that the drift is on shore and northward so that there are good chances that many animals cast adrift on these huge rafts find their way to the islands or mainland a greater or shorter distance to the north of the point of origin.

The chances of each individual island receiving a given species would seemingly then vary with the abundance of the species in the forested habitat type providing the material for the land-slide, the set of local winds and currents, the size of the island and its distance from the point of origin of the slide. We have found certain suitable islands that so far as we could determine are still without a mammal population of any kind. The distribution of all the species encountered will be dealt with in another paper.

Measurements are those used by Jackson (1928 : 13) and were taken in the same way.

Collections of shrews were made on the mainland coast at Schooner Passage, Fitzhugh Sound, Koeye River, Neckis River and Lowe Inlet, and on the following islands: Princess Royal, Swindle, Yeo, Pitt, Campbell, Horsfall, Townsend, Smythe, Reginald, Dufferin, Porcher, Banks, Hunter, Spider, Campania, Calvert, Estevan, McCauley, Goose and Hecate. In addition traps were set on Table, Moore, north Estevan and Aristazable islands but no shrews were obtained. While it is difficult to be sure of a negative result we feel reasonably confident that shrews were not present on these islands at the time we trapped there.

Three species of shrews were found by us in the coastal part of British Columbia between latitudes 51° north and 54° north. Of these *Sorex palustris* was taken once only, at Neckis River, on the mainland coast, and not at all on the islands.

Sorex cinereus was not abundant. Specimens were taken at Neckis River on the mainland, and on Princess Royal, Yeo, Pitt, Campbell, Townsend, Smythe, Hunter, and Spider islands. Even where they did occur they were much less abundant than the next species and we were unable to obtain series adequate for a study of geographic variation. Five specimens taken on Pitt Island, nine on Yeo Island, seven on Campbell Island and five on Spider Island, were the largest series obtained. In view of this rarity we can not assume that *S. cinereus* was not present on many of the islands upon which we did not take it. However, sufficient trapping was done on Calvert Island to warrant the assumption that at least until 1939 the species was absent from that island.

Sorex obscurus was next to *Peromyscus*, the most abundant and widespread species of small mammal. It was taken at every trapping station on the mainland and on every island upon which shrews were taken.

On Spider Island we found *Sorex obscurus* and *S. cinereus* but no *Peromyscus*. On Moore, Aristazable and Table islands *Peromyscus* were abundant and shrews apparently absent.

The forty-three specimens of *Sorex cinereus streatori* taken display remarkable uniformity. In this species there is apparently marked change in pelage color during the course of the summer, but wherever series are available we can discern no differences between comparable populations attributable to geographic location. Either this species is of recent arrival upon the islands and has not yet had time to respond to the action of isolation or it is a stable species producing little material for selective influences to segregate. *Sorex obscurus*, however, exhibits several noteworthy variant populations.

The three mainland collecting stations Koeye River, Neckis River and Lowe Inlet are separated by many miles of tortuous, precipitous coast in which several rivers and many extensive inlets penetrate from the humid outer coast climate to a less humid inland climate. The southernmost station, Koeye River, is approximately one hundred and fifty miles in a straight line from Lowe Inlet but in actual coast line distance perhaps six to eight times farther. It is interesting to note, therefore, that a comparison of the series of *S. obscurus* from these three places reveals no significant differences. The Lowe Inlet series averages slightly paler than that from Koeye River, but with this exception the population of the mainland is essentially homogeneous from Rivers Inlet to the Skeena River.

Specimens in the National Museum of Canada from the mainland south of our area at points on Kincome Inlet, Loughborough Inlet and Bute Inlet indicate a gradual transition in this region from the *Sorex obscurus longicauda* type of the coast north of Rivers Inlet to the *S. o. setosus* type of southwestern British Columbia.

In view of the homogeneity found to exist on the mainland coastal area under study I have felt justified in combining the series from the three mainland stations. Figures hereafter stated as representing the mainland population are derived from the combined data of eleven adults of both sexes from Koeye River, eight adults from Neckis River, and seven from Lowe Inlet. The low values of the coefficient of variability shown by the various measured features in this mainland series is further evidence of the homogeneous nature of the sample.

Since the major objective of the field work on the islands was the securing of adequate series of *Peromyscus* the *Sorex* material here reported upon was captured incidentally. For this reason many of the islands are represented by but a small number of specimens and the removal from these small series of the sub-adult individuals leaves too few specimens to be of significance in a study of geographic variation. This is the case with all the islands except Calvert, Banks, Spider, Hunter, Yeo, Smythe, Reginald and Townsend.

On the basis of the material assembled by us it seems possible to divide the shrews of the species *S. obscurus* on the coast and islands of British Columbia between Queen Charlotte Sound and Dixon Entrance into three

geographic races each differing significantly in several features from the inhabitants of adjoining areas. There are also certain insular populations that differ slightly from those inhabiting adjacent land masses but not to a degree, in our estimation, that their designation by a separate subspecific name would serve any useful purpose. We regard these as incipient races, and from the long-time viewpoint, they may well provide useful data on the rapidity with which evolutionary changes take place.

The Mainland population.—Sorex obscurus longicauda. We have not examined either the type or topotypes of *longicauda* in comparison with our series but follow Jackson in applying this name to the mainland coastal population.

Measurements, cranial and external, of this population are given in Table 1.

The winter pelage of *longicauda* as represented by specimens from Koeye River taken July 14, 1939, is the darkest we have seen on any shrew of the species *obscurus*. Ground color of dorsal surface and sides closest to Blackish Mouse Gray with a smattering of silver-tipped hairs and some dull brownish tipping probably the result of wear but possibly intrinsic. Head slightly more brownish; ears Bister and in strong contrast. Underparts Mouse Gray; tail monocolor, somewhat darker than Warm Sepia; feet same as tail. A single male taken October 12, 1938, at Tom Bay, Mathieson Channel, is the only specimen in winter pelage from the northern end of the area. It is paler than the palest of the Koeye River series.

Summer pelage.—Dorsal surface between Clove Brown and Olive Brown, paling slightly on sides and passing abruptly into the color of the underparts which in general effect approximate Hair Brown. Tail bicolor, above between Natal Brown and Bone Brown, paler below; feet same as under side of tail. Lowe Inlet specimens as a series tend to be just perceptibly paler than those from the two more southerly localities.

Shrews that I am unable to differentiate from the mainland type seem to constitute the populations on Goose, Horsfall, Pitt, Princess Royal, McCauley, Chatfield and Dufferin islands. However, in nearly every case the series from these islands are small and it may well be that the acquisition of further material will reveal demonstrable differences between the populations of some of these islands and that of the mainland.

Across Fitzhugh Sound from the mainland locality of Koeye River is Calvert Island. This is a large island, approximately eighteen miles by eight miles in extreme distances. It is heavily wooded for the most part with a central mountain of two thousand feet altitude. Upon this island there is a population of *Sorex obscurus* differing in remarkable degree from that of the mainland.

The summer pelage of the Calvert Island shrews, as represented by ten specimens taken between April 19 to July 14, 1937 and 1939, is much paler than the corresponding pelage in mainland specimens. Here the upperparts are between Saccardo's Umber and Bister; underparts, tail and feet paler, not essentially different from winter pelage except that the tawny wash present in winter is more pronounced in summer. In color of dorsum specimens in summer pelage from Calvert Island are hardly distinguishable

from specimens of *S. o. setosus* from Vancouver, B. C., but the underparts differ in being tawny rather than whitish.

The winter pelage is represented by eight specimens taken between May 18 and June 14, 1937. Dorsal coloration is between Hair Brown and Deep Mouse Gray, very much paler than the corresponding pelage of the mainland population; head and sides slightly more brownish; underparts grayish-white washed with pale buff. The tail and feet of Calvert Island specimens in winter pelage are markedly paler than even the summer color of these members in *longicauda*.

The winter pelages as represented in our series of *longicauda* from Koeye River and Calvert Island shrews from Safety Cove show no overlap and can be picked out with one hundred per cent accuracy from a mixed series. The contrast is almost identical in degree with the color differences in winter pelage between *S. o. obscurus* and *S. palustris navigator*.

External measurements.—Specimens of *Sorex obscurus* from Calvert Island are smaller than *longicauda* and have a shorter tail and smaller hind foot. Actual values for these measurements can be obtained in comparison of tables 1 and 2. The value of P for total length and length of tail is in each instance much less than .01 revealing these differences as significant. Length of hind foot though is less than .02 and only just greater than .01, consequently though the difference is probably significant it can not be demonstrated as positively so on the existing series.

Cranial measurements.—The mean values of all six cranial measurements are smaller on Calvert Island than in *longicauda*. Condylobasal length ($t=6.67$), cranial breadth ($t=4.1$), maxillary breadth ($t=4.75$) and length of maxillary tooth row ($5=5.02$) in each case have a value of P much less than .01 and are significantly smaller in the insular race. Palatal length is possibly significant.

Thus in the nine measured features the shrews of Calvert Island are significantly smaller than *longicauda* in six, and possibly so in another two. This coupled with the outstanding color differences provides an unusually well characterized race isolated on a single island removed from the mainland by a body of water about four miles across. It would be interesting to know the nature of the shrew population on Hecate Island which is separated from Calvert Island by a comparatively quiet channel in places not much over one-half mile in width. Our sole specimen from Hecate Island is smaller and more pallid than any of those taken on Calvert Island.

On Banks Island 120 miles north of Calvert Island we have found a population of *Sorex obscurus* virtually indistinguishable from that of Calvert Island.

In winter pelage the Banks Island shrews are almost if not quite indistinguishable from those of the Calvert Island race. The summer pelage, however, is somewhat paler on Banks Island.

As is the case with the Calvert Island population that of Banks Island is significantly smaller than *longicauda* in the following measured skull features, condylobasal length ($t=9$), palatal length ($t=3.4$), cranial breadth ($t=5.15$), maxillary breadth ($t=5.99$) and length of tooth row

(t=4.74). As may be seen in comparison of tables 1, 2 and 4 the Banks Island shrews have the skulls smaller even than those of the Calvert Island race. This difference, however, is slight and in only one feature, condylobasal length, is it significant.

Banks Island shrews are significantly shorter than *longicauda* with shorter tail and smaller hind foot. In these features they agree closely with the Calvert Island race as also they do in proportion of tail length to body length. This proportion is seventy-six per cent in the Calvert Island shrews, seventy-seven per cent in the Banks Island series, whereas that of *longicauda* is eighty-six per cent.

Strictly on the basis of our series we can differentiate the shrews of Banks Island from those of Calvert Island only on the basis of shorter condylobasal length (there is but one overlapping specimen) and by possibly paler summer pelage. Our series of specimens from Banks Island is, however, very small and with a more adequate sample it might be possible to establish the existence of other differences.

These two closely similar populations inhabit islands separated by over one hundred and twenty miles of turbulent water set with a maze of large and small islands populated by shrews of very different character.

On strictly theoretical grounds this situation is open to several interpretations but most of these are for various biologic reasons extremely improbable.

It is possible that convergent changes from a dark pelaged, long-tailed ancestral colonizing stock of mainland origin have through the years given rise to the present status quo; that the dark pelaged coastal race sponsored by the selective potential of insular isolation has fostered the selection of similar mutations on both islands. The multiplicity of the mutations that must of necessity be involved reflects considerable doubt upon the probability of this explanation being the true one.

On the other hand it would seem more probable that the coastal mainland population has changed genotypically and phenotypically from its original form. Certainly if the reinvasion of the territory subsequent to the ice withdrawal was at all rapid it may well be that the stock that first inhabited the mainland coast differed little from the race we now know as *S. o. obscurus*, itself a relatively stable and adaptable type, and that the more successful race *longicauda* has arisen *in situ* subsequently and has not since been able to establish itself on Banks and Calvert islands. The two insular populations under discussion do indeed bear closer resemblance to *S. o. obscurus* then they do to *S. o. longicauda.*

From this approach it is possible that Banks Island and Calvert Island were colonized at the time the mainland was reinhabited and though their shrew population since then has undergone minor changes these have not yet been of a kind or magnitude to render the two insular populations markedly dissimilar.

A further insular population well differentiated from that of the mainland inhabits Smythe, Townsend and Reginald islands of the Bardswell group.

The summer pelage of this shrew is almost indistinguishable from the

corresponding pelage of *longicauda* but the insular shrews are much browner in winter and lack the blue-black cast of the mainland race.

Furthermore the Bardswell islands' shrew is smaller, with shorter tail and hind foot, the difference in each case being significant. In external measurements this population agrees closely with that of Calvert Island. Like the Calvert population the tail averages seventy-seven per cent rather than eighty-six per cent of body length.

Cranially the Bardswell shrews have condylobasal length and tooth row significantly shorter (P = less than .01). At the same time cranial breadth, interorbital breadth, and maxillary breadth are the same as in *longicauda*. Thus the insular population has a relatively shorter, broader skull.

The Bardswell population differs significantly from the Calvert Island population in greater maxillary breadth and cranial breadth, reflecting a relatively and actually broader rostrum and brain case.

Of the other islands in the Bardswell group we have *Sorex obscurus* from Dufferin and Horsfall. The two specimens from Dufferin, an island separated from Smythe Island by a channel only a few hundred yards wide, are in all respects indistinguishable from *longicauda*. Those from Horsfall, on the mainland side of Dufferin have characters approximately mid-way between *longicauda* and the Bardswell population in respect to externals. Cranially condylobasal length agrees with the latter, palatal length is greater than either and the other measured features are indeterminate.

In addition to the well:differentiated insular populations described above we have found several islands upon which the shrews differ from those on the mainland in one or two features.

In this category is the population on Spider Island and closely adjoining Hunter and Ruth islands. The shrews on this group of islands resemble those on the Bardswells in color, differing from the mainland population (*longicauda*) in much browner winter pelage and in darker summer pelage. In fact this pelage is on these islands the darkest of any taken by us. Total length is much the same in the Spider-Hunter population and *longicauda*, but tail length and length of hind foot are less though not significantly so. The tail is significantly shorter in comparison with body length, tail length is seventy-five per cent of body length on Spider Island, eighty-six per cent in *longicauda*. This difference is the product of the longer body and shorter tail of the Spider Island shrews. They are in these features intermediate between *longicauda* and the Bardswell type. As regards skull measurements the Spider-Hunter population is virtually identical with *longicauda* except in two features, condylobasal length which is less, not significantly so, and interorbital width which is significantly greater. In the first of these the condition is intermediate between the Bardswell shrew and *longicauda* as were departures from the mean of *longicauda* in external measurements. The broad interorbital region, however, is unique.

Of all the insular populations examined Yeo is the sole island upon which the shrews comprising our series are larger, with longer tails than *longicauda*, the differences, however, are small and not significant and the cranial dimensions are identical. Color, too, is indistinguishable from that of

longicauda at least as regards summer pelage. The winter pelage on Yeo Island is not known to us.

The small series of five adults from Campbell Island is externally the same as *longicauda* except that the hind foot is slightly shorter. The winter pelage is unknown. Cranial measurements while not significantly different from those of *longicauda* in any feature have the mean of condylobasal length less and that of palatal length and interorbital breadth greater. This if confirmed by further specimens is a unique departure from the hypothetical parent stock, at least as far as our investigations have taken us.

Our series of seven shrews from West Estevan Island contains but three adults. The measurements of these suggest that the shrew population of this island may constitute a well-marked race, but our material is too meagre to establish this one way or another. Though the number of islands from which any sort of series are available is unfortunately small, we can nevertheless derive some information on the generalities of the results of insular isolation on *Sorex obscurus*. Of the nine measurable characters used in this study length of tail, length of hind foot and condylobasal length of skull are the most prone to vary geographically. The insular populations, where they differ in any important degree, have these features less in size than on the mainland. In no case have we found an insular population with significantly longer tail and longer hind foot than the shrews of the adjoining mainland area. The differentiated insular populations have the tails relatively shorter in comparison with body length. On Spider Island this is not accompanied by shorter body length, but on the Bardswells, Calvert and Banks it is. Actual values for this proportion are mainland eighty-six per cent, Yeo Island eighty-eight per cent, Spider Island seventy-five per cent, Bardswells seventy-seven per cent, Calvert seventy-six per cent, Banks seventy-seven per cent. In general we have found that this shrew living under insular conditions tends to develop shorter body, tail and hind foot and a skull smaller in all features but interorbital breadth. This is stable and in all but one insular population is the same as in the mainland population. On Spider Island, however, interorbital width of the insular population is significantly greater than that of the mainland shrews. Color apparently varies in haphazard fashion.

In the area studied we can find no evidence of change latitudinally.

In the absence of any direct evidence from breeding experiments we must endeavor to determine by other means whether the differences recorded above are genetic or merely the response of the soma of the individual to the environment.

There are several well known cases which might support the latter view. Thus several cervid species are known to respond to insularity by size decrease and by stunting of the preorbital portion of the skull. Huxley (1932) dealt with *Cervus elaphus* in this regard and Cowan (1936) with *Odocoileus*. In both these instances experiment has proven that the size differences at least are not genetic and that the skull differences are at least in large part the result of heterogony.

How these changes are occasioned is not known but in *Odocoileus* on the

coast of British Columbia the intensity of the effect seems to depend on the size of the island. The presence of a natural predator appears to retard or inhibit the reduction in size.

However, if the size differences observed on certain of the islands are the direct result of environmental action upon the soma of each individual it is difficult to account for the presence of differentiated and undifferentiated populations living on islands of identical type separated by but a very narrow water barrier. It is equally difficult to account for the varied pelage colors displayed by the different populations on closely adjoining islands.

Therefore it seems more logical to assume that the observed differences are due to the building up of forms with superior viability under the selective conditions imposed by insular isolation.

The evidence set forth demonstrates the presence in the area under study of three well-characterized forms. One on the mainland coast, for which I am using the name *longicauda* and two unnamed insular races. For the latter I propose the following names.

Sorex obscurus calvertensis, subsp. nov.

Type.—Male adult, number 1947, British Columbia Provincial Museum; taken July 14, 1937, at Safety Cove, Calvert Island, B. C., by T. T. and E. B. McCabe.

Distribution.—Calvert Island and Banks Island, B. C.

Diagnosis.—Smaller, with shorter tail and hind foot and with skull significantly smaller in condylobasal length, cranial breadth, maxillary breadth and length of upper tooth row than corresponding measurements of *longicauda*. Coat color much paler both summer and winter than *longicauda*. For more extended description see above.

Specimens examined.—Calvert Island: Safety Cove 23, Kwakshua 2. Banks Island: Larson Harbour 9.

Remarks.—As has already been stated even our small series from Banks Island differs in two particulars from the Calvert Island population, significantly in condylobasal length and slightly in color of summer pelage. The color differences could conceivably be the result of pelage wear and bleaching. Our Banks Island series also *suggests* that there may be certain other features in which the shrews from this island differ from *calvertensis*. However, the designation of the Banks Island population as a separate race is not justified on the basis of existing material. In the meantime we feel that the assignment of the Banks Island population to *calvertensis* with the admission that it is at least a nascent race, best expresses the status quo and emphasizes the essential similarity existing between the shrews of the species *S. obscurus* occurring on Banks Island and Calvert Island.

Sorex obscurus insularis, subsp. nov.

Type.—Adult female, number 3110 British Columbia Provincial Museum, taken August 24, 1938, on Smythe Island, Bardswell group, B. C., by T. T. and E. B. McCabe.

Distribution.—Smythe, Townsend and Reginald Islands, B. C.

Diagnosis.—Compared with *calvertensis* and *longicauda* winter pelage is brown rather than gray or blackish. Total length, tail and hind foot significantly less than in *longicauda* but not differing from *calvertensis*. Skull of *insularis* is significantly smaller than *longicauda* in condylobasal length and tooth row, and greater than *calvertensis* in maxillary breadth and cranial breadth. A more extended description is given earlier in this paper.

Specimens examined.—Smythe Island 29, Townsend Island 31, Reginald Island 8.

Besides these well differentiated races our collections indicate a race in the nascent state on Spider Island and possibly others on one or two islands from which our material is too scant to be informative.

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TABLE 1—*Sorex obscurus longicauda.*

VARIANT	MEAN	RANGE	STANDARD DEVIATION	COEFFICIENT OF VARIABILITY	NUMBER
Total length	130 ± 1.34	119 – 144	6.54 ± .945	5.04 ± .727	24
Tail	59.8 ± .964	49 – 68	4.88 ± .680	8.20 ± 1.14	26
Hind foot	15.4 ± .153	13 – 17	78 ± .108	5.08 ± .705	26
Condylobasal length	18.6 ± .043	18.2– 19.0	.209 ± .0302	1.16 ± .168	24
Palatal length	7.7 ± .0505	7.4– 8.4	.252 ± .0356	3.28 ± .464	25
Cranial breadth	9.0 ± .0397	8.5– 9.3	.194 ± .028	2.15 ± .311	24
Interorbital width	4.1 ± .0344	3.9– 4.6	.172 ± .0244	4.20 ± .595	25
Maxillary breadth	5.4 ± .0364	5.0– 6.0	.178 ± .0257	3.3 ± .0476	24
Tooth row	7.0 ± .035	6.6– 7.3	.171 ± .0247	2.45 ± .0354	24

TABLE 2—*Sorex obscurus longicauda*—Yeo Island.

Total length	134 ± 1.41	124 – 142	5.47 ± 1.22	4.07 ± .91	10
Tail	63 ± .80	58 – 68	2.53 ± .565	4.02 ± .90	10
Hind foot	15 ± .20	14 – 16	.633 ± .143	4.21 ± .945	10
Condylobasal length	18.6 ± .115	18.0– 19.4	.340 ± .076	1.83 ± .408	10
Palatal length	7.7 ± .0368	7.5– 7.8	.111 ± .026	1.44 ± .340	9
Cranial breadth	9.0 ± .036	8.8– 9.2	.114 ± .025	1.27 ± .284	9
Interorbital width	4.2 ± .083	3.8– .47	.246 ± .058	5.87 ± 1.38	9
Maxillary breadth	5.4 ± .022	5.3– 5.5	.067 ± .016	1.24 ± .292	9
Tooth row	7.0 ± .062	6.6– 7.2	.185 ± .044	2.66 ± .625	9

TABLE 3—*Sorex obscurus calvertensis*—Calvert Island.

VARIANT	MEAN	RANGE	STANDARD DEVIATION	COEFFICIENT OF VARIABILITY	NUMBER
Total length	121.6 ± 1.39	109 – 129	5.01 ± .987	4.15 ± .816	13
Tail	54 ± .487	52 – 58	1.78 ± .351	3.30 ± .650	13
Hind foot	14.7 ± .165	13 – 15	.603 ± .1184	4.10 ± .806	13
Condylobasal length	18.1 ± .048	17.9– 18.4	.152 ± .034	.840 ± .019	10
Palatal length	7.5 ± .043	7.3– 7.8	.147 ± .030	1.97 ± .403	12
Cranial breadth	8.7 ± .057	8.4– 9.0	.179 ± .040	2.06 ± .046	10
Interorbital width	4.0 ± .025	3.9– 4.2	.087 ± .018	2.17 ± .44	12
Maxillary breadth	5.1 ± .047	4.9– 5.4	.161 ± .033	3.16 ± .065	12
Tooth row	6.7 ± .043	6.4– 6.9	.150 ± .031	2.24 ± .046	12

TABLE 4—*Sorex obscurus calvertensis*—Banks Island.

Total length	122 ± .75	117 – 124	1.67 ± .53	1.37 ± .434	5
Tail length	53 ± 1.14	49 – 55	2.55 ± .81	4.84 ± 1.53	5
Hind foot	14 ± .2	13 – 14	.447 ± .142	3.2 ± 1.01	5
Condylobasal length	17.7 ± .053	17.6– 17.9	118 ± .038	.674 ± .213	5
Palatal length	7.3 ± .045	7.2– 7.4	.1 ± .032	1.37 ± .435	5
Cranial breadth	8.5 ± .078	8.2– 8.7	.173 ± .055	2.04 ± .645	5
Interorbital breadth	4.1 ± .09	3.8– 4.4	.2 ± .064	4.88 ± 1.55	5
Maxillary breadth	4.9 ± .028	4.9– 5.0	.063 ± .02	1.29 ± .409	5
Tooth row	6.6 ± .064	6.5– 6.8	.141 ± .045	2.14 ± .68	5

TABLE 5—*Sorex obscurus insularis.*

VARIANT	MEAN	RANGE	STANDARD DEVIATION	COEFFICIENT OF VARIABILITY	NUMBER
Total length	122.3 ± .760	111 – 134	5.37 ± .537	4.41 ± .441	50
Tail length	52.6 ± .358	46 – 58	2.51 ± .251	4.80 ± .480	50
Hind foot	14.6 ± .80	13 – 15	.577 ± .058	3.96 ± .391	52
Condylobasal length	18.2 ± .034	17.7– 18.7	.252 ± .024	1.39 ± .133	55
Palatal length	7.6 ± .241	7.3– 8.0	.178 ± .017	2.34 ± .224	55
Cranial breadth	9.0 ± .028	8.1– 9.3	.208 ± .020	2.32 ± .223	54
Interorbital width	4.1 ± .022	3.7– 4.5	.164 ± .016	4.01 ± .038	55
Maxillary breadth	5.4 ± .021	5.0– 5.9	.154 ± .015	2.86 ± .274	55
Tooth row	6.8 ± .020	6.4– 7.0	.150 ± .014	2.22 ± .212	55

TABLE 6—*Sorex obscurus longicauda*—Spider Island population.

Total length	130.2 ±1.638	120 – 140	5.42 ±1.158	4.1 ± .877	11
Tail length	54.6 ± .968	49 – 59	3.21 ± .684	5.88 ±1.255	11
Hind foot	15.0 ± .159	14 – 16	.548 ± .120	3.66 ± .748	12
Condylobasal length	18.4 ± .059	18.0– 18.7	.204 ± .042	1.11 ± .228	12
Palatal length	7.8 ± .032	7.5– 7.9	.114 ± .023	1.435 ± .294	12
Cranial breadth	9.0 ± .043	8.8– 9.2	1.47 ± .030	1.64 ± .336	12
Interorbital breadth	4.3 ± .029	4.1– 4.4	1.0 ± .021	2.33 ± .476	12
Maxillary breadth	5.5 ± .026	5.4– 5.7	.914 ± .019	1.66 ± .340	12
Tooth row	6.9 ± .049	6.8– 7.4	1.71 ± .035	2.48 ± .506	12

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THREE NEW WOLVES FROM NORTH AMERICA.

BY E. A. GOLDMAN.

A monograph on the wolves of North America, by Stanley P. Young and the writer, is approaching completion. In order to facilitate discussion of the various geographic races in the text, it seems desirable to publish the descriptions of three that have remained unrecognized until now. For the loan of material used in characterizing a new form from British Columbia, and for other courtesies, I am indebted to Dr. G. Clifford Carl, Acting Director of the Provincial Museum, Victoria, British Columbia.

New subspecies of wolves are segregated as follows:

Canis lupus alces, subsp. nov.

KENAI PENINSULA WOLF.

Type.—From Kachemak Bay, Kenai Peninsula, Alaska. No. 147471, ♀ adult, skull only, U. S. National Museum (Biological Survey collection); collected by C. A. Lambert, 1904. X–catalog number 5133.

Distribution.—Known only from the type locality, near the southern end of the Kenai Peninsula.

General characters.—Size large—perhaps the largest of North American wolves; skull elongated with broad rostrum and narrowly spreading zygomata; canines large, but molariform teeth comparatively small. Similar in general to *Canis lupus pambasileus* of the Mount McKinley region, but apparently larger and differing in cranial details.

Color.—No skins available and color undetermined.

Skull.—Similar in general to that of *pambasileus*, but apparently larger, more elongated; rostrum longer; nasals broader, more divergent anteriorly; supraoccipital shield broader; dentition similar, but molariform teeth relatively narrower.

Measurements.—No body measurements available. Skull: Type, and an adult female topotype, respectively: Greatest length, 280.5, 272; condylobasal length, 263.5, 253.2; zygomatic breadth, 141.3, 141.4; squamosal constriction, 82.2, 81.8; width of rostrum, 47.4, 46.6; interorbital breadth, 49, 45.9; postorbital constriction, 44.3, 42.1; length of mandible, 201.3,

194.3; height of coronoid process, 79.1, 82; maxillary tooth row, crown length, 118.5, 112.3; upper carnassial, crown length (outer side), 25.5, 24.5, crown width, 12.8, 13; first upper molar, antero-posterior diameter, 17.1, 17.1, transverse diameter, 22.3, 22.3; lower carnassial, 30.3, 29.1. Two immature male topotypes (canines not fully in place), respectively: Greatest length, 263, 262.8; condylobasal length, 245, 250; zygomatic breadth, 133.8, 130.5; squamosal constriction, 80.7, 82.3; width of rostrum 44.7, 45.7; interorbital breadth, 43.9, 42.5; postorbital constriction, 42.4, 40.9; length of mandible, 185, 190; height of coronoid process, 76.5, 74; maxillary tooth row, 108.6, 113.2; upper carnassial, crown length (outer side), 26, 27.5, crown width, 14.4, 15.4; first upper molar, antero-posterior diameter, 16.8, 17.3, transverse diameter, 23.3, 23.3; lower carnassial, 28.9, 31.1.

Remarks.—Five skulls without skins, from Kachemak Bay, Kenai Peninsula, do not appear to be properly assignable to any of the races described and are, therefore, regarded as representatives of a new subspecies. This segregate reaches the maximum size attained by the species in North America. The skulls of two adult females are longer than those of any others examined, and present other peculiarities pointed out. Skulls of three immature males are not widely different from those of *pambasileus* of comparable age, but differ uniformly in the greater width of the supraoccipital shield. The new subspecies may range throughout the Kenai Peninsula, which at its base is narrowly connected with the mainland of Alaska. Specimens from north of Turnagain Arm of Cook Inlet are assignable to *pambasileus*. The principal natural prey of the Kenai wolf is doubtless the giant moose of the region.

Specimens examined.—Total number, 5 (skulls only), all from Kachemak Bay, Kenai Peninsula, Alaska.

Canis lupus columbianus, subsp. nov.

BRITISH COLUMBIA WOLF.

Type.—From Wistaria, north side of Ootsa Lake, Coast District, British Columbia. No. 3559, ♂ adult, skull only, British Columbia Provincial Museum; collected by J. C. Shelford, November, 1938.

Distribution.—Greater part of British Columbia, west of the Rocky Mountains and the Stikine Mountains, passing into *Canis lupus fuscus* near the southwestern coast and into *Canis lupus ligoni* along the coast bordering the Alexander Archipelago of southwestern Alaska; grades into *Canis lupus occidentalis* in the Peace River region, and farther south into *Canis lupus irremotus.*

General characters.—Size large; upper parts suffused with light "cinnamon buff" (Ridgway, 1912); skull with broad supraoccipital shield and narrow carnassials. Approaches *pambasileus* of Alaska and *occidentalis* of Mackenzie in size, but reaches less extreme maximum dimensions, and differs from both in color and cranial details. Differs from *irremotus* of Montana in larger usual size, more "cinnamon-buff" coloration, and broader postorbital region of skull. Differs from *fuscus* of Oregon in larger size, paler

color, and cranial features, especially the longer nasals. Differs from *ligoni* of the Alexander Archipelago, Alaska, in greater usual size, and more "cinnamon-buff" suffusion of upper parts.

Color.—A female in fresh pelage from Chezacut, north shore of Chilcotin Lake, No. 4728, British Columbia Provincial Museum: Upper parts in general suffused with light "cinnamon-buff," purest and most intense on sides of shoulders, flanks, and thighs; top of head "cinnamon-buff" mixed with black, becoming abruptly grizzled grayish on forehead and face; muzzle and chin brownish; under side of neck "pale pinkish buff" slightly darkened by black tips of longer hairs; chest and thorax "pinkish buff"; inguinal region white; ears "cinnamon" mixed with black; lower part of legs "pinkish buff," a narrow blackish line along anterior surface of forearm; upper side of tail near base with under color "pale pinkish buff," heavily overlaid with black, passing into "cinnamon-buff" more moderately darkened by black-tipped hairs, becoming black at end as usual in the species; under side of tail pure "pale pinkish buff" on proximal two-thirds, passing into a "pinkish buff" suffusion overlaid with black toward tip.

Skull.—Closely resembling that of *pambasileus*, but usually smaller; supraoccipital shield broader; postorbital processes slenderer, more tapering; carnassials relatively narrower, more elongated (antero-posteriorly); second lower molars larger, more elongated. Very similar to that of *occidentalis*, but usually smaller; postorbital processes slenderer, more tapering; dentition as a whole lighter, but second lower molars larger; canines more slender; carnassials relatively narrower. Compared with *irremotus:* Size larger; frontal region broader, less constricted behind postorbital processes; supraoccipital shield usually broader, more rounded near apex; dentition similar. Compared with *fuscus:* Size larger; nasals relatively longer, extending farther posteriorly beyond ends of maxillae; second lower molars relatively larger. Differs from that of *ligoni* most obviously in greater usual size.

Measurements.—Approximated from tanned skin of a female from Chezacut (used in color description): Total length, 1600 mm.; tail vertebrae, 370. Skull (type, and an adult male topotype, respectively): 272.9, 263.9; condylobasal length, 260, 244.4; zygomatic breadth, 148.4, 147.7; squamosal constriction, 82.5, 80.8; width of rostrum, 46, 45; interorbital breadth, 48.8, 43.1; postorbital constriction, 45.7, 38.3; length of mandible, 196.2, 193; height of coronoid process, 75, 80.9; maxillary toothrow, 112.1, 107.3; upper carnassial, crown length (outer side) 27.1, 26.8, crown width, 13.8, 14; first upper molar, antero-posterior diameter, 17.3, 16.4, transverse diameter, 24.1, 22.9; lower carnassial, crown length, 31.1, 29.5. Two adult female topotypes, respectively: Greatest length, 262.2, 266.5; condylobasal length, 235.8, 246.4; zygomatic breadth, 140, 133.8; squamosal constriction, 79.3, 79.5; width of rostrum, 45.4, 43.1; interorbital breadth, 46.8, 42.7; postorbital constriction, 44.6, 37; length of mandible, 185.3, 188.7; height of coronoid process, 73.6, 73, maxillary toothrow, 105.8, 108.4; upper carnassial, crown length (outer side), 25.6, 24.7, crown width, 12.9, 13.4; first upper molar, antero-posterior diameter, 16.7, 17.1, transverse diameter, 22, 21.8; lower carnassial, 29, 28.2.

Remarks.—The British Columbia wolf, *columbianus*, approaches its larger northern neighbors in size, but differs in combination of color and cranial details. Two skulls from Iskut Summit, 60 miles south of Telegraph Creek, are large for *columbianus*, but present somewhat mixed characters in detail. They probably represent intergradation with *pambasileus* or *occidentalis*. Although from a locality not far distant from the range of *ligoni*, which is mainly confined to the Alexander Archipelago, these specimens exhibit a marked departure from those of that race in size and detailed characters. The British Columbia subspecies is believed to be increasing in numbers in some of the more remote sections of the country.

Specimens examined.—Total number, 17, as follows:

British Columbia: Bowron Lake, Cariboo District, 1 (skull only[1]; Chezacut, north shore Chilcotin Lake, 3 (2 skulls without skins)[1]; Iskut Summit (60 miles south of Telegraph Creek), 2 (skulls only)[3]; Kettle River, 2 (skulls only)[2]; Little Prairie, Horsefly River, Cariboo District, 1 (skull only)[1]; Pemberton, Lillooet District, 1 (skull only)[1]; Roche River, (tributary of Similkameen River), Yale District, 1 (skull only); Telegraph Creek, 1 (skull only)[1]; Vernon, Yale District, 1 (skull only)[1]; Wistaria, north side of Ootsa Lake, Coast District, 4 (skulls only)[1].

Canis lupus hudsonicus, subsp. nov.

HUDSON BAY WOLF.

Type.—From head of Schultz Lake, Keewatin, Canada. No. 180281, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection); collected by H. V. Radford, January 4, 1912. Original number 92.

Distribution.—Northern Keewatin, including the northwestern coast of Hudson Bay (Cape Fullerton).

General characters.—A light-colored subspecies of medium size; winter pelage nearly white, but hairs becoming grayish or brownish toward base over dorsum; skull with rather broad postorbital region and narrow, acutely pointed postorbital processes. Similar in general to *Canis lupus occidentalis* of Mackenzie, but smaller, and cranial features distinctive. Size and color about as in *Canis lupus arctos* of Melville Island, but cranium flatter, less highly arched, the frontal outline much less strongly convex in lateral view, and differing in other details. Differs from *Canis lupus lycaon* of Quebec in larger size and whiter coloration.

Color.—*Type* (winter pelage): Upper parts in general yellowish white, or "cream color" (Ridgway, 1912); top of head and middle of face with dark brown under color faintly showing through; guard hairs over dorsum with a brownish band near middle below which they are whitish to base, the shorter under fur on the same area brownish at base, becoming pale yellowish toward tips; under parts overlaid with yellowish white, the under tone whitish to base of hairs; limbs about like under parts; feet "onion-skin pink" between the toes, as usual in the group; tail "cream color," except

1 Provincial Museum, B. C.
2 Kansas Univ. Mus. Nat. Hist.
3 Mus. Vert. Zool.

on the median line near upper base, where black-tipped hairs tend to form a conspicuous, elongated patch. A skin from Cape Fullerton, Hudson Bay, is whiter, the yellowish tone being absent, and the tail lacks the dusky spot on upper base.

Skull.—Similar in general to that of *occidentalis*, but differs in decidedly smaller size; postorbital processes more slender and more acutely pointed. Similar in size to that of *arctos* but flatter, the frontal region less highly arched and convex in lateral view, more deeply V-shaped along median line in posterior view; zygomata tending to spread more widely; auditory bullae slightly larger, more fully inflated; postorbital processes narrow and acute as in *arctos*; dentition similar, but antero-internal cusps of upper carnassials less prominent. Compared with that of *lycaon*, the skull is much larger, with relatively broader rostrum.

Measurements.—Type: Total length, 1720 mm.; tail vertebrae, 519; hind foot, 323; height at shoulder, 848; weight, 101 pounds. An adult female topotype, 1570; 420; 290. Skull (type, and an adult female topotype, respectively): Greatest length, 258.3, 251; condylobasal length, 241, 228.8; zygomatic breadth, 146.4, 134.8; squamosal constriction behind zygomata, 83.9, 77.4; width of rostrum (at constriction behind canines), 46, 42.4; interorbital breadth, 47.2, 44.4; postorbital constriction, 41.8, 43.2; maxillary toothrow, 110.1, 104.1; upper carnassial, crown length (outer side), 26.8, 24.5, crown width, 14.2, 13.8.

Remarks.—The wolves of northern Keewatin and the northwest coast of Hudson Bay are closely allied to *occidentalis*, the geographic neighbor on the west, but the differential characters pointed out seem to warrant the segregation of a regional race. Comparison with a skull from Ellesmere Island, assumed to represent *arctos*, indicates more distant relationship.

Specimens examined.—Total number, 6, all from Keewatin, as follows: Cape Fullerton, 1[4]; Hudson Bay (without definite locality, 1[4]; Schultz Lake, 3 (2 skulls without skins); Wager River, 1 (skull only)[4].

[4]Amer. Mus. Nat. Hist.

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PROCEEDINGS
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A NEW *LEPTODEIRA* FROM MEXICO.

BY HOBART M. SMITH.

The recent work by Dunn (Proc. Nat. Acad. Sci., vol. 22, 1926, pp. 689–698) and Taylor (Kans. Univ. Sci. Bull., vol. 25, 1938 [1939], pp. 315–355, figs. 1–7, pls. 30–34) on *Leptodeira* has greatly clarified the taxonomy of the Mexican species of the genus. The 70 specimens recently secured in Mexico during tenure of the Walter Rathbone Bacon Traveling Scholarship (Smithsonian Institution) have, with but a single exception, supported the more recent arrangement by Taylor. This exception concerns *annulata polysticta*, an association which both Dunn and Taylor believed divisible; in fact Taylor points out the chief peculiarity of the central and northern Veracruz specimens here named. The segregation of the population in this region greatly clarifies the relationship between *polysticta* and *septentrionalis*.

Leptodeira annulata taylori, subsp. nov.

Holotype.—U. S. National Museum No. 30208, Orizaba, Veracruz, collected by Sumichrast. *Paratypes.* Twelve. U.S.N.M. Nos. 7088, 30207, topotypes; No. 30508, "Veracruz"; No. 12113 (5), Mirador, Veracruz; No. 65154, Hills west of Veracruz; No. 111224, Cerro Gordo, near Puente Nacional, Veracruz; and EHT-HMS 4618, Acultzingo, Veracruz.

Diagnosis.—Like *annulata polysticta*, with 196 to 206 ventrals, 80 to 101 caudals, usually three preoculars, and spots not extending below the third scale row; differing from that form by having fewer spots, 36 to 47 (49 to 66 in 38 *polysticta*).

Description of holotype.—Supralabials 8–8, 4th and 5th entering orbit; 10–10 infralabials, five in contact with anterior chinshields; three preoculars, lower very small and wedged between 3rd and 4th supralabials; two postoculars, lower less than half size of upper; temporals 1–2–3.

Dorsals in 21–23–17 rows; ventrals 201; anal divided; tail incomplete; total length 497 mm.; tail 72 mm. (incomplete).

Dorsal surface of head light brown, uniformly stippled with darker, otherwise without dark marks; nape of same color; a longitudinal, dark

brown nape stripe extending from posterior tip of parietals to first dorsal blotch; latter four scales long medially, with short, anterolateral extensions reaching toward mouth; 44 dark spots on body; these blotches one and one half to two scales long, separated from each other by light spaces two or three scales long, extending laterally to the fifth or sixth scale row; a series of small spots on the second and third, or sometimes involving also the fourth, rows of scales; these spots alternating with the larger middorsal spots; slight evidence of other, smaller, very vague spots between these, opposite the ends of the middorsal blotches; ground color light brown, with fine, darker brown stippling; belly light, with very little stippling posteriorly; subcaudal surface more strongly stippled; mental, anterior labials and anterior chinshields with some dark stippling.

Variation.—The twelve paratypes are very much like the type. All have some evidence of a dark longitudinal nape stripe; the dorsal spots are narrow and do not extend laterally beyond the third scale row. In most there is some evidence of a postocular stripe, and the head may be darker than the nape. Usually there is more pigment on the belly.

Scale Counts in *taylori.*

Museum	Number	Sex	Scale Rows	Ventr.	Caud.	Supral.	Infral.	Proc.	Ptoc.	Body Spots
EHT-HMS	4618	♀	23–23–17	198	84	8–8	10–11	3–3	2–2	45
USNM	7088	♀	20–23–15	202	.....	7–8	.....	2–3	2–2	41
USNM	12113	♀	21–23–17	199	80	8–8	10–10	3–3	2–2	36
USNM	12113	♀	21–23–?	200	85	8–8	10–10	3–3	2–2	37
USNM	30207	♀	21–23–17	196	84	8–8	10–10	3–3	2–2	47
USNM	12113	♂	21–23–?	204	.....	8–8	10–10	3–3	2–2	46
USNM	12113	♂	21–23–15	206	100	8–8	11–11	3–3	2–2	38
USNM	12113	♂	.....	206	94	.....	.....	3–3	.....	44
USNM	30208	♂	21–23–17	201	.....	8–8	10–10	3–3	2–2	44
USNM	30508	♂	.....	.....	88	8–8	10–10	2–2	.....	36 +
USNM	65154	♂	21–23–16	203	94	8–8	10–10	2–3	2–2	43
USNM	111224	♂	21–23–15	198	101	8–8	10–10	3–3	2–2	44

The lower preocular is fused with the third labial on both sides in No. 30508, on one side (the side with seven labials) in No. 7088. In No. 65154 it is fused with the fourth labial.

Remarks.—The series of five specimens (U.S.N.M. Nos. 25206–7, 25209–11) from Tuxpan, Veracruz, referred by Dunn (*op. cit.*, p. 693) to *polysticta*, I believe are more properly identified as *septentrionalis* (Taylor, *op. cit.*, p. 330). Four of the series have the dorsal spots reaching to the first or second scale rows, at least on the posterior part of the body, as is typical of *septentrionalis*. However, one (No. 25211) has the spots reaching only to the third or fourth scale row (posteriorly), as in *taylori;* in this specimen and one other the ventral counts are higher (201) than in other *septentrionalis* (maximum, 197; *taylori*, 196 to 206); and two have caudal counts higher (80, 82) than in other *septentrionalis* (maximum 79; *taylori*, 80 to 101). In view of the great similarity of *taylori* and *septentrionalis* in body form, pattern of the head (almost complete absence, only a feeble postocular stripe), presence of a nape stripe (reduced but present in *septentrionalis*), three preoculars, 21 or 23 scale rows, pigment on the posterior ends of the

ventrals, and a stippled ground color, I believe there can be little doubt that the Tuxpan series shows definite evidence of intergradation between the two forms. Accordingly the northern form should stand as *Leptodeira annulata septentrionalis* (Kennicott). I agree with Taylor that the latter form can not intergrade with, or be particularly closely related to, *maculata*, a specimen of which is present in the Tuxpan, Veracruz, collection (U.S.N.M. No. 25208).

The cotypes of *polysticta* were from Jalapa, Veracruz; Yucatán; Belize, British Honduras; Honduras; and Panamá. Since these specimens include three forms as defined at present (Panamá = *annulata*, Jalapa = *taylori*) it is well to fix the name *polysticta*. I hereby designate the Belize specimen as lectotype. It is a female with 21 scale rows, 211 ventrals and 84 caudals (*fide* Boulenger, Cat. Snakes Brit. Mus., vol. 3, 1896, p. 96).

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ON THE MEXICAN SNAKES OF THE GENUS PLIOCERCUS.

BY HOBART M. SMITH.

Thirty six specimens of *Pliocercus* now in the collections of the U. S. National Museum, and sixteen in the E. H. Taylor-H. M. Smith collection, are referable to the highly composite *Urotheca elapoides* of Boulenger (Cat. Snakes Brit. Mus., vol. 2, 1894, pp. 182–183). Two very different formenkreise were included by him in that species, one the *elapoides* series occurring from central Mexico (Veracruz) to Guatemala, the other the *euryzonus* series extending (with hiati) from northern Veracruz to South America.

Each of these series is composed of two forms now described and named; the collections examined add one form not previously named to each series.

The present study was completed, and a third of the material utilized was collected, during tenure of the Walter Rathbone Bacon Traveling Scholarship. I am indebted to Dr. E. H. Taylor for generous loan of material and for other assistance.

Pliocercus elapoides elapoides Cope.

Pliocercus elapoides Cope, Proc. Acad. Nat. Sci. Phila., 1860, pp. 253–254 (Jalapa, Veracruz).

Elapochrous deppei Peters, Monatsb. Berl. Akad., 1860, pp. 294–295, fig. 2 (Mexico).

Liophis tricinctus Jan, Arch. Zool. Anat. Fis., vol. 2, 1863, p. 301; Jan and Sordelli, Icon Gén., livr. 18, 1866, pl. 4, figs. 4–6 (Mexico).

Diagnosis.—Black bands in triads, the outer two as broad as or broader than yellow bands at least on tail (rarely narrower on body); triads on body 9 to 15 (9 to 10 in males, 9 to 15 in females); triads on tail 5 to 8; yellow band across head narrow, anterior and posterior portions of parietals black, posterior edge of frontal rarely light (on one specimen only); 127 to 131 ventrals in males, 133 to 144 in females; caudals maximum 100 in females, 106 in males; usually 8 or 9 infralabials.

Range.—Central and southern Veracruz.

Specimens Examined.—Twenty-four, all from Veracruz: Cuautlapan (U. S. N. M. 110764–6; EHT-HMS 1776, 5255, 23484–92); Mirador (U. S. N. M. 6368, 25029–30); Orizaba (U. S. N. M. 4383, 6323, 12125; EHT-HMS 1421); Potrero Viejo (U. S. N. M. 110763; EHT-HMS 1580, 5087).

Remarks.—This form differs from *diastemus* in having a higher average number of ventrals and lower average number of caudals; outer black bands of each triad as broad as or broader than the yellow bands (narrower than yellow bands in *diastemus*, or absent); usually irregular dark markings on the red areas (not in *diastemus*); usually more numerous triads (5 to 10 in *diastemus*); and usually 9 or less infralabials (usually 10 in *diastemus*). From *laticollaris* it differs by having a narrower neck band (posterior tip of frontal as well as all of parietals yellow in *laticollaris*); bands of triads broader and usually irregular dark markings present on the red areas (markings dorsally in *laticollaris* as in *diastemus*); and perhaps by usually fewer triads on body (13 in a male, 16 and 18 in two females of *laticollaris*).

Scale Counts of *Pliocercus e. elapoides.*

Number	Sex	Ventrals	Caudals	Upper Labials	Lower Labials	Labials Touch Chinshields	Triads
4383	♀	136	.....	8–9	9–10	5–5	12–?
6368	♀	135	.....	8–8	9–9	5–5	15–?
12125	♀	144	.....	8–8	9–10	5–5	10–?
25029	♀	136	.....	8–8	9–9	5–5	13–7
25030	♀	135	.....	8–8	9–9	5–5	10–?
110763	♀	134	.....	8–8	9–9	5–5	10–?
110765	♀	137	95	8–8	8–8	5–5	9–5
110766	♀	138	98	8–8	8–8	4–4	12–6
1580	♀	134	.....	7–8	9–9	5–5	9–?
5087	♀	136	100	8–8	9–9	5–5	14–7
23484	♀	.....	93	8–8	9–?	5–5	11–7
23485	♀	139	94	8–8	9–9	5–5	11–6
23486	♀	139	.....	8–8	9–9	5–5	11–?
23487	♀	135	.....	8–8	9–9	5–5	10–?
23488	♀	136	.....	8–8	8–9	4–5	14–?
23489	♀	137	99	8–8	9–9	5–5	9–6
23490	♀	134	85	8–8	9–9	5–5	11–7
23491	♀	139	.....	8–8	9–9	5–5	12–?
23492	♀	133	92	8–8	9–10	5–6	13–8
1776	♂	128	103	8–8	9–9	5–5	10–7
1421	♂	127	.....	8–8	9–9	5–5	9–?
5255	♂	129	106	.....	.....	5–5	10–6
6323	♂	131	88	8–8	9–9	5–5	9–6
110764	♂	131	.....	8–8	9–9	5–5	9–5

Pliocercus elapoides diastemus (Bocourt).

Liophis elapoides diastema Bocourt, Miss. Sci. Mex., Rept., 1886, pp. 636–637, pl. 41, fig. 8 (Plateau of Guatemala).

Diagnosis.—Black bands single or triad, but if the latter the outer bands narrower than the yellow bands; triads or single bands 5 to 10 on body, most complete, 4 to 6 on tail; yellow band across head not as long as parietals, sometimes extending to posterior edges of latter, but not includ-

ing any portion of frontal; ventrals 123 to 128 in males, 132 to 137 in females; caudals minimum 98 in females, 115 in males; infralabials usually 10.

Range.—Pacific slopes of southern Chiapas and Guatemala.

Specimens examined.—Nine.

Locality records.—Mt. Ovando, 6500 ft., near Escuintla, Chiapas (No. 110768; La Esperanza, Cruz de Piedra and Las Gradas, all near Escuintla, Chiapas (Nos. 110769–73); Chicharras, Chiapas (Nos. 46437–8); Finca El Ciprés, Volcán Zunil, Guatemala (Calif. Acad. Sci. Nos. 66910–66916).

Remarks.—This form is rather well-defined, differing from typical *elapoides* in average number of ventrals and caudals, average number of infralabials, character of black bands and number of single bands or triads.

In some specimens the outer bands of the triads are very narrow, in others completely missing.

An intergrade between this and *elapoides* may be represented by No. 62088, collected by Sumichrast at an unknown locality (possibly Santa Efigenia, Oaxaca, where, according to his notes in La Nat., vol. 6, 1882, p. 42, he secured specimens of this species). In color pattern it is nearly typical of *diastemus*, the outer bands of the triads being absent on the body (except following the first yellow band on neck). It is like typical *elapoides*, however, in ventral count (142, female); number of infralabials (9); and in having the outer bands of the triads present and broad on the tail. Since the specimen very likely comes from a locality intermediate between the known ranges of *elapoides* and *diastemus*, its intermediate characters indicate the specimen may be an intergrade. On the other hand it may represent the form which occurs on Pacific slopes north of the Isthmus of Tehuantepec.

Scale Counts of *Pliocercus e. diastemus*.[1]

Number	Sex	Ventrals	Caudals	Upper Labials	Lower Labials	Labials Touch Chinshields	Triads
110768	♀	133	.....	8–8	10–10	5–5	9–?
110769	♀	133	101	8–8	10–10	5–5	8–5
110771	♀	136	98	8–8	9–10	5–5	9–4
110772	♀	133	100	8–9	10–10	5–5	9–6
110773	♀	130	103	8–9	10–10	5–5	10–6
66910	♀	129	.....	.....	10–10	.....	.....
66913	♀?	132	.....	.....	10–10	.....	.....
66914	♀	132	.....	.....	10–10	.....	.....
66915	♀?	137	.....	.....	10–10	.....	.....
46437	♂	124	.....	8–8	10–10	5–5	9–?
46438	♂	124	.....	8–8	9–10	5–5	8–?
110772	♂	125	115	8–8	10–10	5–5	7–6
110770	♂	123	.....	9–9	10–10	5–5	10–?
66911	♂	128	115	.....	10–10	.....	.....
66912	♂	124	.....	.....	9–9	.....	.....
66916	♂	123	.....	.....	10–10	.....	.....

[1]The scale counts of the California Academy of Sciences specimens are those given by Slevin, Proc. Calif. Acad. Sci., ser. 4, vol. 23, 1939, p. 402.

Pliocercus elapoides laticollaris, subsp. nov.

Holotype.—U. S. National Museum No. 110767, female, Tenosique, Tabasco, H. M. Smith. *Paratypes.* EHT-HMS 11642, Tres Brazos, Campeche, and No. 11643, Encarnación, Campeche.

Diagnosis.—Bands single or triad, but if the latter the outer bands not as wide as yellow bands; triads or single bands 13 to 18 on body, 10 to 12 on tail; yellow head band involving nearly all of parietals, as well as posterior tip of frontal; ventrals 128 in a male, 127 to 134 in two females; caudals 97 in two females; nine infralabials.

Description of holotype.—Internasals small, one-third area of prefrontals; latter extending onto sides of head; frontal broad, pentagonal, subequal in length to suture between parietals; nasal completely divided, in contact with two labials; loreal large, quadrangular, in contact with two labials and one (upper) preocular; two preoculars, the lower small and wedged between third and fourth labials; two postoculars, lower smaller; temporals 1–1–2, anterior elongate; supralabials 8–8, fourth and fifth entering orbit, last two largest, last elongate; nine infralabials, five (four) in contact with anterior chinshields; latter a little longer than posterior chinshields; two labials in contact with latter.

Dorsals in 17 rows, smooth, not pitted; ventrals 127; anal divided; caudals 97.

Head, anterior to a line between posterior edges of eye, black, except for rostral and lower edges of labials (yellow); a very broad, yellow band across head, involving posterior edges of frontal and supraoculars, all of parietals and all of temporals except tips of tertiary temporals; a black nuchal band covering nearly five scale lengths medially, barely reaching edges of ventrals; following this a series of 15 black bands on body, 10 on tail, all (except last on tail) of about equal length, each covering about two and one half scale lengths; most black bands on body interrupted on midventer, all tail bands complete; black bands bordered by a yellow ring on each side, covering one or one and one-half scale lengths, all complete; separating the yellow rings are complete red bands, each covering nearly five scale lengths; most dorsal scales in red areas black-tipped.

Paratypes.—The ventrals of the male paratype count 128 (tail broken); the ventrals and caudals respectively of the female count 134 and 97. The black bands are in triads, separated by narrow yellow bands, but in the female the narrower black bands are practically obsolete, and in the male they are very narrow. A dark spot occurs at the posterior apex of most of the scales in the red bands. There are 18 primary black annuli on the body of the female, 12 on the tail; 13 red annuli occur on the body of the male. The primary black bands are complete ventrally.

Remarks.—To the present form belong the specimens referred by Bocourt (Miss. Sci. Mex., Rept., 1886, pp. 635–6) to typical *elapoides* (pl. 41, fig. 6). Bocourt had specimens of all three forms of *elapoides,* but *laticollaris* was referred to *e. elapoides;* typical *elapoides* to *e. aequalis;* and *e. diastema* was named by him for the first time.

This subspecies differs from typical *elapoides* in the great width of the

yellow head band; near or complete loss of the outer black bands of the triads; greater number of tail bands and body bands; and perhaps by fewer ventrals.

It is to be emphasized that all three forms of *elapoides* occupy widely different faunal provinces. Specimens from the Pacific slopes north of the Isthmus of Tehuantepec probably will prove distinguishable from the forms here diagnosed, since in species having a distribution on the Atlantic coast and in southern Chiapas and also having a differentiation of geographic subspecies as in *elapoides*, invariably the Guerrero form is still different.

Pliocercus bicolor, sp. nov.

Holotype.—U. S. National Museum No. 25203, female, from Tuxpan, Veracruz, collected by G. Lincecum.

Diagnosis.—Bands alternating black and red, the two of nearly equal length (black slightly longer) middorsally on body; black tail bands twice width of interspaces; black bands 14 on body in type; no secondary tail bands, primary bands few; no markings on infralabials; black head cap involving only extreme anterior tip of primary temporal.

Description of holotype.—Head badly battered, portions missing, supralabials eight, fourth and fifth entering eye, seventh perhaps largest; nasal divided, in contact with two labials; loreal large, quadrangular, in contact with two labials; two preoculars, lower small and wedged between third and fourth labials; two postoculars, lower smaller; temporals 1–1; infralabials nine, five in contact with anterior chinshields, two in contact with posterior.

Scales in 17 rows, smooth, not pitted; ventrals 132; anal divided; tail incomplete.

Entire snout (sides and top) black, posterior to a point slightly behind posterior angle of frontal; entire supralabial border yellow; a yellow band across top of head, anteriorly reaching nearly to postoculars; this followed by the first of a series of 14 black rings, each covering four to seven scale lengths middorsally, separated from each other by red bands covering three to six scale lengths; the red spaces nearly equal to black bands medially, covering about one scale length less than adjoining bands; some of the dorsal scales in the red area black-tipped; black tail rings about twice width of interspaces; red interspaces on tail with very few, small, irregularly placed black spots; chin and gular region light (yellow ?) with no black markings whatever; light spaces on belly and tail (between black rings) without marks.

Remarks.—This very distinct form is related to *dimidiatus* and *aequalis*, all having alternating red and black rings, without yellow rings. From *dimidiatus*[2] it differs by having wider red areas (in all *dimidiatus* the body bands are two to three times as wide as the red rings, the tail bands three times as wide as interspaces); no markings on chin or gular region (all *dimidiatus* have the anterior infralabials black); black head cap less extensive (in *dimidiatus* it extends at least to middle, usually to posterior end of primary temporal); no indentation of black head cap by a light area on

[2] Thirteen specimens examined, from Nicaragua and Costa Rica.

anterior labials (in *dimidiatus* a light spot, fused with light labial border, on portions of the second and third labials).

In some respects *aequalis* of Guatemala is more like *bicolor*, as the black head cap is identical, the gular and chin region is immaculate, and the black bands on body equal the width of the red ones. It has more numerous black body rings, however (25 to 27), and narrower, much more numerous, complete tail rings (about 17) that are separated from each other by areas equal to the size of the primary black rings. Each of the red interspaces between the primary, complete rings encloses an incomplete, secondary black ring.

Dunn and Bailey (Bull. Mus. Comp. Zool., vol. 86, 1939, p. 12; Proc. Acad. Nat. Sci. Phila., vol. 92, 1940, p. 121) treat *dimidiatus* and *euryzonus* as subspecies. It can not now be stated whether *aequalis* and *bicolor* are also subspecies of *euryzonus*, but at least it is very probable that all four of these are members of the same formenkreis, and that they replace each other in a vicariating series from north to south. In the same series there is a constant trend of pattern change from *euryzonus* in the south, with narrow red bands, to *bicolor* in the north, with the broadest red bands. A comparable trend toward elimination of the black on the head is also observable, from *euryzonus* with nearly a uniformly black head to *bicolor* (and *aequalis*) with the least black on head of all.

KEY TO MEXICAN *Pliocercus*.

1. Rings on body alternating red and black, all subequal in length (black rings a little the longer)..... *bicolor*.
   Yellow rings present on body, as well as red and black; black rings in triads or, if single, the spaces between them considerably greater than their own length..... 2
2. Black rings single on body, or, if triad, the outer rings considerably narrower than the yellow rings..... 3
   Black rings triad on body and tail, the outer rings of each triad as long as or longer than yellow rings; red areas frequently black-spotted; posterior end of frontal very rarely light; infralabials seldom 10 (usually less); bands on tail not over eight, on body not over 11 in males, 15 in females..... *elapoides elapoides*.
3. Yellow head band very broad, including posterior tip of frontal; nine infralabials; primary black rings on body 13 to 18, on tail 10 to 12..... *elapoides laticollaris*.
   Yellow head band narrower, the anterior tips of parietals and posterior tip of frontal always black; usually ten infralabials; primary black rings on body 5 to 10, on tail 4 to 6..... *elapoides diastemus*.

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ANOTHER NEW *HYPOPACHUS* FROM GUATEMALA.

BY L. C. STUART.

In the summer of 1940, while investigating the herpetofauna of the Alta Verapaz, Guatemala, I visited, in order to obtain comparative data, the northern part of El Quiché. Most of my work in that region was done in the vicinity of Nebaj, and in an artificial pond on the outskirts of the village I collected a species of *Hypopachus* which, though I possess but a single specimen, I feel certain has not yet been described. Because of its truncate snout, this new species may be called:

Hypopachus simus, sp. nov.

Holotype.—An adult male, Museum of Zoology, University of Michigan No. 89095, collected on the evening of July 11, 1940, by L. C. Stuart.

Type locality.—A pond on the western edge of Nebaj, El Quiché, Guatemala. Altitude, about 1990 meters.

Diagnosis.—An *Hypopachus* of the *inguinalis* series, closest to *H. inguinalis* Cope, from which it may be distinguished by its larger inner metatarsal tubercle, its truncate snout, the broader webs between its toes, and its more conspicuous dermal toe fringe.

Description.—Snout truncate, acute in lateral view, very slightly longer than the diameter of the eye. Canthus rounded, loreal region oblique and slightly concave. Interorbital space very slightly greater than the width of the upper eyelid. Fingers free, comparative lengths III–IV–II–I, subarticular tubercles distinct but not prominent, three palmar tubercles. Toes not dilated, web between third and fourth toe broad but extending only to second tubercle on fourth toes. Other toes about half webbed, all toes, especially the third, with a conspicuous dermal fringe laterally. Comparative toe lengths, IV–III–V–II–I, subarticulate tubercles well developed, two metatarsal tubercles, the outer rounded, the inner large and compressed. The heels fail to meet when the hind legs are adpressed, and when extended forward the outer metatarsal tubercle falls opposite the center of the eye. Skin leathery both above and below, somewhat bumpy dorsally, and containing minute spicules. An inconspicuous dermal fold extends from the eye obliquely posteriorly to the arm insertions.

In spirits the dorsum is purplish brown with several black flecks posteriorly. The limbs are somewhat redder above flecked with black. A light streak extends from the eye posteriorly and ventrally to in front of the arm insertions. There is a fine white line from the tip of the snout to the anus. A faintly darker streak lies just below the canthus and there is a small black spot just behind the angular streak from eye to arms. The throat is dark gray, which color becomes lighter posteriorly until the thighs are white. The chest contains scattered black spots which fuse posteriorly to form black reticulations which cover the thighs and ventral surfaces of the legs.

Range.—Known only from the type locality but very possibly widely distributed throughout the Sierra de los Cuchumatanes of northwestern Guatemala.

Relationships.—This is the third form of the *inguinalis* group [1] to be described since Parker's monograph [2] has appeared. Taylor [3] and myself [4] have further added other species to the genus but these have all shown a *cuneus* relationship with a compressed outer metatarsal tubercle. The *inguinalis* group, as I have previously pointed out,[2] appears to be restricted to "nuclear Central America," and this new species does not extend that range. The species of the *inguinalis* group are best summed up in the following key:

A. Outer metatarsal tubercle compressed.....*cuneus* group.
AA. Outer metatarsal tubercle rounded.....*inguinalis* group.
B. Tarsal-metatarsal articulation not reaching the eye.....
globulosus Schmidt.
BB. Tarsal-metatarsal articulation reaching the eye.....C
C. Skin of dorsum very warty.....*barberi* Schmidt.
CC. Skin of dorsum relatively smooth.....D
D. Snout pointed, inner metatarsal tubercle small....
inguinalis Cope.
DD. Snout truncate, inner metatarsal tubercle large....
simus Stuart.

This new species though closest to *inguinalis* shows some approach to *barberi* in that the skin of the dorsum is slightly roughened but in no way showing the very warty condition of the latter. The relatively large size of the inner metatarsal tubercle is best brought out by comparing its greatest diameter to the distance between the outer borders of the two metatarsal tubercles. In *inguinalis* the diameter is much less than this distance, while in *simus* the two are equal. The truncate form of the snout is unique in the *inguinalis* group.

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[1] Two have previously been described by Karl P. Schmidt, "New Central American Frogs of the Genus *Hypopachus*," *Zool. Ser. Field Mus. Nat. Hist.*, 24, 1, 1939 : 1–5, Fig. 1.

[2] H. W. Parker, "A Monograph of the Frogs of the Family Microbylidae," British Museum (Natural History). London, 1934 : viii+208 pp.

[3] Edward H. Taylor, "Herpetological Miscellany," *Univ. Kansas Sci. Bull.*, xxvi, 15, 1940 : 489–571.

[4] L. C. Stuart, "A New *Hypopachus* from Guatemala," *Proc. Biol. Soc. Washington*, 53, 1940 : 19–22.

Habits.—This species was singing in considerable numbers in a pond on the outskirts of Nebaj during July and early August, 1940. This pond was rather unusual in that it consisted of a moat-like channel surrounding a marshy island in the center of the pond. Because of the depth of the channel and the lack of a raft or boat, I was unable to reach the island where these frogs were singing and many circuits of the pond on different evenings resulted in the capture of but a single specimen, the type, along the shore. Occasional individuals were heard singing in local pools of water in the pastures surrounding Nebaj, but I was unable to secure further specimens. The call of this species, a prolonged hum, can not be differentiated from that of either *H. inguinalis* or *H. championi* Stuart.

In some of the small pools in pastures I secured on August 15, 1940, some tadpoles which are unquestionably the larvae of *H. simus*. The following is a description drawn from that series:

Teeth 0 / 0. The mouth is terminal and hidden, except medially, by a large supralabial apron on either side. These aprons arise at the corner of the mouth and extend medially to about the center of the mouth, where they curve sharply upward and outward to leave a disk-like opening between them dorsally. Medially they are papillated on the edge, and the papillae decrease in size laterally and disappear completely at about the middle of the apron.

The eyes are relatively small, completely lateral, and situated about two-fifths of the body length from the snout. The anus is medial and the spiracle lies to the left of and adjacent to the anus in ventral view. The tail is relatively short, the muscular portion extending almost the entire length of the tail. The fin extends only to the body and the abrupt junction of the tail muscles and the body is demarked by a deep groove in the body extending completely around the tail.

Comparative measurements on the larger specimens show that the tail comprises about sixty per cent of the total length and is about forty per cent as deep as long. The body is broadest at mid-body, being about seventy-five per cent as broad as long and slightly less than one-half as deep as long. The mouth is about forty per cent as broad as the body. In smaller specimens the mouth and tail-body proportions are about the same as in the larger specimens, but the body is proportionally deeper and broader.

Dorsally the color is dark brown, ventrally brownish gray. Proximally the upper half of the tail musculature is brown, the lower half white. Distally the tail musculature is entirely brown. The fin is transparent and lacks pigmentation except for a few scattered brown punctations along its dorsal edge.

In comparing these tadpoles with some poorly preserved larvae of *H. c. cuneus* Cope from Texas and with several equally poorly preserved specimens of *H. c. nigroreticulatus* Taylor from Yucatan, the mouth of *simus* tadpoles appears to be relatively wider, and their color is much darker. The prominent papillary fringe on the labial aprons of *simus* is lacking in the *cuneus* subspecies where it is reduced to nothing more than a scalloped edge.

Acknowledgments.—I wish to acknowledge here the financial grant from the Horace H. Rockham School of Graduate Studies which enabled me to carry on my investigations in Guatemala. To Miss Grace Orton of the University of Michigan I am indebted for aid in studying the tadpoles of this new species, and to Miss Grace Eager of the Museum of Zoology, University of Michigan, for executing the included drawings.

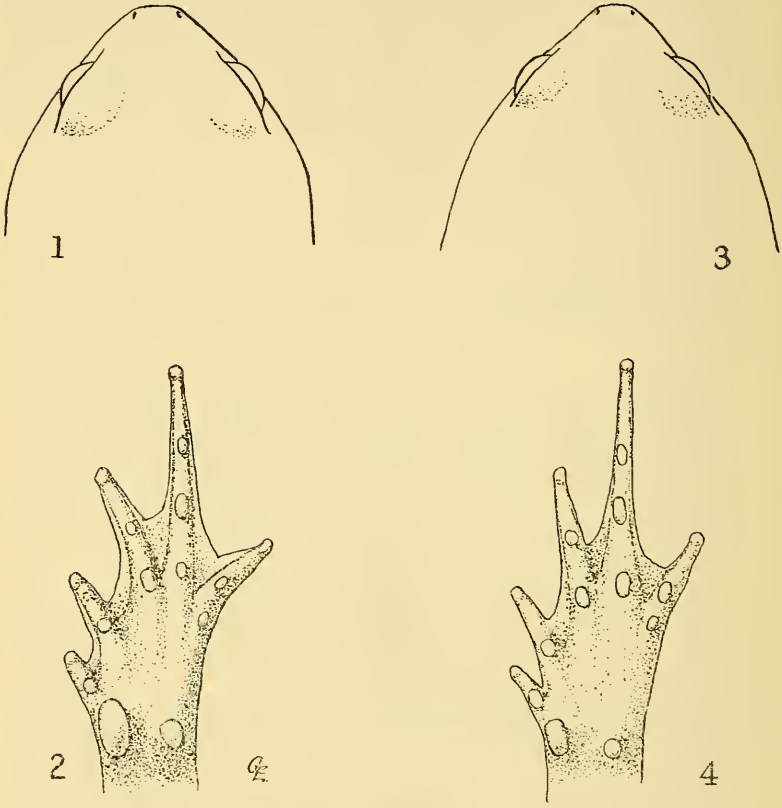

PLATE 1. Sketch showing the comparatively broad snout in *H. simus.* (FIG. 1) as opposed to that of *H. inguinalis* (Fig. 3) and the much larger tubercle and more extensive webbing in *H. simus* (Fig. 2) as compared with the same structures in *H. inguinalis* (Fig. 4).

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PROCEEDINGS
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TWO NEW SUBSPECIES OF THE PIÑON MOUSE, *PEROMYSCUS TRUEI*, FROM CALIFORNIA.

BY DONALD F. HOFFMEISTER,
Museum of Vertebrate Zoology, University of California.

In the course of a study of the variation and distribution of the piñon mice, *Peromyscus truei*, two unnamed races from California have been found. *P. truei* is typically an inhabitant of the Upper Sonoran Life-zone, but one of the races here described is found in a higher and the other in a lower zone. One of the new races is found in the humid coastal area of the Transition Life-zone, where the name piñon mouse is hardly appropriate because no piñon trees occur in this area. Members of this race are the largest of the entire species. Some populations of mice of the other newly named race inhabit the Lower Sonoran Life-zone, and members of this race are among the lightest-colored individuals of the species. The distinctive characters of these mice perhaps have arisen "in response" to the conditions in which the animals live.

Of the specimens examined, the majority are in the Museum of Vertebrate Zoology. The remainder are in the California Academy of Sciences, the Los Angeles Museum of History, Science and Art, and the Vertebrate Collection of the San Bernardino Junior College. I wish to thank the persons in charge of these collections for the opportunity of examining specimens.

The races can be characterized as follows:

Peromyscus truei sequoiensis, new subspecies.

Type.—Male, adult, skin with skull, no. 20842, Mus. Vert. Zool.; one mile west of Guerneville, Sonoma County, California; collected June 16, 1913, by Hilda W. Grinnell, original no. 109.

Range.—The narrow, humid, northwest, coastal belt of California, west

of the crest of the Coast Range, from the Oregon line in Del Norte County south to Marin County.

Diagnosis.—Size: Large (see measurements); tail actually, but not relatively, long (averaging 108 per cent of length of head and body); hind foot long; ear actually and relatively small, averaging (when measured from the notch in the dry skin) only 83 per cent of length of hind foot. Color: Dark; upper parts with considerable blackish and with reddish of a markedly dark tone; underparts of adults usually with an ochraceous or buffy pectoral spot. Skull: Large; rostrum relatively short; palatine slits, relative to the length of the palate, short; auditory bullae large but not greatly inflated.

Comparisons.—From topotypes and most other specimens of *Peromyscus truei gilberti, P. t. sequoiensis* differs in the following characters: Size: Larger, except for length of body, which is about the same; length of tail averages 108 per cent of length of head and body instead of 97 per cent; hind foot usually more than 24 millimeters (averaging 25.2 mm.) instead of less than 24 mm. (averaging 22.8 mm.); ear smaller. Color: Upper parts, including dorsal tail stripe, darker; sides more ochraceous. Skull: Averaging larger in every measurement except length of palatine slits; rostrum heavier; breadth across maxillary arms of zygomata greater. From specimens of *Peromyscus truei* from south of San Francisco Bay, *sequoiensis* differs in the following characters: Size: Larger, but tail relatively shorter; hind foot longer; ear slightly shorter. Color: Upper parts more reddish. Skull: Averaging larger in greatest length and basilar length and length of bony palate; palatine slits shorter; auditory bullae larger but less inflated.

Remarks.—*P. t. sequoiensis* intergrades along the eastern border of its range with the race *P. t. gilberti.* For example, specimens from along Clear Creek, Siskiyou County, are typical of *sequoiensis* in all characters except for lighter coloration; specimens from Taylor Creek in the same county are nearer *gilberti* in body proportions, but in other characters agree with *sequoiensis.* Specimens from the South Fork Mountains, Trinity County, are dark colored, but intermediate between *sequoiensis* and *gilberti* in length of tail and in cranial characters. Although specimens occurring in the "islands" of the Transition Life-zone in Lake, Napa, and eastern Sonoma counties approach *sequoiensis* in various features, they all are nearer in the sum total of characters to *gilberti,* to which race they are referred.

Measurements.—Average and extreme measurements, in millimeters, of 14 adults (10 males, 4 females) from the vicinity of the type locality are: Total length, 220 (200–231); length of tail, 114 (104–123); length of hind foot, 25.2 (24–27); ear, measured from the notch, dry, 20.9 (20.2–22.0); greatest length of skull, 29.7 (28.3–30.7); basilar length, 22.2 (20.9–23.1); greatest breadth of braincase, 13.7 (13.0–14.0); interorbital constriction, 4.6 (4.3–5.0); length of nasals, 11.0 (10.3–11.3); shelf of bony palate, 4.5 (4.3–5.0); palatine slits, 6.0 (5.6–6.2); diastema, 7.4 (7.0–7.8); postpalatal length, 10.5 (9.8–11.0); alveolar length of maxillary toothrow, 4.5 (4.2–4.8).

Specimens examined.—Total number, 91, from the following localities, all in California: *Del Norte County:* Wimer Spring, 1800 ft., 7 mi. E. Smith

River, 4; E. Fk. Illinois River, 1900 ft., ¼ mi. S. Oregon line, 4; Patricks Creek, 3 (Calif. Acad. Sci.). *Mendocino County:* S. Fk. Eel River, 12 mi. S. Garberville, 2; Laytonville, 2 (Calif. Acad. Sci.); 3 mi. S. Covelo, 11; Sherwood, 4 (3 in Calif. Acad. Sci.); 3 mi. W. Summit Mount Sanhedrin, 1; near Hearst, 1 (Calif. Acad. Sci.); 5 mi. N. W. Yorkville, 1. *Sonoma County:* 7 mi. W. Cazadero, 900–1000 ft., 5; 1 mi. W. Guerneville, 2; Guerneville, 4; 2 mi. S. Guerneville, 200 ft., 1; Monte Rio (Bohemian Grove), 4 (Calif. Acad. Sci.); Freestone, 7. *Marin County:* Nicasio, 2 (Calif. Acad. Sci.); Ross, 1. *Siskiyou County:* 9 mi. W. Happy Camp, 1 (Calif. Acad. Sci.); near Happy Camp, 1 (Calif. Acad. Sci.); Clear Creek, 3 mi. W. Klamath River, 1400 ft., 4; Klamath River, mouth of Clear Creek, 1000 ft., 4; Taylor Creek, 5500 ft., Salmon Mountains, 2 (Los Angeles Mus.). *Trinity County:* 3 mi. N. N. W. Mad River Bridge, South Fork Mountains, 2900 ft., 2; 1 mi. N. W. Mad River Bridge, 2300 ft., 2; 1 mi. N. Reilley's Ranch, 3700 ft., South Fork Mountains, 1; Reilley's Ranch, South Fork Mountains, 3000 ft., 2; Mad River ford, above Ruth, 2700 ft., 13.

Peromyscus truei chlorus, new subspecies.

Type.—Female, young adult, skin with skull, no. 77194, Mus. Vert. Zool.; Lost Horse Mine, southern end of Little San Bernardino Mountains (=69 miles east of Riverside), Riverside County, California; collected March 9, 1929, by Robert D. Moore, original no. 163.

Range.—Interior mountains of southern California, particularly the mountain ranges bordering the western edge of the Mohave and Colorado deserts, including the eastern San Gabriel, San Bernardino, Little San Bernardino, San Jacinto, and Santa Rosa mountains.

Diagnosis.—Size: Medium (see measurements); hind foot short; ear large, as long as the hind foot. Color: Pale, resulting from a reduction of black; dorsal tail stripe light brown. Skull: Small; breadth across maxillary arms of zygomata small; auditory bullae relatively large.

Comparisons.—From specimens of *Peromyscus truei truei* from Clark Mountain and the Providence Mountains, San Bernardino County, *P. t. chlorus* differs in the following characters: Size: Larger; tail longer than body rather than equal to or shorter than body; ears and hind feet slightly shorter. Color: Upper parts paler. Skull: Averaging smaller in nearly all measurements; zygomata weaker and more compressed anteriorly. From specimens of *Peromyscus truei* from the region of Mount Pinos, California, those of *P. t. chlorus* differ in shorter hind feet, conspicuously paler color, and a smaller skull with more compressed auditory bullae, narrower and shorter rostrum, and less breadth across maxillary arms of zygomata.

From specimens of *P. t. martirensis* from the Sierra Juárez and Sierra San Pedro Mártir of Lower California, *P. t. chlorus* differs in the following characters: Size: Averaging smaller; ears larger, usually longer than hind foot rather than shorter. Color: Upper parts paler as a result of the markedly lighter tone of the ochraceous and basal color-bands; dorsal tail stripe lighter. Skull: Rostrum shorter and heavier; nasals narrower posteriorly; auditory bullae larger but less orbicular; external auditory meatus larger.

Remarks.—*P. t. chlorus* is isolated from *truei*, the race to the eastward, by the more barren parts of the Mohave Desert, and thus the two do not intergrade directly. Intergradation may occur to the northwest by way of the San Gabriel Mountains. The specimen from Lytle Creek, in the southeastern end of these mountains, is intermediate in some of its characters between *chlorus* and specimens farther to the northwest, but in the majority of characters is nearest to *chlorus*, the race to which it is here referred. Intergradation between *chlorus* and *martirensis* probably occurs in the area of the Laguna Mountains, San Diego County. Two alcoholic specimens from this area are similar to *martirensis* in body measurements and proportions, but in coloration, in so far as can be determined, they are intermediate. These specimens are referred to the race *martirensis* rather than to *chlorus*, but more material may show the average of the population there to be nearer *chlorus*.

Measurements.—Average and extreme measurements, in millimeters, of 9 adults (6 males, 3 females) from the vicinity of the type locality are: Total length, 202 (184–221); length of tail, 107 (95–116); length of hind foot, 22.4 (21.0–24.0); ear, measured from the notch, dry, 22.6 (20.9–23.9); greatest length of skull, 27.9 (26.8–28.7); basilar length, 20.7 (19.7–21.4); greatest breadth of braincase, 13.0 (12.8–13.2); interorbital constriction, 4.5 (4.2–4.6); length of nasals, 10.4 (9.6–11.0); shelf of bony palate, 4.2 (4.0–4.3); palatine slits, 5.8 (5.4–6.2); diastema, 7.1 (6.5–7.4); postpalatal length, 9.9 (9.4–10.3); alveolar length of maxillary toothrow, 4.2 (4.1–4.3).

Specimens examined.—Total number, 45, from the following localities, all in California: *San Bernardino County:* Hesperia, 2000 ft., 1 (Vert. Coll., San Bernardino Junior College); Lytle Creek, near Stockton Flats, 5000 ft., 1 (Vert. Coll., San Bernardino Junior College); Big Bear Valley, 6700 ft., 3 (Los Angeles Mus.); Saragossa Spr., 7538 ft., 1; Seven Oaks, 5000–5100 ft., 2; Barton Flats, 6400 ft., 2 (Vert. Coll., San Bernardino Junior College); Santa Ana River, 5500 ft., 1; Fish Creek, 6500 ft., 4; S. Fork Santa Ana River, 6200 ft., 2; Quail Spring, 17 mi. E. Morongo Valley, 4200 ft., 6. *Riverside County:* Joshua Tree National Monument, 1½ mi. N. Lost Horse Well, 4000 ft., 2 (Vert. Coll., San Bernardino Junior College); Lost Horse Mine, S. end Little San Bernardino Mountains, 6; Strawberry Valley, San Jacinto Mountains, 6000 ft., 2; Kenworthy, 4500 ft., 5; Dos Palmos Spr., Santa Rosa Mountains, 3500 ft., 1; Santa Rosa Peak, 7500 ft., 6.

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PROCEEDINGS
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A NEW SUBSPECIES OF *ARREMON SCHLEGELI*.

BY JOHN T. ZIMMER.

In a collection of birds from Colombia recently sent to me for examination by Hermano Nicéforo Maria of the Instituto de La Salle, Bogotá, is an excellent new form of *Arremon schlegeli* which is described herewith.

I am grateful to Dr. G. C. A. Junge of the Royal Museum of Natural History at Leiden for his assistance in solving a problem of identity connected with the present study.

Names of colors are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature."

Arremon schlegeli canidorsum, new subspecies.

Type.—From San Gil, south of Bucaramanga, eastern Colombia. No. 325,733, American Museum of Natural History. Adult male collected in June, 1939, by Brother Nicéforo Maria.

Diagnosis.—Differs from *A. s. schlegeli* as exemplified by specimens from Santa Marta, Colombia, by having the back dark gray, not yellow; hind neck grayer, less whitish; upper wing-coverts darker and duller yellow; bill with whole upper half of maxilla blackish, from base to tip; rest of bill lemon yellow without any reddish tinge.

Range.—At present known only from the type locality.

Description of type.—Chin and entire sides and top of the head silky black extending also laterally in a broad area on the sides of the upper breast; hind neck Dark Gull Gray with black tips on the feathers, but somewhat paler laterally where the area adjoins the sides of the breast; back near dark Neutral Gray with a slight tinge of Olive Gray, especially on the rump and upper tail-coverts. Under parts (below the black chin) medially whitish, faintly tinged with gray on the sides of the lower breast and approaching Mouse Gray on the flanks. Remiges blackish with outer edges Slate Gray; primary-coverts slaty; greater upper wing-coverts with outer margins broadly Orange-Citrine; median and lesser series with tips broadly Orange-Citrine × Aniline Yellow; bend of wing Aniline Yellow ×

Light Cadmium; under wing-coverts mostly grayish with those at bases of secondaries more whitish, all with some yellowish tinge; inner margins of remiges inconspicuously whitish. Tail blackish with outer margins and most of median pair of feathers slaty. Bill (in dried skin) greenish yellow with whole culmen broadly blackish. Feet dull brownish. Wing, 77 mm.; tail, 66; exposed culmen, 14; culmen from base, 18; tarsus, 25.

Remarks.—Female like the male in pattern and general coloration but with back tinged with Dark Olive Gray; throat, breast, and sides of belly Light Buff; flanks browner; under tail-coverts pale buff; chin black as in the male; wings patterned as in the male but the edges of the remiges duller blue and the yellow shoulder-patch slightly darker and duller. The single female examined shows traces of a gray stripe over the auriculars and one down the middle of the occiput, both indistinct. Wing, 66.25; tail, 56; culmen from base, 17; tarsus, 23.

A young bird, without determined sex, has the upper parts dull Buffy Citrine with some of the black feathering of the head appearing in place; chin black; most of under parts broadly, but not sharply, striped with brownish gray; ground color of throat and belly buffy whitish, of sides brownish buff; under tail-coverts pale buff, unstriped; flanks dull brownish, with dark stripes not conspicuous; wings as in adults but the yellow shoulder-patch much duller.

Two adult male paratypes are like the type in color but are smaller; wing, 73.5, 69.5; tail, 64, 58; culmen from base, 17, 17.5; tarsus, 23.5, 22.5.

Arremon schlegeli was named by Bonaparte in 1850 (Consp. Gen. Av., I, p. 488) from "Am. m.," from a bird in the Leiden Museum. He described it as having, among other characters, a completely yellow bill and a fuscous gray back. When the specimens from San Gil came to hand, the suspicion promptly arose that they were the true *schlegeli* and that the yellow-backed form, to which the name had been applied for ninety years, had been wrongly identified. Every author who discussed the species after Bonaparte insisted on the yellow back but I have been unable to find any evidence that the type was examined or the discrepancies in Bonaparte's description noted. Dr. Junge, of the Leiden Museum, has been kind enough to examine the type for me and reports that Bonaparte's description is at fault and that the type, a male, has a blackish spot at the base of the culmen and a yellowish green back. This effectively disposes of the doubt as to the proper application of the name and assures the novelty of the birds from San Gil.

Berlepsch (1912, Verh. V Int. Orn.-Kongr. Berlin, p. 1107) proposed to restrict the type locality of *schlegeli* to Santa Marta, Colombia. Hellmayr (1938, Field Mus. Nat. Hist. Publ., Zool. Ser., XIII, Pt. 11, p. 428) proposed to change this restriction to Caracas, Venezuela. Authors have agreed that there is no distinction between the birds of this species from the two localities. Dr. Junge writes me, however, that the label on the type specimen gives "Colombie" from data written on the stand by Temminck. Berlepsch's restriction to Santa Marta is, therefore, to be followed.

SPECIMENS EXAMINED.

A. s. schlegeli.—

COLOMBIA:

Santa Marta, Valparaiso, 1 ♂, 1 ♀, 2 (?);
Bonda, 1 ♂;
Onaca, 1 ♂, 1 (?);
Minca, 3 ♂, 3 ♀, 1 (?);
Santa Marta, 1 ♂;
N. Antioquia, 1 (?).

A. s. canidorsum.—

COLOMBIA:

San Gil, 1 ♂ (type), 2 ♂[1], 1 ♀[1], 1 (?)[1].

[1] Specimens in Instituto de La Salle, Bogotá, Colombia.

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ON A COLLECTION OF MYRIOPODS FROM VENEZUELA.

BY RALPH V. CHAMBERLIN,
University of Utah.

The present paper is a report upon a small but interesting collection of chilopods and diplopods made in Venezuela during June, July and August of 1939 and transmitted to me for study through the courtesy of Mr. G. Vivas-Berthier, by whom most of the material was collected with the cooperation of Mr. E. Mondolfi.

Of the species represented the following are here described as new:

New Chilopods.

Ribautia vivas-berthieri, sp. nov.
Keporya miranda, gen. et sp. nov.
Cerethmus naiquatanus, gen. et sp. nov.

The following have also proved to be new and have already been described elsewhere.[1]

New Diplopods.

Neocricus foederatus Chamberlin.
Neocricus encantus Chamberlin.
Neocricus chacaitus Chamberlin.
Ankylophallus chacaitus Chamberlin.
Ankylophallus encantadus Chamberlin.
Ankylophallus vallecolens Chamberlin.

The types of all species are at present retained in the author's collection.

Chilopoda.

Family CRYPTOPIDAE.

Otocryptops ferrugineus (Linné).

One large specimen of this wide-spread form was taken at "Los Canales," Curupas, Edo. Miranda, on July 10, 1939, by E. Mondolfi.

[1] Chamberlin, R. V., "New American Millipeds," Bulletin of the University of Utah, Biol. Series, Vol. 6, No. 4, April, 1941.

Newportia longitarsis (Newport).

One adult was taken on the Rio Chacaito, July 16, 1939, by Vivas-Berthier and Mondolfi.

Family OTOSTIGMIDAE.

Rhysida nuda (Newport).

One female with her numerous young found Aug. 5, 1939, by Vivas-Berthier.

Rhysida sp.

A young specimen of uncertain species was taken Aug. 23, at "Los Canales," Naiquata.

Family SCUTIGERIDAE.

Pselliodes colombiana Chamberlin.

One specimen apparently this species rather than *P. nigrovittata*, reported by Brolemann from Venezuela. It was found by Vivas-Berthier at El Valle, D. F., near Caracas, June 20–29, 1939.

Family ORYIDAE.

Genus **KEPORYA,** new.

Frontal suture present. Antennae thick at base and attenuated distally. Claw of second maxillae concave, not pectinate. Tergites bisulcate. Most segments with two or three series of paratergites, a few of the most anterior in the genotype with but a single series. Prescutellum and spiraculiferous pleurite separate, subequal in size. Ventral pores apparently absent in the genotype. Last coxae without pores. Tarsus of anal legs single jointed, clawless.

Genotype.—Keporya miranda, new species.

From the other known American genera of the Oryidae, the present genus may be distinguished by means of the following key:

Key to American Genera of Oryidae.

1 (2). Each coxopleura of anal segment with two large pits into which glands open.....*Trematorya* Brolemann.
2. Coxopleurae of anal segment without pores.....3
3 (4). Tarsus of anal legs two-jointed.....*Orphnaeus* Meinert.
4. Tarsus of anal legs one-jointed.....5
5 (6). Claw of second maxillae pectinate.....*Notiphilides* Latzel.
6. Claw of second maxillae concave, not pectinate.....7
7 (8). Tergites not bisulcate; all segments with a single series of paratergites; prescutellum smaller than the spiraculiferous plate.....*Incorya* Chamberlin.
8. Tergites bisculate; at least some segments with 2 or more series of paratergites; prescutellum not smaller than the spiraculiferous plate.....9

9 (10). Anterior segments without paratergites; no frontal suture present; ventral pores in a quadrangle..*Titanophilus* Chamberlin.
10. All segments with paratergites; frontal suture present; no ventral pores.....*Keporya*, new.

Keporya miranda, new species.

The general color of body and legs is olive to olive brown; the brown in body more pronounced anteriorly.

Antennae not flattened, thick at base and moderately attenuated distad; joints proportionately short and broad. Head broader than long; the anterior margin obtusely angular; frontal suture distinct. Head fitting into a transverse fold in the basal plate—which is short and a little broader than the head.

Each tergite with a pair of conspicuous widely separated impressions or pits representing the longitudinal sulci.

Sternites without sulci and without pores. Last sternite short and broad.

Anal legs in the male a little thickened; short; tarsus consisting of a single clawless article.

Number of pairs of legs, 87.

Length, about 85 mm. in preserved and contracted holotype.

Locality.—Venezuela: "Los Canales," Curupas, Edo. Miranda. July 19, 1939. One male.

Family BALLOPHILIDAE.

Genus **CERETHMUS,** new.

Differing from *Ityphilus*, to which probably closest, as well as from other known genera of the family in peculiarities of the antennae. These are nearly uniform in diameter from second to eighth article and then abruptly thickened at the ninth article and from there gradually attenuated to the distal end, the last six articles longer and thicker than the preceding ones; geniculate at junction of the two divisions. Prehensors with chitinous lines strongly developed, complete; claws smooth, when closed not reaching front margin of head; other joints also without teeth. Dorsal plates not sulcate. Ventral pore areas entire, circular, elevated, and sharply defined. Last sternite trapeziform, broad. Coxopleural pores two on each side, large, mostly covered. Anal legs strongly crassate; tarsus two-jointed, without claw.

Genotype.—Cerethmus naiquatanus, new species.

Cerethmus may be separated from the other known genera of the family by means of the following key. The placing of *Taeniolinum* in the family is tentative only.

Key to the Genera of Ballophilidae.

1 (14). Ventral pores in one or two sharply limited and usually elevated areas.....2
2 (13). Ventral pores in a single field.....3
3 (10). Antennae decidedly clavate.....4

4 (5). Prehensors lacking chitinous lines.....*Ballophilus* Cook.
5 (4). Prehensors with chitinous lines.....6
6 (7). Coxae of last legs with a single pore on each side; tergites bisulcate.....*Tanophilus* Chamberlin.
7. Coxae of last legs with two pores on each side; tergites not bisulcate.....8
8 (9). Field of ventral pores transversely elliptic..*Thalthybius* Attems.
9. Field of ventral pores strictly circular.....*Ityphilus* Cook.
10. Antennae not truly clavate.....11
11 (12). Antennae short, not geniculate, attenuated from base distad.....*Leptynophilus* Chamberlin.
12. Antennae of the ordinary length, geniculate, with the last six articles set off in form and size from the first eight..... *Cerethmus*, gen. nov.
13 (2). Ventral pores in two circular areas on each sternite..... *Diplethmus* Cook.
14 (1). Ventral pores diffuse, in an indistinctly limited band over caudal border; antennae short and thick, with joints broader than long.....*Taeniolinum* Pocock.

Cerethmus naiquatanus, new species.

The body deeply pigmented, the violet pigment characteristic of most members of the family, probably more pronounced in life than in the preserved specimen; in addition, a more persistent brown pigment.

Antennae at base somewhat compressed in the lateral direction, the joints elsewhere cylindrical; first joint considerably thicker than the second, the following ones gradually decreasing to the penult; ultimate article a little shorter than the two preceding taken together. Head almost equal in length and breadth; caudal margin a little convex, the lateral margins more strongly so; narrowing anteriorly; anterior margin subtruncate.

Prehensorial claws slender, smooth, when closed falling much short of the anterior margin of head.

Second dorsal plate nearly of same length as the first, than which it is a little narrower, but obviously broader than the third.

Dorsal plates conspicuously roughened; sparsely hirsute.

The ventral pores, present on sternites from third to antepenult, on most segments in an elevated circular area; but in posterior region the area becomes transversely elongate, subelliptic.

Last ventral plate trapeziform. Pores large, covered by the sternite except for outer edges.

Anal legs crassate, narrowing from fourth article distad, the ultimate article being conical.

Pairs of legs, 81.

Length, about 40 mm.

Locality.—Venezuela: Los Canales, Naiquata. One specimen taken by G. Vivas-Berthier on July 23, 1939.

Family CHILENOPHILIDAE.

Ribautia vivas-berthieri, new species.

Body, legs and antennae yellow, the head and prehensors chestnut.

Head relatively narrow and long, a little narrowing from frontal region caudad; posterior corners oblique and the rather short caudal margin truncate; overlapping the anterior border of the basal plate. Frontal plate not discrete.

Prehensors much exposed in dorsal view at the sides of the head and the claws when closing attaining or somewhat surpassing the distal end of the first antennal article. Femuroid with a dark rounded tooth toward base (trochanter division) and another larger, acute one at distal end. Claw also with a large acute tooth at base. Anterior margin of prehensors bearing two teeth. Chitinous lines weak but extending nearly to the condylus.

Spiracles all circular, the first not specially enlarged.

Ventral pores present on first ventral plate.

Last ventral plate wide, trapeziform with caudal angles rounded. Coxopleural pores several on each side along margin of plate, aggregated.

Anal legs in female long and slender.

Pairs of legs, 49.

Length, 21 mm.

Locality.—Venezuela; Los Canales, Niaquata. One female taken July 23, 1939, by G. Vivas-Berthier, for whom the species is named.

Diplopoda.

Family SPIROSTREPTIDAE.

Gymnostreptus geayi (Brolemann).

Several males and females of this well-marked species collected at El Valle, D. F., near Caracas, June 20–29, 1939, by Vivas-Berthier.

Gymnostreptus sp. a.

A female taken July 16, on Rio Chacaito by Mondolfi and Vivas-Berthier. In the absence of a male the precise species is in doubt.

Gymnostreptus sp. b.

A female of a much larger form than either of the preceding species. El Encantado, near Petare, Aug. 6, 1939. Coll., Vivas-Berthier and Mondolfi.

Family RHINOCRICIDAE.

Neocricus foederatus Chamberlin.

Three males and one female taken at El Valle, D. F., near Caracas, June 28–29, 1939, by Vivas-Berthier.

Neocricus chacaitus Chamberlin.

One male taken on the Rio Chacaito, Edo. Miranda, July 16, 1939, by Mondolfi.

Neocricus encantus Chamberlin.

A female of this species taken at Encantado, Edo. Miranda, near Petare, Aug. 6, 1939, by Vivas-Berthier and Mondolfi.

Family STRONGYLOSOMIDAE.

Orthomorpha gracilis (C. K.).

Several males and females taken at El Valle, D. F., near Caracas, June 23, by Vivas-Berthier.

Family LEPTODESMIDAE.

Ankylophallus chicaitus Chamberlin.

Two males and one female. Rio Chacaito, Edo. Miranda, July 16, 1939. Vivas-Berthier and Mondolfi.

Ankylophallus vallecolens Chamberlin.

A male and female. El Valle, D. F., near Caracas, June 20–29, 1939. Vivas-Berthier.

Ankylophallus encantadus Chamberlin.

Several males and females. El Encantado, Edo. Miranda, August 6, 1939. Vivas-Berthier and Mondolfi.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW RACE OF *NETTION ANDIUM* FROM VENEZUELA.

BY H. B. CONOVER.

In checking over a series of *Nettion andium* in my collection, it became apparent that specimens from Venezuela were somewhat lighter than a series from Ecuador and the central Andes of Colombia. After borrowing and examining further specimens the difference appeared to be great enough to warrant separation as a new race.

Nettion andium altipetens, new subspecies.

Type.—From the Paramo San Antonio, Culata Mountains, Merida, Venezuela. Altitude 12,000 feet. No. 11, adult male in the Conover Collection, Field Museum of Natural History, Chicago. Collected March 24, 1920, by H. B. Conover.

Characters.—The most salient difference between the new form and typical *andium* from Ecuador is in the coloration of the speculum. In the typical race the green of the speculum has a strong metallic bronze reflection in certain lights, but in *altipetens* this is lacking or very faintly indicated. The new form also has a generally lighter appearance, as the upper back, scapulars and tertials are browner, less blackish green and have grayer, less buffy, edgings; the head and neck are less heavily speckled and barred with dusky and the chest is less heavily blotched with the same color.

Description of type.—Head and neck grayish white, thickly barred with narrow dusky bands, which are heaviest on the pileum and sparsest on the throat; mantle grayish brown, each feather with a grayish buff edge and a narrow white band about a fourth of the way back from the tip; feathers of the upper back, the scapulars and the tertials dark greenish brown, edged with grayish buff; lower back, rump, upper tail coverts and tail grayish brown; upper wing coverts brownish gray, the tips of the greater row hazel, forming a band anterior to the speculum, which is velvety black except for the two or three innermost secondaries, which have a wide metallic green band on the edge of the outer web; tips of the secondaries light hazel, forming a band; primaries dusky brown, darker on outer web

and tip; breast grayish white, tinged with brownish buff on chest, each feather with a subterminal dusky spot and a dusky bar toward the base, these dark markings becoming almost obsolete on the lower breast; abdomen and under tail coverts light buffy gray; outer under wing coverts grayish brown, greater under wing coverts gray with a white edge to the inner web, central under wing coverts white, inner under wing coverts white barred with dusky; axillaries white with dusky shaft spots near tip. Wing (flat) 226; culmen (exposed) 41; tarsus 34; middle toe (without claw) 41 mm.

Range.—Paramo zone in the Andes of Venezuela and in the Eastern Andes of Colombia, south at least to Bogota.

Remarks.—I am indebted to Mr. James L. Peters of the Museum of Comparative Zoology and Mr. John T. Zimmer of the American Museum of Natural History for the loan of additional material.

Specimens Examined.

Nettion andium andium.—19: Colombia (Paramo de Purace, Cauca, 6; Santa Isabel, Quindio Andes, 1); Ecuador (Mt. Cotopaxi, 2; Ilinesa, Pichincha, 1; Antisana, Pichincha, 5; Llanganate, Tunguragua, 4).

Nettion andium altipetens.—24: Venezuela, Merida (Paramo San Antonio, Culata Mts., 3; La Culata, 4; Paramo de Frias, 4; San Antonio, 1; Merida, 3; Quintero, 3; Conefer, 1; Paramo de Santa Domingo, 3); Colombia (Lagunillas, Boyaca, 2).

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PROCEEDINGS
OF THE
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AN ISOLATED RACE OF *MICROTUS MONTANUS* FROM EASTERN WASHINGTON.

BY WALTER W. DALQUEST.
University of Washington, Seattle.

On March 21, 1938, the writer took an adult male *Microtus* at Moses Lake, Grant County, Washington. The skull of this specimen was broken by the trap and yet it was noticeably different from skulls of other meadow mice known from Washington. Repeated trips were made to the Moses Lake region in an effort to obtain additional material, but specimens were not taken until March 24, 1940, when Dr. Victor B. Scheffer and the writer caught thirteen adult meadow mice in the Pothole region, ten miles south of Moses Lake (formerly Neppel). Four additional specimens were taken April 15, 1940, one of which was kept alive in the laboratory for several months.

The write is indebted to Dr. E. Raymond Hall, of the California Museum of Vertebrate Zoology, for helpful suggestions and the loan of topotypes of *Microtus montanus montanus*, and to Mr. Stanley G. Jewett, of the U. S. Fish and Wildlife Service, Portland, Oregon, who kindly loaned a series of *Microtus montanus* from the Blitzen Valley, Oregon.

Comparison of the specimens from the Moses Lake region with other named races of *Microtus* indicates that the former belong to an undescribed race of *Microtus montanus*. The new race is named for Professor Trevor Kincaid, of the University of Washington Department of Zoology, and may be known as:

Microtus montanus kincaidi, new subspecies.

Type.—Adult female, skin and skull number 95084, Calif. Mus. Vert. Zool., from the Potholes, ten miles south of Moses Lake (Neppel), Grant County, Washington, collected by Walter W. Dalquest, March 24, 1940; original number 1748.

Range.—The Moses Lake region, Grant County, Washington.

Diagnosis.—Color, in winter pelage, upperparts varying from dark

chocolate brown to nearly black, paler below; fur long and soft; body large; tail short; hind foot medium; ear small; skull large, strongly ridged; posterior border of palate smoothly concave.

Comparisons.—Compared with *Microtus montanus montanus*, which it most closely resembles, *kincaidi* differs in: basilar length greater; maxillary tooth row longer; zygomatic breadth greater; rostrum wider; posterior border of palate smoothly concave rather than truncate or angular; posterior cusp of last maxillary molar directed inwards rather than posteriorly, giving a blunt rather than a pointed appearance to the posterior end of the maxillary molar row. Compared with *Microtus montanus canescens* and *Microtus canicaudus*, *kincaidi* can be distinguished at a glance by its large size and dark brown rather than grey color. From *Microtus pennsylvanicus* and its subspecies, *kincaidi* may be separated by its much larger, wider, more ridged and angular skull.

Measurements.—(In millimeters.) Six adult males and twelve adult females of *Microtus m. kincaidi* average, respectively: total length 176.6, 168.0, length of tail 45.1, 43.8, length of hind foot 20.8, 20.3, height of ear from notch 14.0, 13.4, basilar length 28.5, 27.8, length of maxillary molar row 7.3, 7.3, length of nasals 7.8, 7.5, zygomatic breadth 17.2, 16.8, interorbital breadth 4.2, 3.7, breadth of braincase 9.5, 9.5, breadth of rostrum 5.7, 5.4.

Remarks.—*Microtus montanus montanus* ranges from California north to eastern Oregon. The range of *Microtus m. kincaidi* is separated from that of *montanus* by the Snake River and nearly two hundred miles of desert. The presence in eastern Washington of mice so similar to *montanus* that their common ancestry can scarcely be doubted and showing but little approach to *Microtus montanus canescens* indicates a much more extensive range for *Microtus montanus* in glacial or interglacial times.

The region where *Microtus m. kincaidi* occurs is about twenty by five miles in area, of sand and gravel deposited in an outwash channel of melt water from the last continental glacier. The shifting sand dunes, for which the Moses Lake region is famous, blocked small streams entering the area and formed Moses Lake in the channel of the old glacial river. Wind blowouts in the sandy areas to the south and west of Moses Lake filled with ground water to form the Potholes. The Potholes are rather temporary affairs, in constant danger of being destroyed by shifting barchane sand dunes (see U. S. Geol. Surv. Map, Moses Lake, Washington, Sheet). Some vegetation, consisting of scrub willows, grasses, reeds, and sedges, grows along the shore of Moses Lake and the more permanent potholes and forms the habitat of *Microtus m. kincaidi*.

The Quincy Plateau, surrounding the Moses Lake region, is arid, loess-covered, sage-brush desert. No *Microtus* are known from the Quincy Plateau, although a related genus, *Lemmiscus*, has been taken there. It is possible that in an earlier, more humid, cycle, the plateau was occupied by *Microtus montanus*.

On at least ten trips to the Moses Lake region between 1938 and 1940, no *Microtus* were captured, although special efforts were made to secure them. A few runways and cuttings were found, but all appeared to be

old. In the spring of 1940, meadow mice were swarming in the Potholes. At the type locality twelve specimens were taken in an area of less than an acre, and numerous traps were sprung but empty. Residents in the region state that in some years meadow mice are abundant, but in other years are very scarce. Apparently *Microtus m. kincaidi* is cyclically abundant.

The runways of *kincaidi* are extremely narrow, considering the size of the mouse. The average width of the runways is about one and one-half inches. The runways were always found near water on damp earth under cover of dense vegetation. As with most *Microtus*, faeces were deposited in a few chosen places, usually the intersection of two or more runways. Burrows, with heaps of damp earth at their mouths, were abundant.

Ten females taken March 24, 1940, were pregnant. The fetuses varied from four to seven in number. A greater number was usually found in the left horn of the uterus of any individual than in the right. The fetuses ranged from six to eighteen millimeters in crown-rump length. Two females taken April 15, 1940, were nursing young. Males with enlarged testes were taken March 21, 1938; also March 24, and April 15, 1940. No young mice were caught on the above dates. This indicates that breeding in *Microtus m. kincaidi* does not take place to any extent during the winter months, but begins early in March.

Specimens examined.—Total number 18 adults, all from Grant County, Washington, as follows:

Moses Lake (previously known as Neppel), 1; The Potholes, ten miles south of Moses Lake 17 (two from the collection of Victor B. Scheffer).

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NEW FORM OF *TOXOSTOMA* FROM HIDALGO.

BY ROBERT T. MOORE,

California Institute of Technology.

The form of the Crissal Thrasher, recently taken by Chester C. Lamb in Hidalgo, Mexico, is so different from the type in the United States National Museum of *Toxostoma dorsale dorsale* Henry, that I do not hesitate to describe it on the basis of one specimen.

Toxostoma dorsale dumosum,[1] subsp. nov.

MEXICAN CRISSAL THRASHER.

Type.—Female adult in winter plumage; number 27917, collection of Robert T. Moore; Portezuelo, Hidalgo, Mexico, altitude about 5200 feet; Dec. 17, 1940; collected by Chester C. Lamb.

Subspecific characters.—Differs from *Toxostoma dorsale dorsale* Henry of New Mexico in being considerably darker above, as well as somewhat darker below; chin-patch whiter (pure white) and larger; size very slightly smaller. Although I have not seen topotypical specimens of *Toxostoma dorsale trinitatis* Grinnell from Lower California, it is clearly different from this form, for, although it is darker than true *dorsale* as is *trinitatis*, it does not seem to be nearly so dark and in size is distinctly very much smaller; the exposed culmen shorter than the measurements given by Grinnell and not so curved, being more like true *dorsale*.

Range.—Known only from the arid valley about the type locality, which, according to Mr. Lamb's notes, consists of "mesquite trees, tuna and cholla cacti, some cardons and much thorny brush. The surrounding low mountains are very rocky and support brush and cacti."

Measurements.—The unworn type and only specimen measures wing, 91.5 mm., tail 123.1 mm., exposed culmen 32.2 mm., tarsus 31.8 mm. The average measurements of five males and one female, given by Grinnell (Condor, 29, p. 127, 1927) are wing, 98.3 mm., tail 140.0 mm., tarsus 34.4 mm., culmen 36.6 mm.

Remarks.—The specimen, which Sutton and Burleigh (Occ. Papers Mus. Zool., La. State Univ., No. 3, April 5, 1939, p. 37) reported from Diamante Pass, Coahuila, March 6th, as *dorsale dorsale* should be re-examined to determine if it is an intergrade between true *dorsale* and *dumosum*.

[1] *Dumosus* equals thorny, referring to the habitat.

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PROCEEDINGS
OF THE
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THREE NEW RACES IN THE GENUS *OTUS* FROM CENTRAL MEXICO.

BY ROBERT T. MOORE,
California Institute of Technology.

Since the review of the Genus *Otus* of Mexico and Central America by James L. Peters and the author (Auk, Vol. 56, January, 1939, pp. 38–56), seven specimens from Mexico of *Otus asio* related to *Otus asio cineraceus* and two specimens related to *Otus vinaceus* (Brewster) have been added to the Moore Collection. Furthermore, four new specimens of *Otus sinaloensis* have been acquired by the Donald R. Dickey Collection. These thirteen individuals give quite a different picture of the relationship of *Otus asio cineraceus* and the race which most authors, including Peters and myself, have come to call *Otus asio vinaceus*. In the above-mentioned review (p. 40) we noted three females from the Rio Sestin and Sanctuario, Durango, referred by Miller (Bull. Am. Mus. Nat. Hist., 20: Art. X, p. 164) to *Otus asio aikeni*, which we considered more nearly related to *Otus asio cineraceus*, resembling birds from Reserve, New Mexico, in their broader streakings on both upper and under parts. These birds average somewhat larger than true *cineraceus*, but not so large as a series of *Otus asio aikeni* from Colorado, which, because of lack of adequate material, was not perceived by Ridgway (Bull. 50, U. S. Nat'l Mus., Part VI, p. 695), and are darker throughout than *aikeni*. That these birds might be intergrades with some undiscovered race farther south was suspected by the author at the time; in fact a single new female from Ojito, Durango, pointing to this conclusion, came into my possession just after the review had gone to press.

Our fresh material reveals the following picture: (1) An undescribed larger and darker (more black and white) race of *Otus asio* belonging to the

cineraceus-gilmani-xantusi group, ranging east-west across the Central Plateau[1] from Aguascalientes to Hidalgo; (2) A second undescribed browner race of the *cineraceus* group, much smaller than *suttoni*, inhabiting the southwest end of the Central Plateau north of the Rio Balsas and carrying the range of the *cineraceus* group southwestward in a semicircle from southwestern Arizona east through New Mexico, thence south through Chihuahua to Durango, thence to Jalisco, part of it north and part east of the great Sierra Madre range inhabited by the *vinaceus-sinaloensis* group. This new prong to the range of the *cineraceus* group continues the curving semicircle west around and exactly south of the *vinaceus* group; (3) A most surprising undescribed huge race of the *vinaceus* group, inhabiting Michoacan, carrying this group seven hundred miles farther southeast straight across the semicircular range of the *cineraceus* group. The result of this curious crossing of ranges is that we find a breeding pair of race (2) mentioned above, at Atoyac, Jalisco, with *vinaceus* due north of it, while southeast of this new race and not one hundred miles away at Apatzingan, Michoacan, is another race of *vinaceus*. These last two races, so close geographically, are *very* much farther apart in characters than *cineraceus* of Arizona and *vinaceus* of Chihuahua-Sinaloa. Furthermore, vagrant dispersion does not enter into the picture, for the two groups were taken within twenty days of each other, one a nesting pair and at least one individual of the other in the breeding period. The conspecific concept of *vinaceus* and *cineraceus* as races of *Otus asio* seems invalidated. As a further complication the Michoacan representative of *vinaceus*, although markedly differentiated from every other known *Otus*, has the large size and feet, and on the toes the thick bristles (without fine hairs extending from the rachis) of *Otus cooperi* and in some ways is intermediate between *cooperi* and *vinaceus*.

Considering all relationships possible for this Michoacan bird, two will be ruled out by all competent students of *Otus*. It is not a *trichopsis* nor a *guatemalae* Four concepts are possible. (1) This undescribed form may be a new species. Although possible, this seems an undesirable solution, except as a last resort, obstructing progress in the modern interpretation of interspecific relationship. (2) It may be conspecific with *cooperi*. (3) It may be conspecific with the *vinaceus-sinaloensis* group and *cooperi*. (4) It may be the connecting link, proving the conspecific relationship of the entire *Otus asio* group with both the *vinaceus-sinaloensis* group and *cooperi*. This is the most *desirable* solution of all, but will analysis support it?

Let us first reconsider the possibility that Ridgway (Bull. 50, U. S. Nat'l Mus., Part VI, p. 708) may have been rirht in considering *vinaceus* closer to *Otus cooperi*, than to *Otus asio cineraceus*, concept (3) above. When Ridgway wieghed this problem, there was extant one specimen of the *vinaceus* group, the type of *Megascops vinaceus* Brewster. When the review of "Genus *Otus*" (opus cit.) was published in 1939 there were six. To-day there are twelve known individuals, the above type in the Museum of Comparative Zoology, four specimens of *sinaloensis* in the Dickey Col-

1 To insure definiteness, hereafter I shall term the great plateau of Mexico running north-south from Chihuahua and Coahuila to Jalisco, Michoacan and the state of Mexico, the "Central Plateau."

lection, seven individuals in the Moore Collection, consisting of two *vinaceus*, three *sinaloensis* and two of the undescribed race from Michoacan. All of these have certain characters in common, differentiating them from the *Otus asio* group: (1) toes bristled, or in *sinaloensis* having both intermediate and true bristles, (2) average tail-length proportionately *longer* than in races of *Otus asio* (obviously longer than half the length of the wing), whereas according to my measurements and those of Ridgway (Bull. U. S. Nat'l Mus. No. 50, Pt. VI, pp. 687-704) the average tail length in all races of *asio*, except possibly *mccallii*, is slightly shorter than one-half the wing, at least in one sex or the other. (These differences are not great and would be unimportant, except as part of general cumulative evidence.), (3) the color pattern although close to that of *Otus asio* group, differs in all three forms and every specimen in having the streaking on under parts hairlike, the "herringbone" marks so obscured that at first glance no bars appear to exist and actually do not in the Michoacan birds, (4) the dots of the vermiculation of posterior under parts are more frequent and thick, extending posteriorly and continuously over the thighs, so that no plain white areas occur, as in the *asio* group, (5) the so-called "vinaceus" (Benzo Brown) coloration of upper parts, progresses as we proceed southward, into a more Avellaneous or Vinaceous-Fawn tone, whereas in the *asio* group a brownish gray coloration proceeds in just the opposite direction toward a sharply contrasted pure black-white coloration in the undescribed *Otus asio* race of the southern Hidalgo-Aguascalientes belt of the Central Plateau, (6) the toes, in proportion to wing have the somewhat larger size of *Otus cooperi*, (7) the quadrate dark spots on outer webs of ninth, eighth and seventh primaries are regularly vermiculated, except in the Michoacan race.

Otus cooperi possesses five of the above seven characters, but in the second (2) its average (and individual) tail length is always obviously and considerably shorter than one-half the wing length, and in the third (3), although possessing an equally continuous vermiculation and equally narrow streaking, reveals only vestigial remnants or none of the dark blotches on the sides of breast and nuchal collar. But the significant thing is that the undescribed Michoacan race of the *vinaceus* group, has assimilated two characters of *cooperi*, not possessed by the *vinaceus* group. (1) extremely large size, if not larger size than *cooperi*, including large feet, toes and claws, (2) absence of vermiculation on the darker quadrate spots on the outer webs of the ninth, eighth and seventh primaries. Finally, the specimen of *cooperi* in the British Museum from Cacoprieto, Oaxaca, fills in an important gap in the range between *cooperi* and the *vinaceus* group.

Summing it up, (1) the presence of a markedly contrasting breeding race of *Otus asio* in the middle of the range of the *vinaceus* group seems to destroy the conspecific concept of *Otus asio* with the *vinaceus* group; (2) the undescribed race from Michoacan fills in the gap in characters between the *vinaceus* group and *cooperi* (the author does not deem the proportionately shorter tail amounting to a difference of a few millimeters a significant specific difference); the gaps left in the anticipated continuous range of the species, which may eventually be known by the specific name of *cooperi*, are large but not unexpected in this group of owls so difficult to collect.

Representatives of *cooperi* and *vinaceus* have now been taken within four hundred and fifty miles of each other, assuming the authors of the Biologia Centrali-Americana (Aves III, 19) were right in assigning the Cacoprieto specimen from the Isthmus of Tehuantepec to *cooperi*, which I believe to be correct, although I have not seen this specimen in the British Museum recently. However, because these gaps are still large, I hesitste to assert the conspecific relation of the *vinaceus* group with *cooperi*, although I believe this decision must eventually be made. This paper is no place for a comprehensive analysis. For the above reasons and others I deem it best at *present* to accept concept (3)—a conspecific relationship with the *vinaceus* group only, separating it from the *asio* group. This concept seems more desirable to me than the assumption of conspecific relation with *cooperi*, until more material is available. It gives me great pleasure to acknowledge the courtesy displayed in the loan of material or otherwise, by Dr. Herbert Friedmann and the United States National Museum, Dr. George Miksch Sutton and Cornell University, Mrs. Donald R. Dickey and Mr. Adrian van Rossem, Mr. George Willett, the Los Angeles Museum and Dr. Louis B. Bishop.

Otus asio suttoni.[2]

PLATEAU SCREECH OWL.

Type.—Female adult in winter plumage, number 27962, collection of Robert T. Moore; Portezuelo, Hidalgo, Mexico, about 5800 feet, December 19, 1940; collected by Chester C. Lamb.

Subspecific characters.—Resembling *Otus asio semplei* Sutton and Burleigh, but differs in having general coloration more purely black and white throughout; the upper parts darker (more black and dark gray, rather than black and dark brown); the streaking on the pileum much more separated (less solid); the auriculars grayer (less brownish); the primary coverts and portions of greater wing coverts immediately above them more blackish (less brownish) margined with whitish, not with buff; the white areas of chin and upper throat pure white, as contrasted with the buffy areas of *semplei;* the ground color of the legs pure white instead of Cinnamon-Buff[3]; and in most specimens, the lighter spots on the under surface of the secondaries and proximal primaries usually pinker, rather than more tan color; wing larger; toes well feathered, not partially bristled as in both *semplei* and *mccallii*. Differs from *mccallii* (Cassin) much more than from *semplei* in being very much darker; more black and white (less brownish) throughout; the toes much more heavily feathered. *Suttoni* differs from *O. a. cineraceus* of Arizona in being darker, more black and white (less brownish) throughout; the streaking above being considerably wider and somewhat wider below; white areas on chin and upper throat whiter (less buffy); vermiculations on breast and

2 I take pleasure in naming this for Dr. George Miksch Sutton, because of his work in regions of northeastern Mexico adjoining that of the range of this new form and because of the courtesy shown to me in the loan of his valuable series of *Otus asio semplei* from northern Nuevo Leon.

3 Names of colors in this paper, when capitalized, are taken from Ridgway's "Color Standards and Color Nomenclature," 1912.

upper abdomen less heavy and more blackish; the large light spots on the underside of the secondaries and proximal primaries much darker, in most specimens distinctly pinkish; size larger.

Range.—The south-central portion of the Central Plateau, ranging west from Hidalgo through Queretaro to Aguascalientes, thence north to Durango and probably to southern New Mexico.

Average Measurements.—

	Wing	*Tail*	*Culmen from Cere*
Males.			
2 ads. *semplei*	153.6 (152.0–155.2)	81.4 (80.1–82.7)	13.9 (13.6–14.1)
6 ads. *suttoni*	161.9 (156.9–166.4)	80.4 (74.4–84.8)	13.9 (13.5–14.0)
10 ads. *mccallii*	152.1 (145.4–160.1)	77.3 (72.3–82.6)	13.7 (13.2–14.5)
Females.			
5 ads. *semplei*	159.1 (155.5–162.7)	80.8 (78.1–82.0)	14.3 (13.6–15.0)
2 ads. *suttoni*	164.9 (152.1–167.7)	78.8 (75.0–82.6)	12.8 (12.5–13.1)
8 ads. *mccallii*	154.6 (150.9–160.6)	79.6 (74.3–82.3)	

Specimens examined.—*Suttoni*—Hidalgo: Portezuelo 1 ♀ (Type, Dec. 19); Queretaro: El Caracol 1 ♂ (Dec. 9); Aguascalientes: San Jacinto 2 ♀ (Oct. 14–22); Durango: Sanctuario 1 ♂ (Feb. 22), Rio Sestin 2 ♀ (Apr. 4–May 3), Ojito 1 im. ♀ (Aug. 26). *Semplei*—Nuevo Leon: Topotypical specimens, including type, from Mesa de Chipinque near Monterrey 2 ♂ 2 ♀ (Feb. 12–May 5), near Monterrey 2 ♀, Montemorelos 1 ♀ (Apr. 3). *Mccallii*—Texas, Tamaulipas and Nuevo Leon: large series listed by Moore and Peters (loc. cit. p. 41).

Remarks.—*Suttoni* finds its best expression in the southern portion of the Central Plateau from Hidalgo through Queretaro to Aguascalientes and north to Durango. The birds of southern New Mexico are nearly intermediate between *cineraceus* and *suttoni*, having the heavier markings and streakings below and above, as well as larger size, of *suttoni*. So far no rufous phase specimen has been found of the new race, as compared with the presence of such specimens both in *mccallii* and *semplei*, but not in *cineraceus*. In one other respect *cineraceus* and the birds of the Central Plateau (*suttoni* and the undescribed race from Jalisco) are more alike in having the toes well feathered, as contrasted with the slightly bristled toes of both *semplei* and *mccallii*, the latter two being the only ones, except *xantusi*, of the *Otus asio* group which possess these intermediate kind of bristles.

Otus asio sortilegus,[4] subsp. nov.

JALISCO SCREECH OWL.

Type.—Female adult breeding, number 17038, collection of Robert T, Moore; 3 miles west of Atoyac, Jalisco, Mexico, about 4200 feet, February 25, 1940; collected by Chester C. Lamb.

Subspecific characters.—Differing more markedly from *O. a. suttoni*, whose range lies geographically between it and *O. a. cineraceus*, it is nearest to the latter, but it differs in having upper parts darker; throat and sides of neck grayer; the fine dots and marks of the vermiculation of the under parts

[4] From the Latin *sortilegus* = foretelling, referring to the revealing of the status of the relationship of the *Otus vinaceus* group, with *cooperi*.

much more numerous; the legs more cinnamon; under wing coverts and axillars more buffy; feathering on toes slightly more scanty, but not consisting of bristles. It differs from *suttoni* in having the upper and under parts browner (less black and white); the streaking above and below more narrow; the vermiculation of the breast and abdomen heavier and browner; the axillars and under wing coverts more buffy; the light spots on the under side of secondaries and proximal primaries more buffy, less pinkish; the legs darker and more buffy; the toes more scantily feathered, but not bristled; size smaller.

Range.—Known only from a pair of birds, male and female, from near Atoyac, Jalisco, at 4200 feet altitude, the male, according to Mr. Lamb, having been caught by hand in the nesting hole in a mesquite.

Measurements.—

	Wing	*Tail*	*Culmen from Cere*
1 ad. ♂ *sortilegus*	150.7	76.3	13.9
3 ad. ♂s *cineraceus*	148.8 (146.9–152.3)	76.2 (73.7–78.0)	12.9 (12.4–13.2)
1 ad. ♀ *sortilegus*	154.9	80.5	14.2
8 ad. ♀s *cineraceus*	156.8 (143.8–164.4)	79.5 (76.5–84.8)	13.4 (12.2–14.3)

Specimens examined.—*Sortilegus:*—Jalisco: near Atoyac 1 ♂ 1 ♀ (Type, Feb. 25–26 breeding). *Cineraceus*—The specimens listed in the American Museum of Natural History and Biological Survey (Auk, vol. 56, January, 1939, p. 40); also specimens in the Donald R. Dickey Collection—Arizona: Bonita Canyon, Chiricahua Mts. 1 ♂ 1 ♀ (Feb. 20–May 5), Fort Lowell 2 ♂ 2 ♀ (Dec. 27–Apr. 17). Intergrades with *suttoni*—New Mexico: Reserve 1 ♂ (Apr. 29).

Remarks.—*Sortilegus* is a bird of the mesquite association and heavily forested flat valleys, consisting of large trees, in addition to the mesquites, such as "Higueras, Guamuchils, Capulins," as well as extensive growth of "Pitaya Cacti." Mr. Lamb writes that the area is a huge valley, fifty miles long and from five to ten miles wide "absolutely flat," which once contained an extensive series of lakes—dry for the past six years. Although *sortilegus* is nearer to *cineraceus* of Arizona, it is separated from it by the eastern portion of the range of *suttoni* (Aguascalientes to Durango). Birds of the last taken at San Jacinto, Aguascalientes, only 180 miles north of the type locality of *sortilegus* are the most extreme black and white examples of *suttoni*, differing much more from the Jaliscan birds than do the birds of Arizona.

Otus vinaceus seductus, subsp.[5] nov.

MICHOACAN SCREECH OWL.

Type.—Male adult, number 25468, collection of Robert T. Moore; 5 miles northeast of Apatzingan, Michoacan, altitude 1000 feet; February 5, 1940; collected by Chester C. Lamb.

Subspecific characters.—Larger than both previously described races of *Otus vinaceus vinaceus* (Brewster) and fully as large as *Otus cooperi* (Ridg-

[5] Seductus = remote, referring to the great extension of the habitat of the species into southern Mexico.

way), both in general measurements and feet, nearest to the former, but differing in having the upper parts very much darker, but general tone of underparts almost exactly the same, except that the chin is much whiter (pure white); the upper throat less buffy; the light spots on the wing coverts and scapulars pure white instead of pure buff; the dark quadrate spots on the outer webs of the ninth, eighth and seventh primaries, counting from outside, not so heavily vermiculated; the auriculars very much darker, browner instead of gray; the lores pure white instead of barred with gray; the toes bristled; size much larger, at least twenty per cent. As compared with *sinaloensis*, the differences are about the same as with *vinaceus*, except that, although the upper parts are very much darker (browner), the under parts are actually lighter, particularly on the center of the abdomen, center of breast throat and chin; the contrast is greater, but the light spots on the wing coverts and scapulars are only a trifle whiter. Compared with *Otus cooperi, seductus* is just as large and has just as large feet, but differs in being darker, browner above; much browner on the auriculars; much whiter on the lores and chin and has the typical *asio* dark spotted nuchal collar, extending from the auriculars around the throat, which is either lacking, or merely vestigial in *cooperi;* the tail considerably longer than half the length of wing, instead of considerably shorter; a dark brownish eye-ring, instead of gray.

Range.—Known only from the two specimens in the Moore Collection, taken in different parts of Michoacan.

Average Measurements.—

	Wing	*Tail*	*Culmen From Cere*	*Middle Toe* [6] *Minus Claw*
Seductus.				
2ad. ♂s	175.3 (169.2–181.3)	92.5 (89.3–95.7)	14.9 (13.7-16.0)	17.9 (17.4–18.3)
Cooperi.				
6 ad. ♂s	166.3 (162.1–174.1)	80.2 (73.8–87.2)	15.1 (13.9–16.0)	16.0[7]
8 ad. ♀s	171.3 (163.0–177.9)	81.4 (76.5–84.2)	15.8 (15.4–16.0)	17.8 (17.5–18.1)
Vinaceus.[8]				
3 ad. ♀s	149.1 (145.5–154.5)	76.4 (74.8–78.2)	13.9 (13.8–14.0)	15.2 (14.5–15.6)
Sinaloensis.				
3 ad. ♂s	140.2 (136.0–142.4)	73.6 (71.6–75.2)	12.6 (12.4–12.8)	14.4 (13.2–15.3)
Sinaloensis.				
1 ad. ♀	148.0	74.7	14.0	15.2

Specimens examined.—*Seductus*—Michoacan: near Apatzingan 1 ♂ (Type Feb. 5), Chinapa 1 ♂ (Jan. 1). *Otus cooperi*—Costa Rica: Esparta 1 ♂ 2 ♀ 1 Im. ♀ (Mch. 26–27). Also the specimens in the American Museum of Natural History and the United States National Museum (Auk, vol. 56, Jan. 1939, p. 48).

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[6] As it would be necessary to destroy the feathers to measure this distance in the usual way, I place the point of the micrometer at the point where the distal margin of the integument between the middle and outer toe reaches its most proximal point and then measure from there to the distal end of the middle toes, where integument ends on the base of the claw.

[7] Lacking this measurement for all six specimens, I took it of the largest individual, a specimen in the Moore Collection from Esparta, Costa Rica.

[8] No males have yet been taken of this race; of *sinaloensis* one male and one female are intergrades and not included in measurements.

Remarks.—Both of our male specimens of *seductus* seem to be in the gray phase, because both specimens are the same depth of tone on the under parts as the under parts of my four specimens of the light phase of *cooperi* and of my two females of *vinaceus*, of which only the gray phase is known. Nevertheless, on the upper parts both males of *seductus* are much darker than the upper parts of either *vinaceus* or *cooperi*, having in an extraordinarily dark coloration between Warm Sepia and Verona Brown of Ridgway. No specimen in any other phase has been taken. No rufous phase specimen has been secured either of *cooperi* or of the *vinaceus* group, nor is it certain that any of the three races of the *vinaceus* group has more than one gray phase; however, I have seen only three of the four specimens of *sinaloensis* in the Dickey Collection. One of these, a male taken at Agiabambo, southwestern Sonora, on May 19, 1937, which has not yet been given a catalogue number, has the printed name of "Robert G. Hannum" on its tag. This individual lies about half way between the darker coloration of all the rest of the specimens of *sinaloensis* and my two intergrades from the higher altitude of the Guirocoba Ranch in southeastern Sonora (Proc. Biol. Soc. of Wash., Vol. 50, April 21, 1937, pp. 64–65). The Agiabampo individual is certainly not sufficiently different from all the others to make one conclude two phases are involved.

Incidentally, these recently taken specimens in the Dickey Collection amply prove the validity of *sinaloensis* and bring the total specimens in collections to five from the coastal plains, in addition to the two intergrades from the cypress-palo blanco association of the Guirocoba area. They prove that *sinaloensis* is very much darker gray and very much more vermiculated below than *vinaceus;* considerably darker above; with the light colored marks on the scapulars and wing coverts much whiter.

The fact that the two individuals of *seductus* are both males would seem to indicate that the taking of females will prove it to be an extraordinarily large Screech Owl. The type of *seductus* has a larger wing (181.3 mm.) than any one of the fifteen specimens of *cooperi*, which I have measured, the largest one being a female (177.9 mm.). In the table of measurements above, I was not able to give a good comparison of size of the feet of *seductus* and *cooperi* from measurements of the middle toe without claw taken in the usual manner. However, I do have a fair comparison for the measurement of the middle toe from the base of the second joint to the point where the integument ends on the base of the claw. This measurement of the two male *seductus* average 19.9 mm., whereas the same measurement of six adult males of *cooperi* average 18.9 mm. It would appear from all measurements that *seductus* is not only just as large as *cooperi*, but probably larger.

It is believed by some that the feet of *cooperi* are very much larger in *proportion* to the size of the bird than the feet of other species of Screech Owls. Taking the percentage of the ratio of the middle toe minus claw, measured from the angle between the middle toe and outer toe, to the wing, I find that in *cooperi* it is 10.1 per cent, *seductus* 10.2, *vinaceus* 10.2, *sinaloensis* 10.2, *xantusi* 9.2, *cineraceus* 9.5, *semplei* 9.6, *suttoni* 8.6, *sortilegus* 9.0, *mccallii* 9.6, *guatemalae vermiculatus* 11.2 and *guatemalae tomlini* 10.0. These measurements cover a series of females of each race except for *seduc-*

tus. From the above it appears that the five races of *Otus asio* of Mexico and the southern boundary States of the United States (*mccallii, cineraceus, xantusi, suttoni*, and *sortilegus*) have the middle toe from one half to one per cent proportionately smaller than *cooperi*, whereas all of the three races of *o. vinaceus* (*vinaceus, sinaloensis, seductus*) have the middle toe proportionately just as large as *cooperi*, in fact very slightly larger, while proportionately longest toes were found in a race of a different species, *Otus guatemalae vermiculatus*, namely 11.2 per cent.

Two deductions can be made from the above measurements, (1) *cooperi* does not have extraordinarily large feet in proportion to its size, (2) the *vinaceus* group is closer to *cooperi* in this character than is the *asio* group.

The relation of *Otus asio xantusi* to the *vinaceus* group is an interesting one. Like other southern races of *asio*, such as *mccallii* and *semplei*, it has the toes more sparsely feathered, but not bristled, since the calamus is very small as in the *asio* group and each one has several hair-like appendages, resembling filoplumes. These are very different from the enlarged calami of the bristles of *cooperi* or *seductus*, which seldom have hair-like appendages. *Xantusi* also resembles the *vinaceus* group in the buffy spotting on the nape and upper back and the vermiculation, in most specimens, on the quadrate darker marks on the outer webs of the ninth, eighth and seventh primaries. However, it is a true *asio* in its color pattern, having the large dark blotches on sides of breast, the conspicuous streaks on the upper parts, the less heavily vermiculated abdomen, pale under wing coverts and the very large white spots on the wing coverts and scapulars. Now that we have a good series of *sinaloensis*, it is proved to be more markedly different from *xantusi* than seemed true when *sinaloensis* was described.

This paper makes no attempt to reach a final conclusion concerning the relationships of these difficult races, but does urge the desirability of temporarily holding together the *vinaceus* assemblage as one conspecific group until the accumulation of more material may prove this course unwise. In any event, the intrusion of an extreme type of *asio, sortilegus*, near to the habitat of the utterly different and huge *vinaceus*-group race, *seductus*, must be satisfactorily explained. If this can be done and the character differences between the two groups proved unimportant, so as to show that the *vinaceus* group *is* conspecific with the *asio* group, then it might be desirable to go even farther and include *seductus* and *cooperi* with them as one conspecific concept.

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NEW *CLETHRIONOMYS* FROM UTAH AND PENNSYLVANIA.

BY J. KENNETH DOUTT.

For several years the Carnegie Museum has been making a study of the mammals of the Uinta Basin and adjacent mountain ranges in northeastern Utah. Critical examination of some of this material has demonstrated the occurrence of an undescribed race of red-backed mice in the Uinta Mountains which may be known as follows:

Clethrionomys gapperi uintaensis, subsp. nov.

Type.—Adult male, skin and skull, no. 9436, Carnegie Museum; from Paradise Park, 10,050 feet, 45 miles by road northwest of Vernal, Uintah County, Utah; collected by J. Kenneth Doutt; July 14, 1933; original number 1900.

Range.—Boreal Zone in the Uinta Mountains of northeastern Utah.

General characters—Similar to *Clethrionomys gapperi galei* from Ward, Colorado, but head and cheeks grayer; sides and back paler; belly whiter. Distinguished from *Clethrionomys gapperi idahoensis* from Sawtooth City, Idaho, by yellowish rather than grayish sides; paler, more yellowish dorsum; backs of hind feet lighter; rump yellowish rather than grayish; belly whiter.

Color.—Type: Head, between eyes, Smoke Gray (Capitalized color terms from Ridgway, 1912), spot at base of vibrissae Blackish Brown. Center of back Auburn shading to Pinkish Buff on the sides. Belly white, darkened by the Blackish Slate underfur showing through. Tail above Clove Brown, below Olive Buff. Feet above Pale Drab-Gray.

Skull.—Type: Larger and heavier than *Clethrionomys gapperi galei*, with longer and heavier rostrum; braincase narrower; zygomatic arches less spreading anteriorly; anterior palatine slits longer; auditory bullae slightly larger. Similar in size and shape to *Clethrionomys gapperi idahoensis* but zygomatic arches slightly more spreading anteriorly; nasals slightly broader at the tip; auditory bullae slightly larger and more globular; diastema longer; anterior palatine slits longer. In most adult specimens of *uintaensis* the posterior extension of the premaxillae end even with the nasals while in *idahoensis* they project back beyond the nasals.

Measurements.—Type: Total length, 155 mm.; tail, 47; hind foot, 19; ear, 19; weight, 30 grams. Skull: Condylobasal length, 24.2; interorbital breadth, 4.1; zygomatic width, 13.2; anterior palatine slits, 4.6; height of skull at bullae, 9.4; alveolar length of upper tooth row, 5.6; diastema, 7.2; length of nasals, 7.4; width of nasals at tip, 3.2.

Averages and extremes of five adult male topotypes: Total length, 145.6 (140–153); tail, 39.8 (37–41); hind foot, 19.4 (19–20); ear, 15 (14–17); weight, 25.5 (23–30) grams. Skull, average of four: Condylobasal length, 24.96 (24.7–25.1); interorbital breadth, 4.05 (3.7–4.2); zygomatic width, 13.3 (13.1–13.4); length of anterior palatine slits, 5.07 (4.8–5.4); height of skull at bullae, 9.45 (9.0–9.8); alveolar length of upper tooth row, 5.52 (5.4–5.7); diastema, 7.5 (7.2–7.6); length of nasals, 7.27 (6.8–7.8); width of nasals at tip, 2.95 (2.7–3.1).

One adult female topotype: Total length, 148; tail, 40; hind foot, 20; ear, 18; weight, 38 grams. Skull: Condylobasal length, 24.1; interorbital breadth, 4.1; zygomatic width, 13.0; anterior palatine slits, 4.7; height of skull at bullae, 9.3; alveolar length of upper tooth row, 5.5; diastema, 7.2; length of nasals, 7.5; width of nasals at tip, 2.8.

Remarks.—This race is most similar in color to specimens of *Clethrionomys gapperi galei* from Ward, Colorado, but differs from them in slightly paler color and decidedly grayer head. The skull of *uintaensis* is larger, the nasals are longer and more expanded at the tip; the palatine slits are longer, and the rostrum viewed from above is longer and broader. From *idahoensis*, *uintaensis* is distinguished at once by the yellowish rather than gray sides and rump, and by the lighter, more yellowish color of the back.

Specimens examined.—Nine from the type locality and one from 15 miles north of Mountain Home, Duchesne County, Utah.

Examination of the red-backed mice occurring in Pennsylvania has shown that specimens from what was once Pymatuning Swamp (now Pymatuning Reservoir) also represent an undescribed race of *Clethrionomys* which may be known as follows:

Clethrionomys gapperi paludicola, subsp. nov.

Type.—Adult male, skin and skeleton, no. 7634,Carnegie Museum; from Pymatuning Swamp, 1000 feet, 4 miles west of Linesville, Crawford County, Pennsylvania; collected by J. Kenneth Doutt; April 11, 1932; original number 1080.

Range.—Known only from the vicinity of Pymatuning Reservoir.

General characters.—Similar to *Clethrionomys gapperi gapperi* from Parry Sound and Nipissing districts, Ontario, Canada, but back lighter, more golden, sides paler, belly more washed with buffy. Distinguished from *carolinensis* by much lighter, more yellowish, color of the back and sides; belly and underside of tail paler and more washed with buffy. Back and sides paler and more yellowish than *rhoadsi*, belly more buffy.

Color.—Type: Head between eyes Buffy Brown streaked with black, back between Mikado Brown and Snuff Brown; sides between Pinkish Buff and

Cinnamon Buff, darkened by the slaty bases of the underfur showing through; lateral line from chin to rump Pinkish Buff; belly Light Buff; tail above Clove Brown, below Light Drab; hind feet above Pallid Neutral Gray.

Skull.—Type: Larger and heavier than *Clethrionomys gapperi gapperi;* rostrum heavier; braincase wider; interorbital and zygomatic width greater. Distinguished from *Clethrionomys gapperi rhoadsi* by wider braincase and greater zygomatic width. Very similar to *Clethrionomys carolinensis,* but distinguished by greater zygomatic width, larger auditory bullae, and wider braincase.

Measurements.—Type: Total length, 149 mm.; tail, 44; hind foot, 19; ear, 15; weight, 30 grams. Skull: Condylobasal length, 24.6; interorbital breadth, 4.3; zygomatic width, 14.2; anterior palatine slits, 5.0; height of skull at bullae, 9.5; alveolar length of upper tooth row, 5.0; diastema, 7.5; length of nasals, 7.3; width of nasals at tip, 2.7; width of braincase, 11.7.

Averages and extremes of the type and ten adult male topotypes: Total length, 148.7 (145–153); tail, 40.8 (36–45); hind foot, 19.1 (18–20); ear, 14.36 (13–15); weight, 32.75 (30.0–38.5) grams. Skull, average of eleven: Condylobasal length, 24.76 (24.2–25.6); interorbital breadth, 4.1 (3.2–4.5); zygomatic width, 14.53 (13.9–15.0); anterior palatine slits, 4.89 (4.4–5.3); height of skull at bullae, 9.38 (8.9–10.0); alveolar length of upper tooth row, 5.26 (4.9–5.6); diastema, 7.36 (6.8–7.7); length of nasals, 7.42 (7.0–7.7); width of nasals at tip, 2.86 (2.6–3.2); breadth of braincase, 11.22 (10.4–11.7).

Averages and extremes of five adult female topotypes: Total length, 153 (149–160); tail, 43.2 (39–48); hind foot, 19.2 (19–20); ear, 15.2 (14–16); weight, 29.7 (21.0–33.6) grams. Skull, average of five: Condylobasal length, 24.58 (24.2–25.5); interorbital breadth, 4.04 (3.7–4.2); zygomatic width, 14.2 (13.8–14.7); anterior palatine slits, 4.7 (4.4–5.2); height of skull at bullae, 9.36 (9.0–9.7); alveolar length of upper tooth row, 5.3 (5.1–5.8); diastema, 7.36 (7.1–7.7); length of nasals, 7.36 (7.0–7.6); width of nasals at tip, 2.7 (2.4–3.0); breadth of braincase, 11.32 (11.0–11.6).

Remarks.—Clethrionomys gapperi is a widely distributed species in the northern part of its range, but towards the southern limit it becomes restricted to isolated bogs or mountain tops. In these latter situations it is cut off from other members of its kind. Each of these communities may develop distinctive characteristics and finally produce recognizable geographic races.

This new race seems to be well marked both by color and skull characters, although there is considerable variation in the series. In some, the buffy wash on the belly is very light, in others the lateral line is indistinct or lacking, and in others the hind feet are considerably darker. Even in the extremes of variation, however, there are few specimens which approach *Clethrionomys carolinensis, Clethrionomys gapperi gapperi* or *Clethrionomys gapperi rhoadsi* in color.

Merriam (1888) described *Clethrionomys carolinensis* as a full species, but until recently I have felt that it should be considered a subspecies of

gapperi. However, the present study has suggested that *gapperi* and *carolinensis* may be distinct species with ranges which overlap in parts of Pennsylvania, West Virginia and Maryland. The characters which separate the two species are not well marked, but the skulls of *carolinensis* are distinctly broader. The infra-orbital shield flares out abruptly and the skulls are wider across the zygomatic arches. Two complete skulls and a broken one from the type locality of *carolinensis*, one specimen from ten miles southwest of Pearisburg, Giles County, Virginia, and six specimens from Garrett County, Maryland, two miles east of Cranesville (West Virginia), are all very similar in skull characters to the Pymatuning series. Specimens from Kane, McKean County; Cresson, Cambria County; near Meyersdale, Somerset County, Pennsylvania; and near Cheat Bridge Post Office, Randolph County, West Virginia, are all similar in this respect to specimens of *Clethrionomys gapperi gapperi* from Parry Sound and Nipissing districts, Ontario. This seems to be explained most simply by assuming that two species are found in the area, one ranging from Canada southward at least to Randolph County, West Virginia, and the other ranging from North Carolina northward to Crawford County, Pennsylvania. Unfortunately the material now available is not sufficient to demonstrate whether or not this assumption is correct, so I have described this new race as a subspecies of *gapperi*. If further study should show that *carolinensis* is a good species, this new race should then be considered a subspecies of it.

Specimens examined.—Sixty-one from the vicinity of Pymatuning Swamp, Crawford County, Pennsylvania.

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A NEW LIZARD OF THE GENUS *UTA* FROM ARIZONA.

BY M. B. MITTLEMAN [1]

Despite a comparatively large range, *Uta ornata linearis* is remarkably constant in all of its diagnostically important features. Occasionally, local varieties are encountered which appear distinct enough to warrant some sort of formal designation. In every case, however, a careful study of these indicates that the supposed race or species falls entirely within the range of variation of *U. o. linearis*, and is not satisfactorily separable from this latter subspecies. Nonetheless, a series of specimens from a comparatively isolated portion of the range of *linearis* has come to my attention; these constantly exhibit several traits which are not in keeping with those of *linearis* as they occur elsewhere in the range of this race. Since the distinctive morphological constancy is correlated with a definite geographic distribution, a subspecific designation is warranted, and the race may be called:

Uta ornata chiricahuae, subsp. nov.

Type.—Museum of Vertebrate Zoology No. 7751, male; collected in Pinery Canyon, Chiricahua Mountains, 6,000 ft., Cochise County, Arizona, by J. E. Law, May 10, 1919.

Paratypes.—Thirty-six, as follows: M.V.Z. Nos. 7747–50; 7752–78; 8190; same data as type. M.V.Z. Nos. 13837–40, Dos Cabezos Mountains, Cochise County, Arizona.

Diagnosis.—Resembling *Uta ornata linearis* superficially, but differing in the greater size of the enlarged dorsal scales; the extension of the vertebral series of enlarged scales onto the basal portion of the tail for a greater distance; greater proportionate width of the head; and a different arrangement of colors and pattern.

[1] Contribution No. 22, from the Department of Zoology, Ohio University, Athens, Ohio.

Description of type.—Two, occasionally three, rows of enlarged, keeled, imbricate, irregularly arranged vertebral scales, extending from a point a trifle craniad of the insertions of the fore limbs posteriorly onto the basal portion of the tail for a distance equal to half the length of the femur; vertebral scales bordered on either side by two series of regularly arranged, imbricate, and prominently keeled scales which are larger than the vertebrals, equal in size to the enlarged femoral scales, and larger than the enlarged tibial scales; scales of the inner series of enlarged dorsals not much larger in size than those of the outer series, or else scales of both series approximately equal in size; other dorsal scales very small, granular, or flattened, lightly keeled and barely imbricate; on the dorsolateral line a series of enlarged scales which extends from a point just anterior to the axilla, posteriorly to a point just caudad of the groin; dorsolateral enlarged scales tubercular, and disposed around other larger, spinose, strongly carinated scales to form small clusters; distinct dorsolateral and lateral folds present; lateral areas with prominent series of enlarged tubercles diagonally dispersed; two short, prominent cervical series of tubercles, and below these, a lateral series of the same and a ventrolateral series; lateral cervical tubercles merging with the series of enlarged tubercles of the dorsolateral line; posterior surfaces of thighs and arms covered with small granules, while the superior and anterior surfaces are covered with large, keeled, mucronate, imbricate scales; ventrals smooth, submucronate, about equal in size to the scales posteriorly bordering the gular fold; eleven of the largest dorsal scales equal to the length of the head from snout to posterior border of occipitals; frontal transversely divided; femoral pores 12–12; postanal plates conspicuously enlarged; a post-femoral dermal pocket present. Coloration (alcoholic): Head light brown dorsally, with fine spots and streaks of a darker brown; dorsum of body, limbs, and tail varying from dark brown to a blue-gray, faintly splotched with light blue; the five irregular cross bands which extend transversely from the lateral fold to the enlarged dorsals and break on the median line of the back, dark brown edged with light blue; limbs with bars of brown irregularly edged with light blue; venter of limbs with a suffused blue-gray; chin, from anterior gular fold up to but not including the sublabials, a bright sky blue; two large, brilliant, light blue abdominal patches which are fused medially, and sprinkled with dark gray laterally; interhumeral and interfemoral areas uniformly shaded with dark gray, and a few flecks of blackish; preanal region with a light blue wash. Measurements of type: Snout to posterior edge of ear, 12 mm.; head width, 11.5 mm.; snout to anus, 51 mm.; hind leg (insertion to tip of 4th toe, exclusive of nail), 33.5 mm.; tail (tip partially regenerated), 70 mm. Measurements of entire type series (thirty-seven adults, both sexes): Snout to posterior edge of ear, 11.32 mm.; head width, 9.16 mm.; snout to anus, 47.70 mm.; hind leg (insertion to tip of 4th toe, exclusive of nail), 30.80 mm. (these figures represent the weighted arithmetic means).

Distribution.—Restricted to the type locality and the Dos Cabezos Mountains, Cochise County, Arizona.

Remarks.—The present form is accorded a subspecific designation on the

basis of certain specimens from nearby localities in Cochise County, which exhibit characteristics that must be considered intermediate between *chiricahuae* and *linearis*. In the main, however, such specimens are few, and *chiricahuae* is essentially different from the *linearis* population of Cochise County, as well as from other points within the distribution of this latter, parental form.

The new subspecies exhibits certain mensural differences which are best illustated by various ratios. Thus, the type series shows an average head length—head width ratio of 81 percent, the range being from 75 percent to 96 percent, with three specimens having a ratio of 75 percent, twenty-six specimens with ratios varying from 79 percent to 83.5 percent, and eight specimens with ratios between 84 percent and 96 percent. By comparison, a test sample of thirty-seven adult *linearis* of both sexes selected at random from a large series of specimens taken at Ramsey Canyon, Huachuca Mountains, Cochise County, Arizona, shows an average head length—head width ratio of 70.8 percent, the range being from 58.25 percent to 83 percent; only four specimens have ratios greater than 77.5 percent, while the great majority are in the quartile sector of the mean. Certain other ratios differ in *linearis* and *chiricahuae*, but none so markedly as this one. Test samples of *linearis* from Pima and Yavapai Counties, Arizona, as well as some from certain counties in New Mexico, agree well with the Ramsey Canyon sample in their morphological as well as mensural details, and exhibit about the same differences towards *chiricahuae*.

The uniform blue color of the gular region in *chiricahuae* is very rare in *linearis*, and is usually replaced by a medial blotch of yellow or orange; similarly, the relative uniformity of color in the interhumeral and interfemoral regions in *chiricahuae* is, in the great majority of *linearis*, replaced by a heavy stippling or mottling of dark gray or brown.

The subspecies *linearis* and *chiricahuae* are further differentiated by the nature of the enlarged dorsal scales; in the former race, these are usually smaller than the enlarged femoral and tibial scales, and only rarely equal them in size. In *chiricahuae*, the enlarged dorsals at least equal the femorals in size, and are consistently larger than the tibials. Further, the vertebral series of enlarged scales in *linearis* does not extend onto the basal portion of the tail for a distance equal to much more than one quarter the length of the femur; in *chiricahuae*, the distance is equal to at least half the length of the femur, often more.

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NEW RACE OF SWIFT FROM THE PHILIPPINE ISLANDS.

BY THE MARQUESS HACHISUKA.

A description of a new form of the edible nest swift is herein proposed.

Collocalia esculenta mindanensis, subsp. nov.

Type.—Male, collected during my expedition on April 7, 1930, at Tumadgopt, S. E. Mindanao.

Characters.—In colour the present race is equal to *C. e. bagabo* Hachisuka from Mt. Apo, Mindanao but it differs from it by having smaller wing. *C. e. isonota* from Luzon, is also included in the following table of measurements.

	♂ *Wing*	*Tail*	♀ *Wing*	*Tail*
C. e. isonota	107	40	103	39
C. e. bagobo	103	40–41	102	38
C. e. mindanensis	100	40	98	37

Remarks.—Mt. Tumadgopt, the summit of which is said to be 6,000 ft. high, was explored during my second expedition to the Philippine Islands (cf. Hachisuka, Bds. Philip. Is., Vol. I, p. 93, 1931). Although this mountain does not possess any of the special genera known to occur in the Apo region, many interesting birds, the present is one of them, have been discovered on it. Mindanao, therefore, possesses three races of *C. esculenta*; one is *bagabo* from Mt. Apo and the second is *mindanensis* from Mt. Tumadgopt and the third is a paler bellied bird from Ayala (specimens in British Museum) indistinguishable from those taken in the mountains of North Luzon (*isonota*). The Bagobo of Mt. Apo call this swift by the name of "Haribasbass."

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THREE NEW RACES OF BIRDS FROM CENTRAL AMERICA.

BY A. J. VAN ROSSEM.

As a result of further studies in Central American birds it seems desirable to offer the following diagnoses. Two of the proposed races have previously been indicated but never named, while one is an indirect result of field work by others.

Lepidocolaptes souleyetii correctus, subsp. nov.

Type.— ♀ adult, number 17056 Dickey collection; Puerto del Triunfo, Dept. Usulatan, El Salvador, Jan. 22, 1926; collected by A. J. van Rossem.

Subspecific characters.—Upper parts, including sharp, narrow streaking of head and upper back, similar to *Lepidocolaptes souleyetii compressus* (Cabanis) of Costa Rica and *Lepidocolaptes souleyetii matudae* Brodkorb of Chiapas and with the ground color very similar to that of *compressus* save that the wing coverts are redder (less olivaceous). Under parts with streaking decidedly wider than in *compressus* or *matudae*, throat more buffy and under tail coverts paler and redder than in either of those races; ground color redder (less olivaceous) than in *compressus* and (save for the under tail coverts) very similar to *matudae*. Compared with *Lepidocolaptes souleyetii insignis* (Nelson) of the Atlantic slope, the streaking on the under parts is very similar, though averaging slightly narrower in series. The ground color is similar save for paler posterior under parts and paler, more narrowly streaked under tail coverts. Dorsally, the streaking is sharper, narrower, and less extensive, and the ground color distinctly paler.

Range.—Coastal lowlands of El Salvador and almost certainly the adjacent portions of Guatemala and Honduras.

Remarks.—In a former publication (Birds of El Salvador, p. 324) I stated that these birds were *insignis* although intermediate in some respects toward *compressus*, an assumption natural enough at the time. However, since Brodkorb (Occ. Pap. Mus. Zool., Univ. Michigan, No. 369, 1938, p. 3) and Wetmore (Proc. U. S. Nat. Mus., 89, 1941, p. 549) have determined west coast birds of Guatemala to be *compressus* it is obvious that El Salvador specimens required a reappraisal. "New" material, that is to say

material examined by me since 1938, consists of 6 *matudae* from Chiapas, 4 *insignis* from Tabasco and eastern Guatemala (Univ. Mich.) and 11 *compressus* from Costa Rica (Los Angeles Mus.). 29 specimens of *correctus* have been examined.

It seems hardly possible that two colonies of *compressus* can be separated by another race and Guatemalan specimens should be re-examined, especially since both Griscom (Dist. Bird-life in Guatemala, p. 244) and Ridgway (Birds No. and Mid. Amer., 5, p. 266) considered Guatemalan birds from the Pacific side to be *insignis*.

Calocitta formosa impudens, subsp. nov.

Type.—♂ adult, No. 17493 Dickey collection; Pine Peaks, Volcan de Conchagua, El Salvador, March 6, 1926, alt. 3500 feet; collected by A. J. van Rossem.

Subspecific characters.—Compared with *Calocitta formosa pompata* Bangs of northwestern Costa Rica, dorsal coloration paler and grayer, dull "Medici Blue" instead of "Deep Medici Blue"; bill distinctly heavier, both in lateral and vertical profiles.

Range.—Arid Tropical Zones of El Salvador up to 5000 feet altitude, north at least to the arid interior of Guatemala.

Remarks.—The line of division between *azurea* and *impudens* along the Pacific Coast must be very abrupt for Griscom (*loc. cit.*, p. 402) states that specimens from San José are "perfect intermediates" between *azurea* and *pompata* (=*impudens*), while a single specimen from Barra de Santiago in El Salvador appears not to be different from normal *impudens*. As Griscom has pointed out there is an abrupt climatic change in this area and the zone of intergradation is probably equally so. Likewise, in the interior, he lists as intermediates specimens from Progreso, while three from Tulumaje, Zacapa (L. A. Mus.) are typical *impudens*. I have not attempted to trace *impudens* further north; according to Griscom pale birds extend as far as interior Oaxaca.

Salpinctes obsoletus costaricensis, subsp. nov.

Type.—♂ of the year in fresh, nearly completed, post-juvenile plumage; No. 22681, Dickey collection; Hacienda El Pelón, Guanacaste, Costa Rica, July 27, 1928, altitude 700 feet; collected by Austin P. Smith.

Subspecific characters.—Juveniles similar to juveniles of *Salpinctes obsoletus fasciatus* Salvin and Godman, of Volcan Viejo, Nicaragua, but tail shorter. Adults similar to *Salpinctes obsoletus guttatus* Salvin and Godman of El Salvador, but ground color of whole underparts distinctly more buffy and with the ventral markings tending to transverse bars rather than spots. Juveniles browner throughout, with the upperparts with markings in the form of wavy transverse lines instead of coarse mottling. Tail shorter than in *guttatus*.

Range.—Known only from northwestern Costa Rica (Volcan Miravalles and Hacienda El Pelón).

Remarks.—Comparison with adults of *fasciatus* is not possible at this

time since there apparently are none in this country. The young seem not to be distinguishable in color from *fasciatus* and it is probable that little or no difference in this respect will be found between adults of the two races. The description of *fasciatus* (Ibis, 1891, p. 610) is that of a barred, not a spotted bird.

There appears to be no difference in size due to sex, nor to age once the juvenals have reached full growth. Neither can I detect any size differences between the three races so far as wing, bill, tarsus, and feet are concerned. Tail measurements are as follows: 40 *guttatus* 49.0–51.5, 6 *fasciatus* 51.5–54.0, 18 *costaricensis* 43.0–48.0 mm.

I am indebted to the American Museum of Natural History, the Carnegie Museum, the Los Angeles Museum, and the United States National Museum for the use of their material.

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NEW GECKOS (PHELSUMA & LYGODACTYLUS), SNAKE (LEPTOTYPHLOPS), AND FROG (PHRYNOBATRACHUS) FROM PEMBA ISLAND, EAST AFRICA.

BY ARTHUR LOVERIDGE.

In their recently published paper on "The Land Vertebrates of Pemba, Zanzibar, and Mafia," Moreau and Pakenham (1940, Proc. Zool. Soc. London, p. 107) invite attention to a suggestion of Parker's that the *Phelsuma* of Pemba Island may be an endemic form of *madagsacariensis* Gray, of which other color forms occur on Aldabra and the Seychelle Islands.

With the object of settling the point, Mr. R. H. W. Pakenham collected a series of these geckos, which, under normal conditions, would have been submitted to Mr. H. W. Parker. The latter, however, is serving his country, and so I take pleasure in naming the new insular race after him; paratypes of this and the other races described below, will be reserved for the British Museum.

Undoubtedly Pemba Island has been separated from the mainland sufficiently long to permit of the stabilization of certain color-pattern forms, and I now take the opportunity of stating that *Mabuya maculilabris albotaeniata* Boettger, of which Mr. Pakenham has now submitted a good series from various parts of the island, is a perfectly valid race, though I synonymized it in 1928.

Phelsuma madagascariensis parkeri, subsp. nov.

Type.—Museum of Comparative Zoology, No. 46,086, a gravid ♀ from Kinowe, Pemba Island, collected by R. H. W. Pakenham, December 3, 1940.

Paratypes.—Museum of Comparative Zoology, Nos. 46,087–46,092, being four males, a female, and a young gecko, from near Kinazini, Pemba Island, collected by R. H. W. Pakenham, September 9, 1940.

Diagnosis.—Agrees with *madagascariensis* Gray in proportions and scale counts, but differs in color pattern.

Description.—(Paratype variations in parenthesis.) Snout (1⅔ to) 2 times as long as the distance between the eye and the ear-opening, vertical diameter of the latter (¾ of, or) equal to, that of the former; rostral without (rarely with) a median cleft above; centre of nostril above the

first labial; nostril between first labial and 3 nasals, the uppermost separated from its fellow by 1 (rarely 2) granule; upper labials 9 (8–10); lower labials 8 (7–9); chin region covered with enlarged scales of which the 4–5 outer pairs are much larger than the inner, the latter posteriorly merging into the gulars.

Back covered with smooth granules; ventral scales smooth; (male paratypes with 32–36 preano-femoral pores); about 16–17 transverse shields and lamellae beneath fourth toe distally; tail, when unregenerate, covered above with smooth scales arranged in verticils of 6–7 scales, below with smooth, imbricate scales, of which the median series is strongly transversely enlarged.

Coloration.—In alcohol. Above, bluish grey (green in life), finely vermiculate with black on back and limbs; tail paler and uniform. Below, whitish, immaculate, even on throat.

Measurements.—Total length of type ♀, 148 (65 + 83) mm., that of a paratype ♂, 148 + (65+ 83+) mm., the tail in process of regeneration.

Breeding.—On December 3, the type ♀ held two ova, each measuring about 13 x 8 mm.

Habitat.—On trunks of coconut palms.

Lygodactylus grotei pakenhami, subsp. nov.

Type.—Museum of Comparative Zoology, No. 46,082, a gravid ♀ from Wete, Pemba Island, collected by R. H. W. Pakenham, December 22, 1940.

Paratypes.—Museum of Comparative Zoology, No. 46,081, a ♀ from Kinazini, and Nos. 46,083–5, being two males and a female from Wete: all taken by the same collector as the type.

Diagnosis.—Agrees with *grotei* Sternfeld in scale counts, but differs in color pattern and habitus, which is smaller and less robust than in *grotei*. The light vertebral and lateral lines of typical *grotei* (of which I recently collected seventeen topotypes) are absent or only faintly indicated. A dark streak from nostril through eye to neck is present, but is both narrower and less well defined than in the typical mainland form. The insular form is characterized by conspicuous black flecking on head, back, and limbs.

Description.—(Paratype variations in parenthesis.) Snout elongate, the distance from its end to the anterior border of the eye much greater than the distance between the orbits anteriorly, much longer than the distance between the eye and the ear-opening, which is small, roundish; nostril pierced above the first labial, so posterior to the suture between rostral and first labial, being between these shields (or the rostral just excluded) and 2–3 nasals, the uppermost separated from its fellow by 1 (or 2) granules; upper labials 8 (or 9); lower labials 7 (or 8); mental deeply fissured, followed by 3 (2–4) small postmentals. Males with 4 preanal pores, fourth toe with 4 pairs of lamellae beneath dilated portion; unregenerate tail below with imbricate scales of which the median series is transversely enlarged.

Coloration.—In alcohol. Above, grey; a *narrow* dark streak from nostril through eye to above ear-opening, *not* extending to flanks; head and back conspicuously flecked with black, no light vertebral or lateral bands (the

latter slightly indicated in paratype No. 46,081); tail somewhat paler, with darker and lighter mottlings. Below, uniformly white.

Measurements.—Total length of type ♀, 60 (28+32) mm., that of a paratype ♂ (M.C.Z. 46,084), 62 (28 + 34) mm. From snout to anus the other paratypes measure 28, 28 and 26 mm. respectively, their tails being regenerated.

Breeding.—On December 22, the type ♀ held two ova, each measuring about 4.5 x 4 mm.

Habitat.—The Wete series was taken on trees (*Pterocarpus* sp. and *Cassia javanica*) in a garden, also on veranda and walls of house.

Remarks.—These geckos have been compared with sixty typical *grotei* from widely scattered localities in Tanganyika and Mozambique. They constitute the first examples of the genus ever to be recorded from the island, and I take pleasure in associating them with the name of Mr. R. H. W. Pakenham, who has done so much to advance our knowledge of the vertebrate fauna of Pemba and Zanzibar.

Leptotyphlops emini pembae subsp. nov.

Glauconia emini Boettger (not of Boulenger), 1913, in Voeltzkow, Reise in Ostafrika, **3**, p. 351, pl. xxxv, fig. 2 (Pemba Island).

Leptotyphlops emini Loveridge (not of Boulenger), 1925, Proc. Zool. Soc. London, p. 72 (Chakechake and Wete, Pemba Island).

Type.—Museum of Comparative Zoology, No. 46,116, a gravid ♀ from Wingwi Pwana, Pemba Island, collected by R. H. W. Pakenham, October 4, 1940.

Paratypes.—Museum of Comparative Zoology, Nos. 46,117–46,121, from Kinazini; Kinowe; and Vitongoje, Pemba Island, collected by R. H. W. Pakenham, v.d., 1940; also No. 19,111, from Chakechake, Pemba Island, taken by Loveridge's native collector, Salimu b. Asmani, October 4, 1923.

Diagnosis.—Differs from the typical mainland form as follows:

Chin, throat, and circum-anal region white flecked with black; midbody diameter (48.3 *fide* Boettger) 50–70 times in total length (10 examples); range: Pemba Island ..... *e. pembae*

Chin, throat, and circum-anal region black like rest of snake; midbody diameter 40–58.5 times in total length (10 examples); range: East and central African mainland ..... *e. emini*

Measurements.—Total length of type ♀, 201 (184 +17) mm.; midbody diameter 4 mm. Diameter into length 50.2 times. Total length of a paratype ♂ (M.C.Z. 46,118), 140 (123 + 17) mm.; midbody diameter 2 mm. Diameter into length 70 times.

Remarks.—Boettger (1913), in reporting on the first three worm snakes to be recorded from Pemba, remarked on the white patches of chin and anal regions. Ten years later (1923) my collectors obtained three further examples on the island; these were so stained by rust, from the action of formalin on their container, that I erroneously stated that they were "wholly black." Reexamination of the only specimen retained (M.C.Z.

19,111), however, reveals that it agrees with the six freshly-preserved specimens submitted by Pakenham.

Remeasuring it also discredits the measurement previously given, so that the proportion of diameter into length of 45 times is doubted. I imagine that the diameter of Boettger's 145 mm. specimen is 2.5, rather than 3 mm, which would give 58 (instead of 48.3) times into total length, and conform better to the other data. The total lengths, followed by diameters in parenthesis, are as follows: 121 (2); 135 (3, A.L., doubted); 138 (2); 140 (2.5); 145 (3, O.B., doubted); 148 (2.5); 153 (2.5); 162 (2.5); 163 (3.25, O.B.); 185 (3); 201 (4).

The ten examples of the typical form in the Museum of Comparative Zoology come from localities in Tanganyika Territory; Uganda; Belgian Ruanda; and Belgian Congo.

Phrynobatrachus pakenhami, sp. nov.

Type.—Museum of Comparative Zoology, No. 24,568, a gravid ♀ from Machengwe swamp, near Wete, Pemba Island, collected by R. H. W. Pakenham, April 9, 1940.

Paratypes.—Museum of Comparative Zoology, Nos. 24,569–72, being two adult males and two females with same data as type, except that one was collected May 4, 1940.

Diagnosis.—Agrees with *acridoides* Cope of Zanzibar, Pemba, and tropical Africa, in all respects except its much larger size and different coloring. They may be distinguished as follows:

Lower jaws dusky, *not* sharply chequered with brown and white. Length of ♂♂ 33–35 mm., of ♀♀ 33–36 mm. ..... *pakenhami*

Lower jaws sharply chequered with brown and white. Length of both ♂♂ and ♀♀ normally 23–25 mm., and exceptional ♀ measures 27 mm. ..... *acridoides*

Description—In size like *natalensis* Smith, from which it is distinguished by its well-developed digital disks. In other respects it agrees so closely with *acridoides* Cope, of which the Zanzibar cotypes are in the Museum of Comparative Zoology, that further description is unnecessary; perhaps a trifling difference in the amount of webbing might be discerned. The Pemba frog can not be regarded as a race of *acridoides*, however, as the latter species has been collected by Mr. Pakenham at Mkoani, as well as at Verani and Tunda near Wete.

Coloration.—In alcohol. Above, plumbeous or brownish grey, more or less uniform on male with a broad, light, vertebral area; a broad, transverse, interorbital bar present (or absent); hind limbs uniform (or transversely barred with broad, light-edged dark bands). Below, whitish, minutely punctate with brown resulting in areas of infuscation; palms and soles plumbeous.

Measurements.—Length from snout to anus of type ♀, 36 mm., of paratype ♂ (M.C.Z. 24,569), 35 mm.

Breeding.—On April 9, gravid females were taken in water and flooded meadows at edge of swamp; on May 4, a gravid female at edge of thickets on a wooded hillside.

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VARIETIES OF THE STRAWBERRY GUAVA.

BY F. R. FOSBERG.

The name used for the edible fruit commonly known as strawberry guava, or, in Hawaii, *waiwi*, or more recently among certain horticulturists, cattley guava, has long been *Psidium cattleianum* (often misspelled *cattleyanum*). The name *Psidium littorale*, if mentioned at all, was usually considered a synonym, as the original plates of the two manifestly represent the same species. This seemed correct on the basis of the dates of the volumes of the journals in which they were published—1822 and 1823, respectively, as long as the actual dates of the separate fascicles remained obscure. In the Flora Brasiliensis Berg described *Psidium variabile*, citing both of these earlier names as synonyms. This new name, of course, was superfluous.

Merrill and Perry (Jour. Arn. Arb. 19 : 199. 1938) used *P. littorale* as the correct name, giving the date as 1820. This date is that given on the fascicle cover of Opuscoli Scientifici 4 fasc. 23 (copy in Museum of Comparative Zoology, Cambridge, Mass. fide Merrill in litt. 1941). *P. cattleianum* was published in the 3d fascicle of vol. 4 of the Transactions of the Royal Horticultural Society, which, according to Stearn (Suppl. Cat. 4. 1940), appeared in May or June, 1821. Thus the priority of *P. littorale* is clearly established. The synonymy is as follows:

Psidium littorale Raddi, Opusc. Sci. Bologna 4 : 254, t. 7. f. 2. 1820 (not 1823).

P. cattleianum Sabine, Trans. Roy. Hort. Soc. 4 : 315–317. t. 11. 1821 (not 1822).

P. humile Vellozo, Fl. Flumin. 211, Tab. 49, Tom. 5. 1825. (Plate very poor, but doubtless intended to represent this species.)

P. variabile Berg in Mart. Fl. Bras. 14 (1) : 400. 1857.

P. coriaceum Mart ex Berg, l.c. 401.

P. coriaceum var. *α obovatum* Berg, l.c. 401.

P. coriaceum var. *β grandifolium* Berg, l.c. 401.

P. coriaceum var. γ *longipes* Berg, l. c. 402.

P. cattleyanum var. *coriaceum* (Berg) Kiaerskou, Enum. Myrt. Bras. 28. 1893.

This species is distinct and easily recognized by its cuneate obovate, weakly nerved coriaceous leaves and unwinged twigs. It includes at least two recognizable varieties, both widely cultivated. Of these one was the basis of each of the two originally described species. Their names and contrasting characters are given below.

That *P. humile* Vellozo should be referred here may be considered doubtful because of the very brief description and rough plate, but there seems to be no other species that the plate could represent. Berg, who included *P. humile* in his *P. coriaceum*, apparently maintained the latter as separate from his *P. variabile* [*P. littorale*] only on the basis of a slight puberulence on the twigs and ciliolation on leaves and sepals. Judging by a series of specimens of cultivated plants, this is a fluctuating character found now and then in both of the varieties maintained below. The two varieties of *Psidium littorale* recognized are as follows:

Psidium littorale Raddi var. **lucidum** (Degener) Fosberg, n. comb.

P. cattleianum var. *lucidum* Hort.

P. cattleianum f. *lucidum* Degener, Fl. Haw. fam. 273. *Psidium cattleianum.* 1939.

Fair-sized rather loosely branched tree; fruit ellipsoidal to pyriform, narrowed to the base, clear yellow, with skin glossy, tender, and with flesh somewhat translucent, acid even when ripe.

Type of the variety is Degener, 12275 from Hawaii, in the herbarium of Otto Degener, Honolulu.

This variety includes the plant described and figured by Raddi, so it must be considered the typical variety of the species.

Psidium littorale Raddi var. **longipes** (Berg) Fosberg. n. comb.

P. cattleianum Sabine. Trans. Roy. Hort. Soc. 4 : 315–317, t. 11. 1821.

P. coriaceum var. *longipes* Berg, in Mart. Fl. Bras. 14 (1) : 402. 1857.

Small dense tree; fruits purplish red, becoming whitish toward center, globose or almost so, rounded at base, with skin rather dull, slightly tough, and with flesh opaque, sweet when ripe and pleasantly flavored.

Of Berg's varieties, the first names to be used in varietal rank, only var. *longipes* is identifiable from his description. The others obviously belong in this species, but their fruits are not described. Since his specimens are at present inaccessible, var. *longipes* is the obvious choice for this red-fruited plant.

This variety is to be recommended for its fruit, while the other is useful in reforestation.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW RACE OF *LYGOSOMA* FROM MEXICO.

BY HOBART M. SMITH.

Fifteen specimes of *Lygosoma cherriei* recently secured by me in Mexico during tenure of the Walter Rathbone Bacon Traveling Scholarship of the Smithsonian Institution, have a somewhat higher number of dorsals than specimens of the typical race from Tabasco, Chiapas, Guatemala, Nicaragua and Costa Rica.

Lygosoma cherriei stuarti, subsp. nov.

Holotype.—U. S. Nat. Mus. No. 115174 (H. M. Smith field no. 2053), from Potrero Viejo, Veracruz. *Paratypes.* Fourteen, of which thirteen are topotypes (U.S.N.M. Nos. 115175–86, EHT-HMS [HMS No. 1780], Univ. Mich. Mus. Zool. No. 85429); one other is from Cuautlapan, Veracruz (U.S.N.M. No. 115187).

Diagnosis.—Related to *cherriei* and *assatum*, having a single frontoparietal and a moderately large interparietal; no nuchals; scale rows 30 to 32. Like *cherriei* and different from *assatum* in having a blue or gray, banded tail pattern, and relatively long, stout legs not or little (maximum four scales) separated from each other when adpressed (separated only in adults measuring 45 mm. or more snout to vent). Different from *cherriei* in dorsal scale count, having 65 to 72 (average 69) dorsals, as opposed to 59 to 67 (average 63.2) in 39 *c. cherriei.*

Discussion.—The type was described in detail as *cherriei* by me in 1939 (Proc. Biol. Soc. Wash., vol. 52, pp. 191–2), and a table showing the scale counts and measurements of most of the paratypes also was given (p. 193). Data for the other four paratypes are given below.

TABLE OF DATA ON *Lygosoma c. stuarti.*

Number	*Rows of Dorsals*	*Dorsals*	*Snout to Vent*	*Hind Leg*	*Fore Leg*	*Axilla to Groin*	*Hind Plus Fore Leg*
85429	32	69	55.0	19.0	12.0	31.0	31.0
115178	30	70	52.0	16.0	10.4	31.0	26.4
115179	31	69	48.5	15.5	10.0	28.0	25.5
115181	30	69	50.0	17.0	10.8	27.5	27.8
115182	31	70	49.0	17.0	11.0	27.0	28.0

I can discern no differences, other than in dorsal scale count, between *c. cherriei* and *c. stuarti*. In coloration and limb proportion they seem to be nearly identical. The blue tail, which I have observed in live *stuarti*, is also characteristic of at least northern *c. cherriei*, and is, I believe, constant in the species. Young specimens from Palenque, Chiapas, and Piedras Negras, Guatemala, had very distinctly bluish tails in life. In grown specimens the tail assumes a grayer color, but never becomes brown or pinkish (in life) as it does in *assatum* and its close relatives. Unfortunately in specimens preserved for a considerable length of time the tail becomes reddish-brown, much as in *assatum*. For this reason field notes on the tail color of captured specimens are much to be desired, especially for material from lower Central America. The caudal cross-bands observed by Stuart (Occ. Papers Mus. Zool. Univ. Mich., no. 421, 1940) are found in *stuarti* as well as in other subspecies of *cherriei*.

I am much indebted to Dr. L. C. Stuart for very kindly permitting me the use of the data gathered by him for his recent study of the "Lampropholis" group of *Lygosoma*, and for the loan of specimens in the University of Michigan Museum of Zoology.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW GENUS AND A NEW SPECIES OF AMPHIPODA FROM THE PACIFIC COAST OF NORTH AMERICA.[1]

BY CLARENCE R. SHOEMAKER.

In 1851 F. Brandt described *Allorchestes ochotensis* from the Sea of Ochotsk, but he failed to notice or did not mention the very small inner ramus to the third uropods. As the possession of this inner ramus, combined with certain other characters, renders it unacceptable to any of the existing genera of the Talitridae, it becomes necessary to create a new genus, *Parallorchestes*, for its reception.

Parallorchestes, new genus.

Antenna 1 about two-thirds as long as antenna 2. Eye rather small, dark, nearly round, or slightly reniform. Mandible, molar prominent with long marginal seta on inner edge and a group of setae on front margin; cutting-edge well toothed; accessory plate double-edged and toothed; spine-row with two spines. Maxilla 1, inner plate slender and bearing two apical plumose setae; outer plate with nine serrate spine-teeth; palp not quite reaching to the base of the spine-teeth of outer plate, and consisting of what appears to be a short basal joint indistinctly separated from a long second joint; a longitudinal ridge bearing short marginal setae extending from near the base to about the middle of the inner surface of outer plate. Maxilla 2 normal. Maxillipeds, inner plate longer than outer plate and bearing three apical teeth; outer plate with closely set spines but no spine-teeth on inner margin. Lower lip with lateral lobes very short and lying parallel with the outer lobes.

Gnathopod 1 subchelate in male and female. Gnathopod 2 subchelate in male and female and larger than gnathopod 1; fifth joint narrowly produced between fourth and sixth joints. Uropod 3 short, inner ramus very small. Telson divided to its base. Coxal-gills simple.

Genotype, *Allorchestes ochotensis* Brandt.

[1] Published by permission of the Secretary of the Smithsonian Institution.

Parallorchestes ochotensis (Brandt).

Allorchestes ochotensis Brandt 1851, Middendorf, Reise Sibirien, vol. 21, p. 143, pl. 6, fig. 27 a–f.

This species extends from the Sea of Ochotsk through Bering Island, the Probilof Islands, the Aleutian Islands, and down the coast of Alaska, British Columbia, and the United States to southern California. In the northern part of its range, where it is said to reach a length of 29 mm., the uropods are armed with many small, closely-set spines and the telson bears several short spines on each lobe. As the species moves southward, it becomes smaller and there is a marked reduction in the number of spines on the uropods and telson. In the southern specimens there is a single spine standing upright on each lobe of the telson. As the transition from the northern to the southern form appears to be gradual, I have refrained from giving the latter a subspecific name.

In some of the northern specimens the two or three rear segments of the thorax and the segments of the abdomen are dorsally ridged and produced as shown in Brandt's figure, while in some this character is less pronounced and in others it is entirely lacking.

Corophium stimpsoni, new species.

On March 19, 1912, the Fisheries Steamer *Albatross* took specimens of an undescribed species of *Corophium* in shallow water on the western shore of San Francisco Bay between Point San Quentin and Raccoon Strait. On July 30, 1926, Mr. G. E. MacGinitie collected specimens of this species at Elkhorn Slough, near Pacific Grove, California, and recently very fine specimens were taken at Dillon Beach, Marin County, California, and sent by Dr. S. F. Light to the National Museum for identification. I am, therefore, taking the opportunity to describe this species which I designate *Corophium stimpsoni* in commemoration of William Stimpson, who did much valuable work on the crustacea of the west coast of North America.

Male.—Head, rostrum slightly produced and evenly rounding, not projecting beyond lateral lobes. Eye not discernible in preserved specimens. Antenna 1 reaching to distal end of fourth joint of antenna 2; first peduncular joint only moderately expanded above, a prominent forward- and downward-pointing tooth on inside surface near proximal end and no spines on lower margin; first joint a little longer than the second, which is about twice the length of the third; flagellum composed of ten or eleven joints and not as long as peduncle. Antenna 2 longer than the body; first joint of peduncle as long as the head; third joint nearly twice as long as first; fourth joint about twice as long as third, stout and bearing a prominent, curved forward-pointing tooth, above which is a small tooth, at the lower distal corner; fifth joint about two-thirds the length of the fourth, slightly produced at the lower distal margin, and bearing a tooth on the lower proximal margin; flagellum much shorter than the fifth peduncular joint and consisting of one long and one short joint; all joints bearing very few setae.

Gnathopod 1, palm very slightly oblique, convex and forming a broad,

rounding and somewhat produced angle with the hind margin of joint. Gnathopod 2, seventh joint bearing five or six very short teeth and a row of setae on inner margin.

Peraeopods 1 and 2, second and fourth joints moderately expanded; seventh joint as long as or longer than sixth. Peraeopods 3 and 4 normal. Peraeopod 5 reaching beyond uropod 1, second joint well expanded and fringed on rear margin with long plumose setae. Urosome segments free and uropods attached below. Uropods as figured by Sars [2] for *C. grossipes* (Linn.) (now *C. volutator* (Pallas)) but not quite so spinose. Length of male 5 mm. from rostrum to end of uropod 1.

Female.—Like the male except in the antennae. Antennae 1 about as long as antenna 2, first peduncular joint bearing a forward-pointing spine at lower distal corner; flagellum of about 10 joints. Antenna 2, third joint of peduncle with two forward-pointing spines on inner surface; fourth joint without the distal teeth of the male, but bearing a stout spine at the lower distal corner and another near the proximal end of the lower inner edge; fifth joint nearly as long as fourth and without teeth or produced corners; flagellum consisting of one long and one short joint as in male. Length about 6 mm. from rostrum to end of uropod 1.

Type.—A male specimen, U. S. Nat. Mus. no. 79381, taken at Dillon Beach, Marin County, California, in mud at boundary between beach and water on mud flats, at low tide, June 7, 1941.

This species bears a rather close superficial resemblance to *C. salmonis* Stimpson, but the tooth on the inner margin of the first joint of antenna 1 of the male and the absence of the dorsal expansion of this joint at once distinguish it from that species.

[2] Crust. Norway, Vol. I, Amphipoda, 1895, p. 614, pl. 219.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

ON THE NAMES OF CERTAIN CALIFORNIA AMPHIPODS.[1]

BY CLARENCE R. SHOEMAKER.

In the course of my studies on the amphipoda of the west coast of the United States, I have had great difficulty in recognizing many of the species described from Laguna Beach, California, in 1912 and 1913 by Vinnie Ream Stout. Unfortunately, the material upon which she worked is no longer extant, but with the aid of fresh material from Laguna Beach I have now been able to work out most of her species, some of which appear to be valid, some synonyms of earlier described species, while there are a few I am still unable to recognize.

For the convenience of students of the west coast amphipodan fauna I am giving a list of Miss Stout's names and indicating their present status.

Stout's name	Correct name
Nannonyx dissimilis[3]	*Aruga dissimilis* (Stout)
Ampelisca articulata[3]	Probably *Ampelisca lobata* Holmes
Amphilochus littoralis[2]	*Amphilochus littoralis* Stout
Caliniphargus sulcus[3]	*Melita palmata* (Montagu)
Fimbriella robusta[3]	*Eurystheus tenuicornis* (Holmes)
Maera simile ?[3]	*Maera inaequipes* (A. costa) ?
Neogammaropsis antennatus[3]	*Elasmopus antennatus* (Stout)
Orchestoidea corniculata[3]	*Orchestoidea corniculata* Stout
Allorchestes frequens[3]	*Hyale frequens* (Stout)
Allorchestes oculatus[3]	*Allorchestes angustus* Dana
Dulichiella spinosa[2]	*Melita fresnelii* (Audouin)
Lembos concavus[3]	*Lembos concavus* Stout
Neophotis inaequalis[3]	*Chevalia aviculae* Walker
Photis californica[3]	*Photis californica* Stout

[1] Published by permission of the Secretary of the Smithsonian Institution.

[2] 1912. First Annual Report of the Laguna Marine Laboratory at Laguna Beach, Orange County, California, Pomona College, pp. 134–149, figs. 74–84.

[3] 1913. Zoologische Jahrbücher. Systematik, Geographie und Biologie der Tiere, vol. 34, pp. 633–659, figs. A–C.

Acanthogrubia uncinata[2]	*Paragrubia uncinata* (Stout)
Ischyrocerus parvus[3]	*Ischyrocerus parvus* Stout
Ericthonius disjunctus[3]	*Ericthonius brasiliensis* (Dana)

Two of Miss Stout's species I have been unable to recognize: *Amphithoe corallina*[2] and *Grubia indentata.*[3]

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PROCEEDINGS

OF THE

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A NEW WESTERN SUBSPECIES OF GOLDEN MOUSE.

BY E. A. GOLDMAN.

The golden mice of the subgenus *Ochrotomys* are distinguished at a glance by their vivid coloration, in comparison with the less ornate tones exhibited by the members of other sections of the genus *Peromyscus*. Many specimens of *Peromyscus nuttalli* have been collected in the Southeastern States, but although the species has long been known to range as far west as eastern Texas and eastern Oklahoma, comparatively few examples have been available from west of the Mississippi River. In revising the genus *Peromyscus*, Osgood (North American Fauna No. 28, p. 226, April 17, 1909), examined one specimen from each of the four States Arkansas, Louisiana, Missouri, and Texas and two from Oklahoma. These were referred by him to the subspecies *Peromyscus nuttalli aureolus*, described from "In the oak forests of South Carolina." Osgood remarked: "The amount of difference between this form and typical *nuttalli* is not great, but is reasonably constant in the material thus far examined." Examination of numerous specimens subsequently collected in the East, however, has led to the conclusion that *aureolus* can not satisfactorily be distinguished from typical *nuttalli*.

Although the specimens available from localities in five States west of the Mississippi River are still remarkably few in number, the uniformity of characters presented, especially by a collection of eight from Delight, Arkansas, indicates the need of segregation of the regional race here described.

Peromyscus nuttalli flammeus, subsp. nov.

WESTERN GOLDEN MOUSE.

Type.—From Delight, Pike County, southwestern Arkansas. No. 170591, ♀ adult, skin and skull, U. S. National Museum (Biological Survey Collection); collected by Walter G. Savage, November 16, 1910. X-catalogue number 8221.

Distribution.—Southeastern Missouri, eastern and southern Arkansas, northern Louisiana, and west to eastern Oklahoma and eastern Texas.

General characters.—A small, western race of *Peromyscus nuttalli*, with buffy under parts, and a flattened skull. Closely resembling *Peromyscus nuttalli nuttalli* of the coast region of southeastern Virginia, in rich "ochraceous-tawny" (Ridgway, 1912) upper parts; under parts usually more distinctly overlaid with pale "ochraceous-buff" across mid-section, the basal color of the hairs more extensively dusky; skull flatter and differing in detail.

Color.—*Type* (winter pelage): Upper parts in general rich "ochraceous-tawny," darkened by a fine admixture of blackish hairs on top of head, becoming more pronounced over back; lower part of sides and outer surfaces of forearms and thighs paler and shading toward "cinnamon-buff," under parts in general overlaid with pale "cinnamon-buff," most intense across mid-section, the hairs dusky basally except on throat and middle of chest, where they are white from tips to roots; vibrissae dusky, but face without dusky markings, as usual in the species; inner and outer surfaces of ears thinly clothed with short "ochraceous-tawny" hairs similar to those on top of head; feet white; tail brownish, somewhat darker above than below. Adult topotypes agree closely in details of coloration with the type. *Young* (in first pelage): Upper parts near "cinnamon," under parts mainly "light buff," the dusky basal color distributed about as in adults.

Skull.—Similar to that of typical *nuttalli*, but smaller and flatter or more depressed, the difference in vertical depth most noticeable in the braincase; incisive foramina about equal in length to palatal bridge (incisive foramina usually longer than palatal bridge in *nuttalli*); maxillary arms of zygomata relatively heavier; dentition about the same.

Measurements.—*Type:* Total length, 157 mm.; tail vertebrae, 70; hind foot, 18. An adult male and female from the type locality, respectively: 172, 181; 76, 81; 19, 19. *Skull* (type): Occipitonasal length, 25.7; condylobasal length, 23; zygomatic breadth, 13.5; depth of braincase over basisphenoid, 7.6; interorbital constriction, 4.1; length of nasals, 10; length of incisive foramina, 4.3; length of palatal bridge, 4.3; maxillary toothrow, 3.6. An adult male and female from type locality, respectively: Greatest length, 25.3, 26.2; condylobasal length, 23.1, 24.1; zygomatic breadth, 13.3, 13.5; depth of braincase over basisphenoid, 7.5, 7.5; interorbital constriction, 4.1, 4.3; length of nasals, 9.2, 9.9; length of incisive foramina, 4.3, 4.3; length of palatal bridge, 4.3, 4.3; maxillary toothrow, 3.9, 3.7.

Remarks.—Additional specimens are needed for the more exact delimitation of the ranges of the subspecies of golden mice. It seems probable that

the Mississippi River will prove to be a convenient line separating *Peromyscus nuttalli flammeus* from *Peromyscus nuttalli nuttalli*. The new subspecies requires no close comparison with *Peromyscus nuttalli lewisi*, which appears to be a northern race with more restricted distribution.

Specimens examined.—Total number, 15, as follows:

Arkansas: Beebe, 1; Big Creek, 1; Delight (type locality), 8.
Louisiana: Ruston, 1.
Missouri: St. Louis, 1.
Oklahoma: Redland, 2.
Texas: Joaquin, 1.

The subspecies of *Peromyscus nuttalli*, with their type localities, should apparently now stand as follows:

Peromyscus nuttallii nuttalli (Harlan). Norfolk, Norfolk County, Virginia.

Synonym—*Peromyscus nuttali aureolus* (True). "In the oak forests of South Carolina."

Peromyscus nuttalli lewisi Howell. Amelia, Amelia County, Virginia.

Peromyscus nuttalli flammeus Goldman. Delight, Pike County, Arkansas.

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PROCEEDINGS
OF THE
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AN UNDESCRIBED SKINK (LYGOSOMA) FROM NEW CALEDONIA.

BY ARTHUR LOVERIDGE.

In the year following the publication of his work on "Les Reptiles de la Nouvelle-Calédonie et des îles Loyalty," (*loc. cit. infra*) the late Dr. Jean Roux arranged an exchange with the Museum of Comparative Zoology which included one of the Mont Canala skinks that he referred to *gracile* Bavay. Some ten years ago I noticed differences between this specimen and Boulenger's (1887, Cat. Snake Brit. Mus., **3,** p. 331) redescription, but only recently through the courtesy of Mr. J. R. Slevin, have I been able to obtain a genuine *gracile* (M.C.Z. 46172, from Yahoue Valley, near Noumea, New Caledonia) for comparison.

Both skinks fall into the group which Boulenger called *Siaphos;* recently, however, Malcolm Smith (1937, Rec. Indian Mus., **39,** p. 219) in his Revision of *Lygosoma,* refers *Siaphos* (type *aequalis*) to the subsection *Lygosoma* and transfers the New Caledonian *gracile, mariae,* and *nigrofasciolatum* to the subsection *Leiolopisma.* Certainly the new skink is most nearly related to *gracile,* of which it may be a montane form, and as it lacks a name I take pleasure in associating it with that of our good correspondent at the California Academy of Sciences.

Lygosoma slevini, sp. nov.

Lygosoma gracile Roux (not of Bavay), 1913, Nova Caledonia, Zool., **1,** p. 133.

Type.—Museum of Comparative Zoology, No. 9295. A ♀ from Mont Canala, New Caledonia. Collected by Dr. Jean Roux, January, 1912.

Diagnosis.—Differs from *gracile* in possessing 4 (not 5) toes; midbody scales which are keeled (not smooth) and arranged in 22–26 (*fide* Roux; not 20) rows.

Description.— Except for the points noted in the diagnosis above, this skink agrees well with Boulenger's redescription of the types of *gracile.* Roux has described all variations, both of scalation and coloration, in detail in the citation given above.

Size.—Total length of type ♀, 72 (42 + 30) mm.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

BOGERTIA LUTZAE—A NEW GENUS AND SPECIES OF GECKO FROM BAHIA, BRAZIL.

BY ARTHUR LOVERIDGE.

Recently Dr. Bertha Lutz submitted for examination a pair of geckos (M.C.Z. 46190–1) which she had found inhabiting the large bromeliads, probably *Hohenbergia selloiana*, occurring among scrub vegetation about a hundred yards from the shore on a lonely stretch of coast near Pituba, São Salvador, Bahia Brazil; several others were obtained at the same time.

As suggested by Dr. Lutz they represent a new species, not only so, however, but apparently a new genus somewhat intermediate between *Perochirus* and *Gehyra*. In recent years a number of interesting geckos have been described from Brazil, among them the new genus *Briba* (Amaral, 1935, Mem. Inst. Butantan, **9**, p. 251, pl. —, figs. 4–7) which, though intermediate between *Gehyra* and *Hemidactylus*, has nothing in common with that about to be described. It is named for Mr. Charles M. Bogert, who has also examined them.

BOGERTIA, gen. nov.

Digits clawed, but pollex rudimentary (in ♀) or absent (in ♂), *free*, the distal phalanges moderately long, rising angularly from within a dilated portion beneath which are a series of *undivided* transverse lamellae. Body slightly depressed; dorsum covered with uniform granules; tail (regenerate, subcylindrical or slightly depressed). Pupil vertical; eyelid distinct anteriorly and above. Preanal pores absent in both sexes.

Genotype.—Bogertia lutzae (M.C.Z. 46190).

Most nearly related to *Perochirus* Boulenger, of the Philippines, Carolines, and New Hebrides, from which it differs in having *all* the subdigital lamellae undivided and the digits without trace of webbing. Unfortunately no examples of *Perochirus* are available for comparison.

Closely related to *Gehyra*, from which it differs in having all the *toes* clawed, the reduction (♀) or absence (♂) of a pollex, and the absence of both femoral and preanal pores in the male.

From *Hemidactylus* it differs in having all the subdigital lamellae undivided, and the absence of a pollex in the ♂. There is one West African species—*H. greeffi*—which has a clawless inner digit.

Bogertia lutzae, sp. nov.

Cotypes.—Five in Museu Nacional do Brasil and a pair in the Museum of Comparative Zoology, viz. No. 46,190, an adult ♀, and No. 46,191, an adult ♂, from bromeliads near Pituba, Sao Salvador, Bahia, Brazil, collected by Dr. Bertha Lutz, February 3, 1941. The following description of the female has male deviations given in parentheses.

Description.—Snout depressed, much longer than the distance between the eye and the ear-opening; scales on the snout plate-like, progressively decreasing in size to the minute granules of crown and occiput; rostral quadrangular, twice as broad as high, with median cleft above; nostril bordered by the rostral, first labial, and three nasals, of which the uppermost is in contact with its fellow; upper labials 10 (or 9) followed by 2–4 granules; lower labials 9 (or 7–8) followed by 1–3 granules; an anterior pair of very elongate postmentals which, posteriorly, are flanked by granules and followed by a row of 3 elongate (or 4 rounded) chin shields; gular granules minute.

Back and flanks covered with small uniform granules, as also the limbs above but enlarged on their anterior aspect; ventral scales smooth, rounded, imbricate; no preano-femoral pores; inner finger extremely minute (absent in paratype); inner toe (of both sexes) small, closely juxtaposed to second toe, distinctly clawed, remaining four fingers and toes well developed, free, strongly dilated, inferiorly with undivided transverse lemallae, 10 beneath fourth toe; tail (regenerate, slightly depressed; subcylindrical in paratype) covered above with small scales, below by a median series of transversely dilated plates.

Coloration.—Substantially the same as in life, which Dr. Lutz states was: Above, mouse gray to livid liver color variegated with lighter. Below, uniform whitish (or dusky, almost brownish).

Size.—Length from snout to anus of ♀, 63 mm. (♂, 64 mm.); length of regenerating tail, 42 mm. (49 mm.); length of head to back of ear-opening, 20 mm. (19 mm.).

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW SPECIES OF *ELEUTHERODACTYLUS* FROM GUATEMALA.

BY L. C. STUART.

In examining specimens of the genus *Eleutherodactylus* collected in Guatemala in 1940, I found two species which appear to be undescribed. Inasmuch as both originated from the Sierra de los Cuchumatanes—Alta Verapaz mountain chain, known for its high degree of endemism, I have overcome my hesitancy to further miltiply Eleutherodactylid names and herein describe them.

I have the honor of dedicating the first to General Roderico Anzueto V., Minister of Agriculture of the Republic of Guatemala, whose many courtesies to me greatly facilitated my investigations in that country. It will be known as

Eleutherodactylus anzuetoi, new species.

Holotype.—A male, University of Michigan, Museum of Zoology No. 89160. Collected July 12, 1940, by L. C. Stuart.

Type locality.—Floor of oak forest about 2 km. north of Nebaj, El Quiché, Guatemala. Altitude, about 1985 m.

Diagnosis.—An *Eleutherodactylus* possibly representing an upland relative of *E. rostralis* (Werner) from which it differs by its complete absence of webs between toes and tarsal fold, a shorter leg, and by its possession of a row of outer tarsal tubercles.

Description.—Vomerine teeth in two elongate rows extending from the posterior level of the choanae obliquely posteriorly. Dorsum smooth anteriorly, slightly pustular posteriorly. Belly entirely smooth; ventral disc conspicuous. Head as broad as body, somewhat lanciform in outline; sides sloping outwards; loreal region plane. Nostrils very near tip of snout; eyes moderately large; eyelids slightly tuberculate; tympanum vertically oval, its greatest diameter about two-thirds the width of the eye. A fold from the corner of the eye posteriorly above the tympanum, dividing to send one branch downwards behind the tympanum and another posteri-

orly to above arm insertions. A low mid-dorsal fold from the nape to the anus and a >-shaped fold on either side of the mid-dorsal fold.

Arms moderately stout; fingers free; comparative finger lengths, II–I = IV–III. Discs small; subarticular tubercles prominent; three large basal palmar tubercles. Legs slender; heel reaching to the tip of the snout. Toes not webbed; discs about size of those of fingers; subarticular tubercles prominent; a large inner and smaller outer metatarsal tubercle. No tarsal fold but a row of inconspicuous tubercles along the outer side of the tarsus. Upper, posterior thighs tuberculate.

Dorsum light brown, without markings save for a dark smudge between the eyes and a black spot at the apeces of the >-shaped dorsal folds. Arms and legs also light brown above. The legs cross-banded with darker brown. A small black spot on the upper surface of the fore-arm. The canthus demarked by a dark line which diffuses ventrally onto the cheeks. A dark line follows the postorbital fold. Undersurfaces brownish white, the chin and throat faintly marbled with darker shades; the under surfaces of the legs peppered with brown; a broad dark line from the heel to the base of the fourth toe; a small black anal-patch.

Head length 10 mm.	Head width 10.5 mm.
Head-body length 23 mm.	Arm to wrist 7 mm.
Leg to heel 23.5 mm.	Heel to tip of toe IV 16.5 mm.
Eye diameter 2.3 mm.	Tympanum diameter 1.5 mm.

Paratypes.—University of Michigan, Museum of Zoology No. 89911, collected with the holotype, and Nos. 89912–3 collected in the cloud forest above Finca Chichén (11 km. [straight line] south and slightly east of Cobán), Alta Verapaz, Guatemala, altitude about 1600 m.

Variation.—The paratypes are almost identical to the holotype in all particulars except that the row of tubercles on the tarsi are more conspicuous. In the specimens from the Alta Verapaz the undersurfaces are more heavily stippled with dark than in those from El Quiché. In the paratypes there is a conspicuous, dark knee patch, barely visible in the holotype. The life color recorded in my field notes is the same as that described from the preserved holotype.

Habits.—This species is apparently, despite its ventral disc, a ground form. In actions it reminds one of *E. rostralis* (Werner). It seems to be restricted to the "cloud forest" zone. At Finca Chichén it was in the cloud forest proper, while at Nebaj, a local rain-shadow valley, it occurred in a dry counterpart of the wetter cloud forest.

Range.—Restricted, so far as is known, to the mountain mass of the Alta Verapaz and the eastern Sierra de los Cuchumatanes of Guatemala.

Remarks.—I have compared the above to *E. rostralis* (Werner). Dunn and Emelen [1] have considered that species synonymous with *E. gollmeri* (Peters). While I believe the relationship to be extremely close, material from Honduras and Guatemala indicates that it is a longer-legged species than its southern relative.

[1] Dunn, E. R. and Emelen, J. P., Jr. "Reptiles and Amphibians from Honduras," *Proc. Acad. Nat. Sci. Phila.*, LXXXIV, 1932 : 24.

Though showing many differences from *E. rostralis*, I do, nevertheless, consider *E. anzuetoi* an upland member of the *gollmeri* complex. It is entirely possible, however, that the species may fit into the *mexicanus* group recently revised by Taylor.[2] From these frogs it differs primarily in the absence of an inguinal gland.

The second species I offer to Xucaneb, the mountain king of the Alta Verapaz, on whose domain I trespassed to collect,

Eleutherodactylus xucanebi, sp. nov.

Holotype.—An adult female, University of Michigan, Museum of Zoology No. 89914. Collected March 25, 1940, by L. C. Stuart.

Type locality.—Cloud forest above Finca Volcán (49 kilometers [straight line] east of Cobán), Alta Verapaz, Guatemala; altitude about 1300 meters.

Diagnosis.—An *Eleutherodactylus* with free fingers and almost free toes close to *E. spatulatus* Smith from which it differs in possessing smoother skin; more slender snout, larger tympanum, smaller finger discs, and absence of a tarsal fold.

Description—Vomerine teeth in two elongate patches extending from opposite the middle of the choanae posteriorly and medially, almost meeting at their posterior extremities. Dorsum smooth except for a slight granulation on the nape and shoulders; belly entirely smooth. Head about as broad as body; oval in outline; sides sloping sharply outwards; loreal region almost plane. Nostrils almost terminal. Eyes large; upper eyelid prominent and strongly tuberculate. Tympanum almost circular; about one-half the diameter of the eye. A low fold extending from posterior corner of eye posteriorly above tympanum and terminating just posterior to mid-point of tympanum. Several enlarged tubercles posterio-ventral to the tympanum.

Arms long and slender. Fingers completely free; comparative lengths, I–II–IV–III. Discs of fingers II, III, and IV large, bilobed and subtriangular in outline; that of finger III exactly equals the diameter of tympanum. Subarticular tubercles large and cone-shaped. Two enlarged, basal, palmar tubercles and another on inside of basal phalange of thumb.

Legs slender; heel not quite reaching the tip of snout. Toes with mere vestige of web. Discs much smaller than those of fingers. Subarticular tubercles like those of fingers. Foot free of tubercles except for larger inner and small but conspicuous outer metatarsal tubercles. No trace of a tarsal fold. Except for a small tuberculate patch on the posterior face of the upper thighs, the legs are smooth.

Pattern above mottled gray and brown, difficult of description. Top of head brown; a darker, broad stripe between eyes. Snout lighter. Loreal region light brown with broken vertical dark bars. On back above shoulder a VV-shaped dark figure. Mid-dorsum gray, spotted with brown. Lateral to this light area on either side, an elongate, irregular brown-mottled, dark, patch. Sides mottled brown and gray. A poorly-defined dark streak from posterior corner of eye, across top of tympanum, to above arm insertions.

[2] Taylor, E. H., "Some Mexican Frogs," *Proc. Biol. Soc. Wash.*, 54, 1941 : 91–94.

Arms and legs mottled brown and gray with indistinct dark brown bars. Underparts gray, heavily peppered with brown. In life the darker color of the dorsum is an orange-brown.

Head length 11.8 mm.	Head width 11 mm.
Head-body length 33 mm.	Arm to wrist 11.7 mm.
Leg to heel 30 mm.	Heel to tip of toe IV 25 mm.
Eye diameter 4.2 mm.	Tympanum diameter 1.9 mm.

Range.—Known only from the type locality but probably generally distributed through the cloud forest of the Alta Verapaz.

Habits.—The above specimen was found on the ground in the cloud forest at the very height of the dry season. It is a female with well-developed eggs in the body cavity.

Remarks.—Through the courtesy of Dr. E. H. Taylor I have been able to compare this specimen with a topotypic female *E. spatulatus*. Although the two are apparently rather closely related they are quite distinct as noted in the diagnosis. From *E. alfredi* Boulenger, which it resembles superficially, it differs in possessing a narrow head, relatively small finger discs, shorter legs, and a wholly different pattern.

Günther [3] described and figured specimens from Costa Rica and Alta Verapaz which he referred to *E. brocchii* (Boulenger). Whereas his description very probably agreed with the specimens before him, it certainly did not agree with Boulenger's original description (in Brocchi[4]). The greatest discrepancies are in the nature of the vomerine teeth—two triangular groups in Boulenger, and two short transverse series in Günther—and in the size of the digital discs—moderately developed according to Boulenger and well developed (figured large) in Günther. Though many of Brocchi's figures are notoriously bad, by no conceivable stretch of the imagination could the same species produce two such diverse sketches as those of Günther and Brocchi.

Inasmuch as *brocchii* was described from Guatemala, it is quite probable that Günther referred his Verapaz specimen to typical *brocchii* and the Costa Rican specimen to *brocchii* var. Dr. Dunn informs me that the latter is *E. melanostictus* (Cope), and through his courtesy I have examined specimens from Günther's locality. The former I believe to be the same species as that now before me. Though at present I can not be certain, I believe that my Alta Verapaz collections contain typical *brocchii*. These, to be published upon at a later date, are not even remotely connected to this new species.

For financial support of my Guatemalan investigations I wish to acknowledge grants received from the Horace H. Rackham School of Graduate Studies and from the Baird Endowment Fund, University of Michigan. To Dr. E. H. Taylor of Kansas University I am greatly indebted for his many suggestions and for his painstaking care in comparing my *Eleutherodactylus* material with Mexican specimens.

[3] Günther, A., "Reptilia and Batrachia," *Biol. Cent.-Amer.*, 1885–1902 : 236–7, pl. 68, figs. A and B.

[4] Brocchi, P., "Etudes sur les batraciens," *Miss. Sci. Mex.*, 3, 2, 1882 : 60–1, pl. 15, figs. 3.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW PINE MOUSE, GENUS PITYMYS, FROM WISCONSIN.

BY HARTLEY H. T. JACKSON.

During the course of his studies upon the Mammals of Clark County, Wisconsin, the late young naturalist F. J. W. Schmidt collected 34 pine mice (genus *Pitymys*), the first specimens of this genus taken in Wisconsin. In my early examination of these specimens I pronounced them to be *Pitymys pinetorum scalopsoides* (Audubon and Bachman) though noticing at that time certain variations from that subspecies in color and cranial characters. Under this name they were recorded by Schmidt (Journ. Mammalogy, vol. 12, p. 113, May, 1931). A more critical review of 14 specimens that Mr. Schmidt kindly donated to the Biological Surveys collection shows them to represent a clearly marked unrecognized form which I take pleasure in naming for the collector.

Pitymys pinetorum schmidti, subsp. nov.

Type specimen—No. 248079, U. S. National Museum, Biological Survey collection; ♀ adult (teeth slightly worn), skin and skull; collected September 4, 1927, by F. J. W. Schmidt. Original number 192; Biological Surveys miscl. no. 24658X.

Type locality.—Worden Township, Clark County, Wisconsin.

Diagnostic characters.—Differs from any described subspecies of *Pitymys pinetorum* (*pinetorum, scalopsoides, nemoralis,* or *auricularis*) in its decidedly more grayish, less rufescent coloration in specimens of comparable age and season, and in its average shorter tooth row. *Color* (Color standards and color nomenclature, by Robert Ridgway, 1912).—Upper parts mummy brown, or a trifle paler and more grayish, fading on the flanks and legs to the drab gray or pale drab gray of the under parts. Immature (post-nursing young) of *schmidti* distinctly more grayish than young of the other subspecies.

Measurements.—Type-specimen: Total length, 128; tail vertebrae, 24; hind foot, 18. *Skull* of type-specimen: Greatest length, 25.5; mastoidal breadth, 12.8; breadth of rostrum, 4.0; interorbital breadth, 4.6; upper molariform tooth row, 5.9. *Skull* of subadult ♂ (U. S. N. M. Biol. Surv. coll. no. 248085): Greatest length, 25.7; mastoidal breadth, 12.9; breadth of rostrum, 4.4; interorbital breadth, 4.6; upper molariform tooth row, 5.6.

Remarks.—Specimens of this subspecies in its typical distinctive coloration have been examined only from Clark County, Wisconsin. Although one could suspect that a pine mouse might inhabit the sandy pine barrens so common in north-central Wisconsin, we are told by the collector: "Pine mice were found only in the hardwood forests of the Colby loamy clay area. No traces of them could be found in cultivated fields, pastures, or orchards." (Schmidt, *loc. cit.*)

A specimen of *Pitymys* from Lynxville, Wisconsin, several miles to the south of Clark County, and near the Mississippi River, approaches *schmidti* in dental characters, but shows little of the distinctive coloration, and is provisionally referred to *Pitymys pinetorum nemoralis.*

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PROCEEDINGS
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NEW FORMS OF BIRDS FROM MÉXICO AND COLOMBIA

BY ALEXANDER WETMORE.

During current examination of collections resulting from recent expeditions into southeastern Veracruz, México, and into the Guajira Peninsula of northeastern Colombia six interesting forms of birds have been obtained that appear new to science. They are described herewith.

Rallus longirostris phelpsi, subsp. nov.

Characters.—Similar to *Rallus longirostris longirostris* Boddaert [1] but darker above, especially in the darker centers of the back; pileum darker; breast brighter, more cinnamon; differs from *R. l. pelodramus* Oberholser [2] in being more brightly colored below, with the breast more cinnamon and abdomen whiter, averaging lighter above; generally similar to *R. l. pallidus* Nelson [3] but definitely darker above, the dark centers of the feathers much blacker, less brownish, and the edgings of these same feathers browner, less grayish; brighter brown below; bill slightly heavier.

Description.—Type, U. S. National Museum no. 368,583, male adult, from the Laguna de Tucacas at Puerto López, La Guajira, Colombia, taken April 23, 1941, by A. Wetmore and M. A. Carriker, Jr. (original number 11,567). Feathers of pileum clove brown, obscurely edged and tipped with hair brown and drab, the forehead and hindneck olive brown with the same edgings; feathers of back, scapulars, tertials, rump and upper tail coverts clove brown centrally, margined widely with grayish olive; wing coverts drab, the greater coverts washed with buffy brown; alula, primaries and secondaries dull olive brown, becoming dull clove brown on innermost secondaries, outer web of alula and first primary margined narrowly with buffy brown; rectrices dull olive brown, edged obscurely with dull grayish olive; sides of head dull mouse gray, with a narrow, rather indistinct streak of vinaceous buff extending from the base of the bill above the lores to

[1] *Rallus longirostris* Boddaert, Table Planch. enl., 1783, p. 52 (Cayenne).

[2] *Rallus longirostris pelodramus* Oberholser, Proc. U. S. Nat. Mus., vol. 84, 1937, p. 323 (Caroni Swamp, Trinidad).

[3] *Rallus pallidus* Nelson, Proc. Biol. Soc. Washington, vol. 18, June 9, 1905, p. 141 (Río Lagartos, Yucatán).

above the center of the eye; lower eyelid grayish white; chin and throat white, with a lateral margin of dull vinaceous buff extending from the base of the mandible back along the lower ramal area to merge across the upper fore-neck below the white where it becomes more cinnamon, this color, between cinnamon and wood brown extending down over breast and sides of breast (brighter, more cinnamon on sides of breast); sides of neck mouse gray, the feathers edged slightly with avellaneous; abdomen white; sides and flanks olive-brown, barred with white, the dark bars twice as wide as the white ones; posterior face of tibia drab, indistinctly barred with white and washed with avellaneous anteriorly, the markings very faintly indicated; crissum dull hair brown, barred with white; lateral under tail coverts white, central ones clove brown barred with white; under wing coverts lighter than chaetura drab, barred rather irregularly and indefinitely with white. Maxilla blackish brown number 3 at tip and base, bone brown centrally, buffy brown along basal half of tomium; mandible dull olive-brown on tip, dull buffy brown basally; tarsus, crus and toes dull buffy brown, marked on posterior surface near joints with olive-brown; claws olive brown (from dried skin.)

Measurements.—3 males, wing 131.1–135.8 (133.4), tail 53.9–55.3 (54.5), culmen from base 48.6–51.5 (50.1), tarsus 46–48.7 (46.9), middle toe without claw 43.4–45.8 (44.4) mm.

3 females, wing 119.5–125.4 (123.4), tail 47.3–50.1 (48.6), culmen from base 46.8–48.3 (47.8), tarsus 43.2–45.4 (44.2), middle toe without claw 41.2–42.4 (41.6) mm.

Type, male, wing 131.1, tail 53.9, culmen from base 50.3, tarsus 48.7, middle toe without claw 45.8 mm.

Range.—Known from Riohacha, Bahia Portete and Puerto López, La Guajira, Colombia, and La Boca, Adicora, Paraguaná Peninsula, Estado Falcón, Venezuela; probable range the northern coast of Colombia and Venezuela.

Remarks.—So few clapper rails from along Caribbean coasts are found in collections (except for those from the islands of the Greater Antilles) that it has been especially interesting to examine the six specimens on which the present form is based. To collect in the slimy mud and the steamy heat of mangrove swamps is difficult, with comparatively few species of birds to reward the search, so that the naturalist in the Tropics, usually pressed for time, is prone to work in more accessible places where the return may seem greater. For this reason a number of the forms of *Rallus longirostris* recognized at present have been described from single specimens. To add another to this list may seem venturesome but after careful study I am convinced that the bird found along the coast of the Guajira and the Paraguaná peninsulas, with a probable range that covers the northern shores of Colombia and Venezuela is different from any others known. Study of this matter was begun by Mr. William Phelps of Caracas, when his collectors secured a male clapper rail from La Boca at Adicora, on the eastern side of the Paraguaná Peninsula on November 2, 1938. Another skin, a female, from this same point was obtained for the Phelps collection on May 2, 1941. At this time M. A. Carriker, Jr., and I were collecting in

the Guajira where we took four of these rails, at Riohacha April 9, Puerto López, April 23 and 24, and Bahia Portete May 16. In view of the more extensive material in the U. S. National Museum Mr. Phelps, who had recognized that the bird was new, has turned the matter over to me for final study. I have had much pleasure in naming the race in his honor.

The new form here described seems to have its nearest affinity with typical *longirostris* of the Guianas, and also to have close relationship with the bird of Trinidad. It may be noted that *longirostris, crassirostris* and *phelpsi* are marked by somewhat heavier bills when compared with the races to the north.

In my study I have had the advantage of the loan of the type specimen of *R. l. pallidus* from the Field Museum, of the two skins of *phelpsi* in the Phelps collection, and of two critical specimens from the American Museum of Natural History. One of the last two mentioned is marked as from "Lguna" Yucatán, March 5, 1886, and is an immature of *pallidus*. This race it may be noted is characterized by the lighter, warmer brown central areas in the dorsal feathers and by the broad gray margins of these same feathers. There is a second specimen in the American Museum collection (no. 471,854) marked "Yucatan (Whitely)" that bears the original collection label of Baron A. von Hügel. This bird in color of back and breast is practically a counterpart of *phelpsi,* differing only in the very slightly more pronounced black in the barring of the flanks. It agrees with the South American skins in heavier bill as well as in color, and differs from the two seen with definite localities in Yucatán, so that, after careful study, I am convinced that in reality it has come from some point in northern South America and that it has been wrongly ascribed to Yucatán, possibly by the dealer Whitely.

Oreopeleia lawrencii carrikeri, subsp. nov.

Characters.—Similar to *Oreopeleia lawrencii lawrencii* (Salvin)[4] but definitely paler above; crown, hindneck and upper back lighter, brighter green; center of back and scapular area lighter, more purplish; wing coverts and tail lighter brown; lower back and rump lighter; black streak on malar region decidedly wider; sides and flanks paler brown; under tail coverts whiter.

Description.—Type, U. S. National Museum no. 359,656, female adult, collected April 17, 1940, between 3000 and 4000 feet elevation on Volcán San Martín, Sierra de Tuxtla, Veracruz, México, by M. A. Carriker, Jr. (original no. 766). Posterior part of pileum dusky olive green becoming dark ivy green on hindneck and upper back; forehead, loral region and a narrow line extending back above the eye white; forepart of crown gray number 8; anterior part of cheeks white, becoming gray below the eye; a very narrow line of black extending from rictus back below the eye along the edge of the bare ocular area; a broad, heavy line of black reaching from the edge of the throat back below the cheeks to beneath the ear; center of

[4] *Geotrygon lawrencii* Salvin, Ibis, 1874, p. 329 (Calobre, Veraguas, Panamá).

back and upper scapular area dark slate-purple; lower back between clove brown and olive brown, changing to olive brown on the rump, and slightly darker than natal brown on the upper tail coverts; exposed part of innermost secondaries dark olive, changing gradually to slightly darker than snuff-brown on the outermost secondaries and on the lesser and middle wing coverts; primaries fuscous, with a narrow external edging of sayal brown, which is bordered in turn along the sinuation on the outer webs of the second to the fifth remiges with a very narrow edging of whitish; alula and primary coverts fuscous black; middle rectrices darker than natal brown; others deep to dark neutral gray, tipped with hair brown; throat and upper foreneck white, becoming neutral gray on lower foreneck and breast; lower breast paling to light neutral gray; abdomen white; central lower tail coverts white, becoming pale neutral gray externally; sides of neck and upper breast shading over from the gray of the breast to the dark ivy green of the hindneck; sides and flanks below this wood brown to drab; under wing coverts dull warm sepia. "Iris brown; bill black, leaden apically; tarsus purplish blood color" (from collector's notes on label).

Measurements.—Three females, wing 144.7–149.8 (147.7), tail 84.7–88.0 (86.7), culmen from cere 9.0–9.3 (9.2), tarsus, 41.0–43.3 (42.1) mm.

Type, female, wing 149.8, tail 88.0, culmen from cere 9.3, tarsus 42.0.

Range.—Known only from Cerro de Tuxtla and Volcán San Martín, Sierra de Tuxtla, southeastern Veracruz, México.

Remarks.—Since *Oreopeleia lawrencii* has been recorded as a species only from Veraguas in Panamá to northwestern Costa Rica the discovery of another race in eastern México marks a considerable and unexpected extension of range. Comparison has been made with the typical form of which I have seen skins from Panamá, labelled from the Veraguas region, the Boquete Trail back of Almirante, and Chiriquí. Specimens from Costa Rica from Guácimo (near Guápiles), and Cariblanco de Sarapiquí (located on the north face of Volcán de Poás but on the Atlantic drainage) also belong with the typical form.

Peters has named another form from northwestern Costa Rica calling it *lentipes*,[5] basing his distinction on paler coloration and on slightly larger size. I have examined one of the original specimens from Tenorio, a young male that still carries part of the juvenile plumage on the sides of the lower breast and find the new feathers of the breast slightly paler than typical *lawrencii*, the greenish on the sides seemingly restricted, and the flanks lighter, more grayish brown. However, the form *carrikeri* differs from this individual in clearer, paler colors almost as much as it does from typical *lawrencii*. The bird described here as new is so markedly different from the two currently recognized races as to be distinguished at a glance.

The race is described from three fully adult females.

[5] *Oreopeleia lawrencii lentipes* Peters, J. L., Bull. Mus. Comp. Zoöl., vol. 71, February, 1931, p. 300 (Tenorio, Costa Rica).

Pampa pampa excellens, subsp. nov.

Characters.—Similar to *Pampa pampa pampa* (Lesson)[6] and *Pampa pampa curvipennis* (Lichtenstein)[7] but larger in bulk of head and body; tail much longer, of larger feathers, and more strongly graduated; lighter gray below; bill averaging heavier than in *curvipennis*.

Description.—Type, U. S. National Museum no. 359,708, male (testes enlarged), collected at about 3300 feet elevation on Volcán San Martín, Tuxtla Mountains, Veracruz, México, April 22, 1940, by M. A. Carriker, Jr. (original no. 799). Pileum bright metallic violet; rest of upper parts, including lesser and middle wing coverts deep metallic green; remiges and greater wing coverts purplish dusky, the three outer primaries with the shafts broadened centrally and toward the base, and bowed distinctly outward; tail with broad feathers, much graduated, the central pair exceeding the lateral pair by 20 mm., dull metallic green, tipped with blackish violet, the tipping slight on the central pair, and covering the inner webs and ventral surface as well as an extensive tip on the others; three outer rectrices with a very narrow terminal edging of light gray; sides of head, including region above eye and lores brownish gray; a postocular spot of white; under surface grayish white to the central abdomen which, with the tibial feathers, is white; under tail coverts dull grayish, tipped with brownish buff; throat feathers with centers slightly darker than tips, producing a semblance of squamation; under wing coverts dull metallic green. Bill dull black, slightly horn colored at base, feet dull brown (from dried skin).

Measurements.—4 males, wing 67.5–73.2 (70.3), tail 60.3–63.5 (61.4), culmen from base 26.9–29.2 (27.7) mm.

Type, male, wing 67.5, tail, 60.4, culmen from base, 29.2 mm.

Female not seen.

Range.—Known only from the Sierra de Tuxtla, southeastern Veracruz, México.

Remarks.—At first glance the four birds from which this sabre-wing is described suggest very clean, over-stuffed examples of the two previously known races of *Pampa pampa*, a resemblance that is heightened by the fact that the bill in *Pampa p. excellens*, while averaging heavier than in *curvipennis* is little or not at all longer, and the wing also is about the same in length. Not until the large size of the head and the much longer, more graduated tail, of larger feathers, is noted does the true fact suddenly appear that we have in *excellens* much larger individuals that differ decidedly from those hitherto known. The new subspecies appears in bulk half again as large as the others.

Ridgway [8] gives the following measurements for males of *Pampa pampa pampa:* Wing 66–72 (68), tail 48–59.5 (53.2), culmen 23–25.5 (24.5) mm. And for males of *Pampa pampa curvipennis*, wing 65–68.5 (66.8), tail 50–55.5 (52.5), culmen 26–29.5 (27.3) mm.

[6] *Ornismya pampa* Lesson, Hist. Nat. Colibris, Suppl. Ois.—Mouch., 1832 [1833], p. 127, pl. 15 ("Paraguay," error=Guatemala). For date of publication see Sherborn, Index Animalium, pt. 19, 1929, p. 4725. Type locality designated by Cory, Field Mus. Nat. Hist., Zool. ser., vol. 13, pt. 2, no. 1, 1918, p. 166.

[7] *Trochilus curvipennis* Lichtenstein, Preis-Verz. Mex. Vög., 1830, pt. 1, no. 32 (México).

[8] U. S. Nat. Mus. Bull. 50, pt. 6, 1911, pp. 354–355.

Hylophilus flavipes melleus, subsp. nov.

Characters.—Similar to *Hylophilus flavipes flavipes* Lafresnaye [9] but slightly darker on pileum and back, more buffy, less yellowish below, with upper breast and lower foreneck distinctly darker than lower breast, particularly on the sides.

Description.—Type, U. S. National Museum. no. 369,860, male adult, from 1000 feet elevation in the Serranía de Macuire, near Nazaret, La Guajira, Colombia, taken May 7, 1941, by A. Wetmore and M. A. Carriker, Jr. (original no. 11,823). Crown Saccardo's olive; side of forehead, intruding on upper part of lores indistinctly old gold; lower part of lores cream buff; an indistinct line above eye, extending from the anterior margin of the eye back to a short distance beyond posterior margin, chamois; back olive-citrine, changing to olive lake on rump and upper tail coverts; wing coverts dull citrine; primaries and secondaries dark mouse gray, edged with yellowish citrine; rectrices dull citrine-drab, edged for the basal half with yellowish citrine, which distally changes to a slight margin of olive-buff at tip and along the distal part of the inner web; chin whitish, passing to dark olive buff on throat and foreneck with faint, indefinite lines of dull cartridge buff; sides of head and neck dull buffy olive; upper breast washed with dull chamois; lower breast, abdomen and flanks dull colonial buff; sides of upper breast dull ecru-olive; under tail coverts dull reed yellow; under wing coverts including edge of wing amber yellow. Maxilla and tip of mandible dull olive-brown; base of mandible dull deep olive-buff; tarsus and toes dull olive-brown (from dried skin).

Measurements.—6 males, wing 55.5–57.4 (56.9), tail 42–45 (43.6), culmen from base 12.2–13.2 (12.6), tarsus 17.2–19 (17.6) mm.

4 females, wing 54.2–55.7 (55), tail 41.8–44.1 (42.8), culmen from base 11.6–12.8 (12.3), tarsus 17.4–18.3 (17.9) mm.

Type, male, wing 57.2, tail 44.1, culmen from base 13.2, tarsus 17.7 mm.

Range.—Foothills of the Serranía de Macuire, La Guajira, Colombia.

Remarks.—In a series of skins of this species that we collected during the recent Guajira expedition of the Smithsonian Institution the ten birds collected in the foothills of the Macuire range at the far eastern end of the Guajira peninsula stand out definitely because of their darker color. They are closest in appearance because of this to typical *flavipes* which ranges in the Tropical Zone from the Caribbean coast of Colombia at Barranquilla and the northern base of the Sierra Nevada de Santa Marta south to Cartagena, the Magdalena Valley and Villavicencio at the eastern base of the eastern Andes. The species originally was described from Bogotá skins without definite locality. At Maicao, Carriapía and Riohacha, Carriker and I secured a series of skins that must be referred to *H. f. acuticaudus* because of their decidedly paler color. With this additional material it appears certain that Todd was in error in ascribing his Riohacha specimens to *flavipes*, as these birds are definitely paler. It appears therefore that *melleus*, the new form, is surrounded by the paler colored race

[9] *Hylophilus flavipes* Lafresnaye, Rev. Zool., vol. 8, September, 1845, p. 342 ("Bogotá," Colombia).

acuticaudus, which is here at its western limit, as it ranges mainly in Venezuela south to the Orinoco Valley.

Cyanerpes cyaneus gemmeus, subsp. nov.

Characters.—Largest of the forms of *Cyanerpes cyaneus* (Linnaeus), with bill heavier as well as larger when compared with *Cyanerpes cyaneus eximius* (Cabanis);[10] crown cap of male darker blue; upper surface in female more grayish, less vivid green.

Description.—Type, male adult, U. S. National Museum, no. 369,976; 600 feet elevation, Serranía de Macuire, above Nazaret, La Guajira, Colombia, collected May 7, 1941, by A. Wetmore and M. A. Carriker, Jr. (original number 11,814). Lores and an elongated streak extending to behind the eye, upper back, lower neck (extending laterally over sides of neck), anterior portion of sides, under tail coverts, crissum, wings and tail deep black; pileum more bluish than Nile blue; inner webs of primaries and most of under wing coverts light strontian yellow; outer under wing coverts black, with a little smalt blue along edge of wing; rest of plumage smalt blue, this color encircling the Nile blue crown patch. Bill black, tarsus avellaneous, feet terra cotta, claws blackish (from dried skin).

Measurements.—7 males, wing 68.7–73.6 (70.3), tail 40.7–42.5 (41.2), culmen from base 22.4–24.1 (23.0), tarsus 14.5–15.8 (15.1) mm.

4 females, wing 67.0–72.8 (70.3), tail 40.4–43.0 (41.6), culmen from base 24.1–27.4 (25.7), tarsus 14.3–16.1 (15.2) mm.

Type, male, wing 73.6, tail 41.5, culmen from base 24.0, tarsus 15.3 mm.

Range.—Known only from the humid forest belt on the Serranía de Macuire, La Guajira, Colombia.

Remarks.—The eleven birds from which this new form is described are definitely larger than skins from elsewhere through the extensive range of this species, a fact that is obvious at a glance as the specimens are laid out in order. But in view of the individual variation found in this bird it has been only after an extended review of all the races that have been proposed that *gemmeus* has been described as new. The bird so far as known is confined to the restricted island of cloud forest found across the slopes of the Serranía de Macuire. It was noted only at 600 to 1000 feet altitude.

It is approached in size only by *C. c. tobagensis*, from which it differs in longer bill as well as in average length in wing and tail.

Basileuterus cinereicollis pallidulus, subsp. nov.

Characters.—Similar to *Basileuterus cinereicollis cinereicollis* P. L. Sclater[11] but averaging lighter in color; sides and flanks paler; upper breast lighter gray; lower breast lighter yellow; hind-neck grayer; back, wings and tail somewhat lighter, more greenish.

Description.—Type, male adult, U. S. National Museum no. 369,892, between 4000 and 5000 feet elevation in the northern end of the Sierra

[10] *Arbelorhina eximia* Cabanis, Mus. Hein., pt. 1, 1851, p. 96 (Puerto Cabello, Venezuela).

[11] *Basileuterus cinereicollis* P. L. Sclater, Proc. Zool. Soc. London, August, 1864, p. 166 ("Bogotá," Colombia).

Negra east of Fonseca, Departamento de Magdalena, Colombia, taken July 10, 1941, by M. A. Carriker, Jr. (original no. 1519). Pileum, except in center, dark quaker drab; an extensive, partly concealed crown patch of lemon chrome, a few of the darker feathers bordering this yellow area in part blackish mouse gray; back of head and hindneck dark grayish olive, a few of the feathers with an indistinct tipping of greenish; back and scapulars slightly brighter than dark greenish olive, changing on rump and upper tail coverts to serpentine green; lesser and middle wing coverts dark greenish olive, edged with light yellowish olive; greater coverts fuscous black, edged with light yellowish olive; primaries and secondaries fuscous black edged with citrine, becoming dark citrine on inner secondaries; rectrices chaetura drab, edged with citrine; sides of head deep neutral gray; anterior part of loral area whitish, this color extending as an indistinct line back to eye, with another more definite line of whitish extending from upper edge of rictus, where it includes the bases of part of the rictal bristles, back across lower eyelid; the two whitish marks just mentioned enclosing an area of deep neutral gray immediatly in front of eye; auricular region with very faint and indefinite lighter gray streakings; feathers of throat and upper foreneck dull white, washed with gray number 10; lower foreneck, sides of neck and upper part of breast light neutral gray; lower breast, abdomen and under tail coverts lemon chrome; sides and flanks slightly darker than warbler green; tibia light yellowish olive; lower portion of edge of wing olive-yellow; under wing coverts partly yellowish olive, and partly Marguerite yellow. Bill dull black; tarsus and toes dull olive brown (from dried skin).

Measurements.—4 males, wing 67–70.6 (69.2), tail 57–61 (59.2), culmen from base 12.8–13.8 (13.5), tarsus 21.3–23 (22.3) mm.

1 female, wing 62.4, tail 54.7, culmen from base 12.8, tarsus 21.8 mm.

Type, male, wing 70.6, tail 61, culmen from base 12.8, tarsus 21.3 mm.

Range.—Northern end of the Perijá Range, known from specimens from 3000 to 5500 feet elevation near Tierra Nueva and Monte Elias, in the Sierra Negra east of Fonseca, Magdalena, Colombia.

Remarks.—As the present specimens mark a northward extension of range for what has been previously known of *Basileuterus cinereicollis* it is not surprising to find that they display a color difference worthy of a name. I have compared them with specimens from Buena Vista, above Villavicencio in Cundinamarca, and from Río Negro in Boyacá, which are uniformly darker.

I have also examined numerous specimens of *Bassileuterus conspicillatus* Salvin and Godman from the Sierra Nevada de Santa Marta, which are so uniform in having the upper breast entirely yellow and the gray confined to the foreneck, a difference in color pattern, that I consider them as a distinct species and not a geographic race of *cinereicollis* as suggested by Hellmayr.[12]

[12] Field Mus. Nat. Hist., vol. 13, pt. 8, 1935, p. 514.

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OF THE

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NOTES ON *TOXOSTOMA CURVIROSTRE* OF MEXICO, WITH DESCRIPTION OF A NEW RACE.

BY ROBERT T. MOORE,

California Institute of Technology.

A misconception of the relationship of the races of *Toxostoma curvirostre* in Mexico has hindered progress in our understanding of this group, a misconception due to lack of adequate material. With one hundred and twenty-eight recently taken specimens in the Moore Collection, covering every race, except that of extreme northeastern Mexico, from which last area fresh material has recently been received on loan, it is now possible to assess the characters of the races more correctly.

The chief misconception has been the belief that the bird of southern Sinaloa, *Toxostoma curvirostre occidentale* (type locality Mazatlan, Sinaloa) has white tips to the rectrices. Our very large series from Sinaloa proves that *occidentale* has grayish-brown tips, if any, there being only one specimen with a white tip out of thirty-five in our collection. Therefore, the chief character, on which Ridgway (Bull. 50, U. S. Nat'l Mus., Pt. IV, 202 and Key pp. 186–187) relied to distinguish between *occidentale* and *maculatum* of southern Sonora is non-existent. We have a single aberrant specimen, taken on April 5th within twenty miles of Alamos, type locality of *maculatum*, which has large immaculately white tips, just as we have one taken close to the type locality of *occidentale*, but all the rest of our large series of both races, even in fresh fall plumage, have either no tips or decidedly buffy ones. The true white-tipped birds seem to consist chiefly of two groups,—(1) those of the Central Plateau at high elevation, ranging from Guanajuato and Aguascalientes north, which in fresh plumage have immaculately white tips, and (2) those of northeastern and eastern Mexico; all of them east of the main Sierra Madres of Mexico, this section of the backbone of the continent being the dividing line between the white-tipped and buffy-tipped groups.

The undescribed form of the Central Plateau, lying between *oberholseri* to the north and true *curvirostre* to the south, is a larger bird than either,

having the tail longer than the wing, whereas in true *curvirostre*, as well as in the birds of eastern Mexico and in *oberholseri*, wing and tail are about equal. Since its validity is confirmed by other characters, it is herewith described.

My thanks are extended to Dr. George Miksch Sutton, to Mr. Zimmer and the American Museum of Natural History, to Dr. Herbert Friedmann and the United States National Museum, also to Mrs. Donald R. Dickey and Mr. Adrian van Rossem. By an exchange of courtesies the last, who requested the opportunity to examine our thirty-five specimens of *occidentale*, permitted the author to quote from his notes on Swainson's and Lichtenstein's types.

Toxostoma curvirostre celsum, subsp. nov.

PLATEAU THRASHER.

Type.—Female adult in worn breeding plumage; no. 19190, collection of Robert T. Moore; Laguna Juanota, southwest Chihuahua, Mexico; altitude more than 9000 feet; August 5, 1937; collected by Chester C. Lamb.

Subspecific characters.—Nearest to the races with white tail-tips, *Toxostoma curvirostre curvirostre* (Swainson) and *Toxostoma curvirostre oberholseri* Law, but differing from the former in larger size; in adult winter plumage, having breast and upper abdomen with more confluent spots (Hair Brown[1] instead of Drab); lower abdomen and under tail coverts buffier, more cinnamon; tips to outer rectrices apparently smaller and certainly whiter (pure white even in worn breeding plumage); upper parts darker gray, less brownish. Differs from *obholseri*, in larger size; generally more buffy on posterior under parts; spots on upper abdomen larger and always present. *Celsum* differs so obviously from *occidentale*, *maculatum* and *palmeri*, the three buff-tipped races to the west of the Sierra Madres, that no comparison is necessary, but I add that *celsum*, in addition to having white tips, although much smaller in length of tail, has a larger wing (in Guanajuato-Aguascalientes birds, markedly the largest of all the races); much larger spots on the breast and much less cinnamon on abdomen and under tail-coverts. In nuptial plumage it differs from *curvirostre* in having whiter ground color of upper abdomen; lower throat paler, more uniform with breast instead of darker; white tips of tail smaller; upper parts grayer, less brownish. It differs from the nuptial plumage of *occidentale* in having much whiter ground color of under parts and paler under tail coverts, as well as pure white tips, instead of buffy white ones; from *oberholseri* it differs in the same characters as in the winter plumage. If *Turdus deflexus* Lichtenstein represents a race in Hidalgo, differentiated from *T. c. curvirostre*, *celsum* differs from it in winter plumage in having spots on abdomen fewer and smaller; white tips to rectrices smaller; tail, proportionate to wing and absolutely, longer.

Range.—Southeastern Arizona (Chiricahua Mountains), thence east to southern New Mexico, thence south keeping east of the Sierra Madres

[1] Names of colors in this paper, when capitalized, are taken from Ridgway's "Color Standards and Color Nomenclature," 1912.

through Chihuahua and Durango, probably through Aguascalientes to northwestern Guanajuato and extreme northeastern Jalisco. The type from Laguna Juanota was taken at an altitude of more than 9000 feet, indeed, according to Mr. Lamb, "10,000 feet." This, apparently, is the highest altitude at which any race has been found. The Latin name, *celsum*, refers to the high range of this form.

AVERAGE MEASUREMENTS IN MM. OF *Toxostoma curvirostre celsum* AND ALLIED RACES.

Males	*Wing*	*Tail*	*Exposed Culmen*	*Tarsus*
2 ads. (*deflexum* ?)				
Hild.–Queretaro	109. (107.9–110.1)	109.9(108.6–111.2)	29.3(28.6–29.9)	32.3(32.2–32.4)
10 ads. (*Oberholseri*)[2]	102.9(98.3–108.4)	105.1(98.2–110.5)	28.0(25.8–29.9)	34.4(32.3–36.2)
18 ads. (*celsum*)				
Ariz. to Durango	109.7(103.4–117.0)	112.7(101.6–121.9)	30.5(27.1–32.5)	33.3(31.0–35.0)
10 ads. (*celsum*)[2]				
Chiricahua Mts.	108.9(103.8–112.5)	112.4(107.7–117.3)	31.1(29.1–32.9)	34.6(32.6–35.8)
13 ads. (*celsum*)				
Aguas. to N.W. Guanj.	112.0(107.5–116.6)	112.6(106.8–124.1)	30.5(26.9–32.8)	34.5(33.0–35.8)
7 ads. (*c. curvirostre*)	107.0(99.8–111.2)	106.9(104.8–111.9)	30.1(28.1–33.0)	33.4(32.2–35.4)
8 ads. (*maculatum*)	104.4(101.9–108.3)	115.5(111.1–119.9)	31.3(29.9–33.0)	33.9(31.9–35.8)
14 ads. (*occidentale*)	108.1(100.7–113.8)	119.0(112.4–124.9)	31.0(28.9–33.3)	34.5(32.4–36.7)
7 ads (*palmeri*)	105.8(102.3–108.9)	117.3(113.1–119.9)	32.2(30.8–34.3)	
Females				
3 ads (*deflexum* ?)	106.0(103.4–107.6)	103.9(100.8–105.7)	28.5(27.4–30.6)	32.0(31.8–32.4)
15 ads. (*oberholseri*)	100.5(96.7–106.2)	102.5(97.0–105.0)	29.1(27.8–32.2)	32.0(30.7–34.2)
20 ads. (*celsum*)				
Ariz.–Durango	107.7(100.3–115.1)	111.8(106.0–117.5)	30.0(27.4–32.0)	32.9(31.2–34.7)
15 ads. (*celsum*)				
Aguas. to N.W. Guanaj.	108.8(105.1–113.6)	110.6(105.1–117.0)	28.5(27.0–31.2)	32.4(29.3–34.4)
5 ads. (*curvirostre*)	105.2(99.5–111.4)	105.3(99.1–112.8)	29.3(27.8–31.2)	33.1(30.4–35.0)
8 ads. (*maculatum*)	99.9(99.6–101.5)	113.2(110.2–114.2)	30.1(27.6–33.3)	32.8(30.1–33.5)
10 ads. (*occidentale*)	103.9(101.2–107.1)	115.3(110.5–118.5)	31.6(29.5–34.8)	34.3(32.3–36.6)
4 ads. (*palmeri*)	104.8(103.8–106.4)	115.3(114.3–116.2)	30.5(29.6–30.8)	

Remarks.—*Celsum* is chiefly a denizen of the high arid plateau of central Mexico at an altitude of 5000 to at least 9000 feet, wherever there are plains with occasional streams. Like many species of the Central Plateau, particularly those of Guanajuato, this race has an unusually large wing. A series of 17 specimens, collected by Batty for the American Museum of Natural History, are badly faded and of slight use for comparison of coloration. The thirteen males and fifteen females taken between northwestern Guanajuato-Aguascalientes and the extreme northeastern projection of Jalisco, are tentatively determined as *celsum*, although they have even larger wings, the largest of any group of *curvirostre*, and seem to have heavier (almost contiguous) blotching on the breast and lower throat. These lie geographically between typical *celsum* to the north and the smaller true *curvirostre* to the south, whose range our series proves is restricted to a narrow east-west geographical belt from the western part of the state of

[2] Above measurements given by J. Eugene Law (Condor, Vol. XXX, March, 1928, p. 151). My measurements of apparently the same birds from the Lower Rio Grande are almost identical.

Mexico (Temascaltepec) through Michoacan to eastern Jalisco. West of Atoyac, at Tapalpa, individuals of *curvirostre* show intergrading characters with *occidentale*. The final determination of this excellent series from the Guanjauato-Aguascalientes area must await the collecting of more birds from Hidalgo and eastern Mexico.

For the Hidalgo-San Luis Potosi birds, I am employing tentatively Lichtenstein's name *deflexum*. According to van Rossem's memorandum concerning Lichtenstein's two co-types (see in addition his brief statement: Bull. Mus. Comp. Zool., Vol. 77, No. 7, 1934, p. 416), number 3655 from Chico [Hidalgo], accords better with Lichtenstein's description of "white-gray" under parts, whereas number 3656, the co-type from Temascaltepec, "is definitely buffy on the posterior under parts and more heavily spotted." My two series from Temascaltepec and Hidalgo confirm these differences, the Hidalgo birds having whiter ground color on upper abdomen, less buffy lower abdomen and undertail coverts and much heavier (larger) spotting on upper abdomen and lower throat. It would seem, then, that the name *turdus deflexus* Lichtenstein might well be restricted to specimen number 3655 from Chico. I hesitate at the present time to take this step, as I have not seen birds from the Valley of Mexico, which may be the same as those from Hidalgo and may have to be known by the name of *T. curvirostre curvirostre*.

In a recent letter (Oct. 30, 1941) to me, van Rossem asserts that Swainson's locality "Tableland" for types such as *Orpheus curvirostre*, "boils down to one of three places, Valley of Mexico where most of Bullock's time was spent, Puebla where a few birds were collected, and Cofre de Perote, where he spent about a month. He speaks of all three as Tableland." Although this conclusion might be accepted for designating the type locality of a race, known to occur at one of these localities and *not* at Temascaltepec, it does not seem desirable to choose one of them for the type locality of *Orpheus curvirostre* and designate it, when a Curve-billed Thrasher, fitting our meager knowledge of the type, is found at Temascaltepec. The type should be re-examined and compared with freshly-taken specimens from Temascaltepec and the other above-mentioned localities. Van Rossem's memorandum of his examination of Swainson's type does not cover the characters which chiefly differentiate Hidalgo and Temascaltepec birds, except the measurements, which, for the type, are shown as "wing 114.0, tail 113.0." Although this is larger than any of my five Temascaltepec individuals, it is nearly approached by one adult female, which has wing 111.4 mm. and tail 112.8 mm. Tentatively I am employing Swainson's name for these birds, believing this preferable to coining a new name, or "stretching" the application of *Toxostoma vetula* Wagler to birds of the southern end of the Central Plateau, the types of which name Hellmayr (Pub. Field Mus. Nat. Hist., Vol. XIII, Pt. VII, p. 299, footnote) states "agree with birds from Veracruz (Perote) and Oaxaca, which I have not seen."

It should be emphasized that *celsum* is not an intermediate, being larger than either true *curvirostre* to the south, or *oberholseri* to the north. A specimen, number 117720 (U. S. Nat. Mus.) from San Luis Potosi is large

and heavily spotted on the breast like the birds of Hidalgo (*deflexum* ?), while number 10504 in the Cornell University Collection from near Monterrey, Nuevo Leon, reported by Sutton (Occas. Pap. Mus. Zool. La. St. Univ. No. 3, p. 37) as *oberholseri* has the small size and lightly spotted abdomen and breast of that race. Three birds obtained by the author's expedition at Guayachi and the Barranca del Cobre at high altitude in extreme southwestern Chihuahua, in spite of the geographical closeness to *maculatum* of the coastal plains, have white tail-tips and are practically pure *celsum*. It should be noted that van Rossem (Trans. San Diego Soc. of Nat. Hist., Vol. VI, No. 19, p. 275) gave measurements for "ten adult male *maculatum* from Sonora," showing the wing 106.6 and tail 122.0 mm. These tail measurements are much larger than those revealed in my tables, for my eight adult birds, all of which were taken within forty miles of the type locality, Alamos. This is possibly explained by van Rossem's inclusion of birds from central Sonora, north as far as Tecoripa. A *celsum* male, number 22138 Moore Collection, is partially albino, having fifth to the second primaries, counting from the outside, on the right wing and fifth to the third primaries on the left wing, pure white.

T. c. maculatum (Nelson) (type locality Alamos, Sonora) is recognizable chiefly on ground of average wing and tail measurements being smaller than either *occidentale* or *palmeri*. The ground color of the upper abdomen *only* in a majority of specimens, is also slightly darker than in *occidentale*. The tips of the rectrices do not differ from those of *occidentale* and as to its being *generally* "darker," there are too many individuals taken close to the type localities of each, which are identical. In any event, *maculatum* has a very restricted range and birds from northeastern Sinaloa, not thirty miles away from the type locality, are true *occidentale*. It extends farther south into northwestern Sinaloa, a series from Ahome to Culiacan being variously intermediate.

Occidentale does not seem to reach an altitude over 3000 feet in Sinaloa. It extends into Durango at elevations approximately this, apparently where the birds of the Coastal Plains can follow up the rivers without reaching high altitude. Our group of specimens from Tamazula, Durango, at an elevation of 2800 feet, illustrates this type of fluvial penetration and are typical *occidentale*, although geographically close to *celsum* on the upland plateau.

Specimens examined.—Of the following specimens, all are in the Moore Collection, unless enclosed in brackets:

Palmeri—Arizona: Fresnal 1 ♀ [Dickey Col.—Arizona: Ft. Lowell 3 ♂, Continental 2 ♂ 3 ♀, Santa Cruz River 1 ♂ 1 ♀, East Slope Baboquivari Mts. 1 ♂ 1 ♀; Sonora: Saric 1 ♂]. *Maculatum*—Sonora: Tecoripa 1 ♀ (Nov. 13), Agiabampo 1 ♂ 2 ♀ (Apr. 19–25), Guirocoba 1 ♀ (Jan. 20), Sinaloa: El Orito 1 ♂ (Mar. 14), Cienaquita 2 ♂ (Apr. 13), La Guasimas 1 ♂ 2 juv. ♀ (July 1–19), Colmoa 1 ♂ 1 ♀ juv. ♀ (July 28–Sept. 3), El Fuerte 1 ♀ (May 14 nesting), Palmar 1 ♀ (Nov. 30), Yecorato 1 ♂ (Apr. 29). Intergrades *maculatum* x *occidentale*—Sinaloa: Los Leones 1 ♂ 1 ♀ (Apr. 5), Guamuchil 1 im. ♀ (Oct. 2), Ahome 1 ♀ 1 im. ♀ (Aug. 4–Sept. 11), Rancho El Padre 2 ♀ (Nov. 22–26), Copalitos 2 ♂ 1 ♀ (July

22–Aug. 4). *Occidentale*—Sinaloa: El Molino 3 ♂ (Nov. 3, Feb. 23–May 16), Culiacan 3 ♂ 3 ♀ 1 im. ♂ (Apr. 15–Feb. 27), Reforma 1 ♂ 1 ♀ (Apr. 18), Badiraguato 2 ♂ (Jan. 4–10), Cacalotan 1 ♀ (Feb. 12), Matatan 1 ♂ (Apr. 23 breeding) Vado Hondo 1 ♂ (Mch. 30 breeding), Quelite 1 ♂ (Feb. 9), San Lorenzo 1 ♂ (Jan. 15), Rosario 3 ♂ 3 ♀ (Sept. 8–Feb. 26), Iguana 2 ♂ (Feb. 20–22), Elota 1 ♂ (Mch. 25); Durango: Tamazula 2 ♀ 1 im ♀ (Nov. 25–Dec. 9); Nayarit: Tepic 1 im. ♀ (June 20). *Celsum*—Guanajuato: Puerte de Guadalupe 1 ♂ 4 ♀ (May 13–21 breeding), Rancho Enmedio 4 ♂ 4 ♀ (May 1–2 breeding, Jan. 28–Feb. 2), Irapuato 6 ♂ 5 ♀ 1 im. ♂ (Apr. 6 breeding, Sept. 10–Jan. 19); Aguascalientes: San Jacinto 3 ♂ 1 ♀ (Oct. 11–21); extreme N. E. Jalisco: Lagos de Moreno 2 ♀ (Oct. 30–Nov. 3); Durango: Ojito 2 ♂ 1 ♀ (Aug. 21–26) [Col. Am. Mus. N. H.—Rio Sestin 1 ♂ 3 ♀ (Apr. 9– May4), Rancho Baillon 2 ♂ 1 ♀ (May 6–9), Arroyo del Buey 1 ♀ (May 28), Las Bocas 2 ♂ 2 ♀ (Feb. 8–11), Rosario 1 ♂ (Jan. 24), Santuario 1 ♂ 1 ♀ (Feb. 16–22), Cienega de las Vacas 1 ♀ (Mch. 28), La Boquilla 1 ♀ (Feb. 14]. Chihuahua: Laguna Juanota 1 ♂ 1 ♀ (Type) 2 ♀ (Aug. 2–5), Tohuariqui 1 ♂ 1 ♀ (May 10–18 breeding), Guayachi 1 ♀ (May 26 nesting). [Dickey Col.—Arizona: Chiracahua Mts.: Whitetail Canyon 1 ♂, Pinery Canyon 1 ♂ Buckhorn Canyon 1 ♀, "Chiracahua Mts." 1 im. ♂; Fairbanks 1 ♀, Tucson 1 ♂ (van Rossem states taken farther east). Col. U. S. Nat. Mus.—New Mexico: Lone Mt. 3 ♂ 3 ♀ 2 ♂ juv. (July 17– Sept. 29), Silver City 1 ♀ (Nov. 5).] *Curvirostre*—Mexico: Temascaltepec 3 ♂ 1 ♀ (July 16–Aug. 5 breeding; Michoacan: San Augustin 1 ♂ 1 ♀ (Feb. 11–14), near Uruapan 2 ♂ 1 ♀ 1 juv. ♂ im. ♀ (June 10–July 3), Zacapu 1 ♂ 1 ♀ 1 im. ♀ (Aug. 20–Sept. 7); Jalisco: near Atoyac 3 ♂ 2 ♀ (Feb. 23–Mch. 7). *Curvirostre* x *occidentale*, nearer *curvirostre*—Central Jalisco: Tapalpa 1 ♂ 2 ♀ (Apr. 1–10 breeding), Guadalajara 1 ♀. *Deflexum?* Hidalgo: Portezuelo 1 ♂ 1 ♀ (Dec. 13–14); Queretaro: El Caracol 1 ♂ 1 ♀ (Dec. 3–5); [U. S. Nat. Mus. Col.—San Luis Potosi: San Luis Potosi 1 ? (Feb.)]. *Oberholseri*—[Dickey Col.—Texas: Laredo 1 ?; U. S. Nat. Mus. Col.—Texas: Ft. Clark 1 ♂ 4 ♀ (Dec. 28–Mar. 6), Rio Grande City 1 ♂ 1 ♀ (Mar. 12–Apr. 26), Hidalgo 1 ♂ 1 ♀ (Apr. 17–May 5), Lomita 1 ♀ (Apr. 10), Laredo 3 ♂ 1 ♀ (June 2–12, Nov. 21), Brownsville 8 ♂ 6 ♀ (Jan. 1–May 1), Point Isabel 1 ♂ 1 ♀ (Nov. 26–30), "Texas" 1 ♂; Nuevo Leon: Monterrey 1 ♂ (June 18); Cornell Univ. Col.—near Monterrey 1 ♀ (Feb. 3).]

Since the paper, "New Form of *Toxostoma* from Hidalgo" (Proc. Bio. Soc. Wash., 54, pp. 149–150) was forwarded to the publisher, the author, thanks to the courtesy of George Willett and Adrian van Rossem, has compared the type of the new race, *Toxostoma dorsale dumosum*, with additional specimens in the Los Angeles Museum and the Donald R. Dickey Collection from areas near the type locality, Rincon, New Mexico. The size difference seems much greater than originally believed; the wing and tail are ten per cent shorter and the feet obviously very much smaller.

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ERRATA.

1. Robert T. Moore.

An error was made by the author in his paper (Proceedings of Biological Society of Washington, Vol. 54, March 21, 1941, p. 38) in connection with the description of *Vermivora superciliosa sodalis*. Therein it was stated that the form *Vermivora s. palliata* (Proceedings Biological Society of Washington, Vol. 52, pp. 11–12) was described "from the southwestern state of Guerrero." The locality of the type was clearly stated in the original paper as coming from "Sierra Nevada de Colima, Jalisco, Mexico—." However, this error does not seem to affect the validity of either race. As stated in my description of *sodalis*, it ranges from southwestern Chihuahua south "through western Durango and eastern Sinaloa to the vicinity of Tepic and Nayarit," from which last locality the birds are "slightly intermediate." *Palliata* ranges from Guerrero north to extreme southern Jalisco. Between the two ranges is a considerable area, covering the southern half of Nayarit and the larger part of Jalisco where intermediates between *sodalis* and the east Mexican form, *mexicana*, occur, as well as others approaching *palliata*. As stated in my paper (Op. Cit. p. 39), "my series from Tapalpa, in west-central Jalisco, represents intermediates between *mexicana* . . . and *sodalis*." The ancient and much faded series in the British Museum is of little help in solving this problem. Only a considerable amount of fresh material will positively determine where the range of *palliata* begins. Fortunately, new collections, taken between Nayarit and the Rio Balsas in northern Guerrero, are on the way to the author and may provide definitive material.

2. L. C. Stuart.

An error in wording was made by the author in his diagnosis of *Xenosaurus rackhami* (pp. 47–48) which completely reverses the intended meaning. In the diagnosis this species is said to differ from *Xenosaurus grandis* (Gray), ". . . in possessing smaller gular scales, etc. . . . " The word "smaller" should read "larger."

INDEX.

New names are printed in **heavy type.**

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