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PROCEEDINGS

OF THE

Biological Society of Washington

VOLUME 50
1937

WASHINGTON
PRINTED FOR THE SOCIETY

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HERBERT FRIEDMANN, *Chairman*

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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.

PRESS OF
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(FOR 1937-1938)

(ELECTED MAY 15, 1937)

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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 1937 (pp. v-xiii; 231-239) were issued on February 18, 1938. The title page and lists of officers and committees for 1937-1938 (pp. i-iv) were issued on June 22, 1937.

PLATES.

Plate I, facing page 40.	<i>Aigola crassimana</i> <i>Aigola filicata</i> <i>Aigola flava</i> <i>Aigola flavescens</i> <i>Aigola rectangulata</i> <i>Aigola recurvata</i> <i>Aigola rotunda</i>
Plate II, facing page 52.	<i>Hyla erythromma</i> <i>Hyla pinorum</i> <i>Hyla robertmertensi</i>
Plate III, back of Plate II.	<i>Hyla bistrincta</i>
Plate IV, facing page 60.	<i>Gastrodonta saludensis</i> <i>Paravitrea reesei</i> <i>Retinella columna</i> <i>Retinella floridana</i> <i>Retinella virginica</i>

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

The Society meets from October to May, on alternate Saturdays, at 8 P. M. All meetings during 1937 were held in the new lecture hall of the Cosmos Club.

January 9, 1937—842d Meeting.

President Fuller in the chair; 150 persons present.

President H. C. Fuller was nominated to the Washington Academy of Sciences as Vice-President.

Informal communications: F. Thone, Exhibition of new books on biological subjects; T. Ulke, Exhibition of the larva of the Hercules beetle.

Formal communication: F. A. Flood, Through Borneo and Australia.

January 23, 1937—843d Meeting.

President Fuller in the chair; 73 persons present.

New members elected: I. T. Bode, Lincoln Constance.

Informal communications: A. Wetmore, Necrological note on T. E. Penard; W. Spawn, Exhibition of swollen buds of various shrubs.

Formal communications: T. H. Kearney, Recollections of Dr. F. V. Coville; F. D. McKenney, Deer as a factor in Texas Fever control in Florida; H. B. Ward, A summer's contact with salmon in Canadian Labrador.

February 6, 1937—844th Meeting.

President Fuller in the chair; 125 persons present.

Informal communications: F. Thone, Exhibition of new books on biological subjects; H. C. Fuller, Note on the mourning

dove; Phoebe Knappen, Note on the effect of cold weather on plant life.

Formal communications: A. Wetmore, An ornithologist in Guatemala; F. M. Uhler, Poisonous snakes of the eastern United States.

February 20, 1937—845th Meeting.

President Fuller in the chair; 55 persons present.

Informal communications: V. Bailey, Note on the least shrew; I. N. Hoffman, Note on identification of an unknown vine by means of the butterfly pupating on it.

Formal communications: A. H. Clark, Virginia butterflies; Theodore Ahrens, New conservation laws in Germany; A. B. Clawson, Bighead in sheep: sunlight effects in poisoning by plants.

March 6, 1937—846th Meeting.

President Fuller in the chair; 55 persons present.

Informal communications: F. Thone, Exhibition of new books on biological subjects; T. Ulke, Exhibition of specimens of Veronica and Euphorbia.

Formal communications: Phoebe Knappen, Queer things that birds eat; F. L. Earnshaw, Federal big-game protection; R. A. Soderberg, Migratory waterfowl conservation.

March 20, 1937—847th Meeting.

President Fuller in the chair; 95 persons present.

Formal communications: E. A. Preble, William T. Hornaday, an appreciation; W. C. Henderson, A summary of the Wildlife Conferences at St. Louis; Prof. Marie-Victorin, Vanishing floras of northeastern America.

April 3, 1937—848th Meeting.

President Fuller in the chair; 105 persons present.

Informal communications: T. Ulke, Exhibition of specimens of *Tithymalus helioscopia*; E. A. Goldman, Note on the new Migratory Bird Treaty between Canada, Mexico, and the United States; T. S. Palmer, Note on the new Halibut Treaty and on the Conservation Treaty affecting whaling licenses; T. S. Palmer, C. H. Merriam, M. B. Waite, Mrs. Florence M.

Bailey, and J. S. Wade, Reminiscences and comments on John Burroughs; J. S. Wade, Exhibition of new books on biological subjects.

Formal communications: Doris M. Cochran, Frog collecting in Brazil; O. J. Murie, Animal life of the Aleutian Islands, Alaska.

April 17, 1937—849th Meeting.

President Fuller in the chair; 49 persons present.

New members elected: C. C. Boxler, W. S. Derrick, C. B. Dorsey, M. P. Footer, J. A. Fowler, R. M. Greenburg, I. B. Hansen, I. R. Howard, L. Jarbor, Z. Kluger, M. P. Landman, T. Lang, Elizabeth Newman, F. H. Seversmith, W. T. Stafford, S. Zibit.

Informal communications: F. Thone, Exhibition of new books on biological subjects, and Exhibition of an Easter egg; Raymond Adams, Note on observations of robins in North Carolina; T. Ulke, Note on habits of wrens.

Formal communications: J. A. Hyslop, the periodical cicada; Clarence Cottam, F. C. Bishopp. W. F. Bowen, and L. L. Williams, Mosquito control and wild life.

May 1, 1937—850th Meeting.

President Fuller in the chair; 70 persons present.

Informal communications: T. Ulke, Occurrence of *Unifolium canadense* in Rock Creek Park; W. Spawn, Note on the flowering of *Silene pensylvanica*.

Formal communications: I. N. Hoffman, Aviary pheasants, habits and species; Arno Viehoever, An intimate panorama of life as shown by *Daphnia* and *Palaemonetes*—living reagents.

May 15, 1937—851st Meeting.

FIFTY-EIGHTH ANNUAL MEETING.

President Fuller in the chair; 18 persons present.

New members elected: H. G. du Bey, Mrs. Marjorie Campbell, J. G. Graham, Marquess Hachisuka, Willis King, Keith Johnson, M. C. McClanahan, Alice May.

The reports of the Recording Secretary, Corresponding Secretary, and Treasurer were read. Reports were presented for the

Trustees of Permanent Funds and the Committee on Communications.

The following officers and members of council were elected: President, H. C. Fuller; Vice-Presidents, C. W. Stiles, T. H. Kearney, W. B. Bell, E. P. Walker; Recording Secretary, S. F. Blake; Corresponding Secretary, J. S. Wade; Treasurer, F. C. Lincoln; Members of the Council, A. A. Doolittle, I. N. Hoffman, J. E. Shillinger, A. L. Nelson, J. E. Benedict, Jr.

October 2, 1937—852d Meeting.

President Fuller in the chair; 90 persons present.

Informal communications: J. F. Couch, Necrological notice of A. B. Clawson; T. Ulke, Exhibition of Indian shell money from this region; A. A. Doolittle, Observation of a fruiting chestnut tree.

Formal communications: Carlos de la Torre, Land shells of Cuba and Florida; D. E. McHenry, Nature trails around Washington.

October 16, 1937—853d Meeting.

President Fuller in the chair; 70 persons present.

New members elected: Mrs. Mary S. Cookson, L. K. Couch, E. H. Graham, A. A. Lindsey, J. P. E. Morrison, W. H. Olson.

Informal communication: T. Ulke, Exhibition of spines from a cactus and of a beetle in amber.

Formal communications: Elmer Higgins, Speckled beauties: the natural history of the freshwater trout; I. T. Haig, Forest wildlife in silviculture.

November 13, 1937—854th Meeting.

President Fuller in the chair; 62 persons present.

Informal communications: T. Ulke, Rediscovery of Scott's spleenwort near Washington; J. S. Wade, Exhibition of new books on biological subjects.

Formal communications: F. G. Ashbrook, Furs from domestic animals; Benjamin Schwartz, Strange life histories.

November 27, 1937—855th Meeting.

President Fuller in the chair; 52 persons present.

Informal communications: F. Thone, Exhibition of new books

on biological subjects; T. Ulke, Note on arborescent specimens of *Aralia spinosa* and *Euonymus atropurpureus*; F. Thone, Note on the new German regulations regarding whaling.

Formal communications: H. C. Oberholser, Report on American Ornithologists' Union meeting at Charleston, South Carolina; R. F. Griggs, The ecology of some rare plants; F. E. Garlough, Research on the control of destructive animal pests.

December 11, 1937—856th Meeting.

President Fuller in the chair; 190 persons present.

New members elected: George Butler, Mrs. Mary F. Knowlden, Loretta F. Linsky, Arthur Story, Ralph Watt.

President H. C. Fuller was nominated to the Washington Academy of Sciences as Vice-President.

Formal communication: R. A. Bartlett, North in the Morrissey, or collecting in the Arctic for the Smithsonian Institution.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



A NEW GENUS OF TYRANT-FLYCATCHERS.

BY PIERCE BRODKORB.

The genus *Cnemotriccus* Hellmayr (*Empidochanes* auct. nec Sclater) as currently understood is a far from homogeneous group. The genotype, *C. fuscatus* (Wied), is very close to the South American members of *Empidonax* Cabanis, and in fact the three species *Cnemotriccus fuscatus*, *Empidonax euleri* (Cabanis), and *E. lawrencei* Allen have been so thoroughly confused in the literature that an actual examination of specimens is often necessary in order to ascertain which form an author had in mind. Structurally *fuscatus* is separable from *Empidonax* only by longer tail and more rounded wing. These differences are practically bridged, however, by *Empidonax griseipectus* Lawrence, a species which more than once has been referred to *Cnemotriccus*.

On the other hand "*Cnemotriccus*" *poecilurus* (Sclater) is a very different bird with no close allies. Although by no means a believer in extreme generic refinement, still I feel that the relationships are obscured by the present arrangement and accordingly propose

Eumyiobius, gen. nov.

Type and only included species, *Empidochanes poecilurus* Sclater.

Differs from *Cnemotriccus* Hellmayr in less rounded wing (tenth primary equal to second, instead of shorter than secondaries; ninth primary longer, instead of shorter, than fifth; wing tip equal to, instead of 75% of, middle toe with claw); tail much shorter (80% of wing, instead of 95% and rounded (instead of slightly double-rounded); longer middle toe (60% of tarsus, instead of 50%); and more strongly curved claws.

Style of coloration quite different (no supraorbital stripe; tail bicolored).

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW AND NOTEWORTHY NORTHWESTERN PLANTS.

PART 7.

BY HAROLD ST. JOHN.



This numbered series of papers was initiated for the presentation of phytogeographic notes or the descriptions of new plants from the Pacific Northwest. The earlier parts have been published as follows: parts 1 in 1928 and 4 in 1931 in the Proceedings of the Biological Society of Washington; 2 and 3 in 1929, and 5 in 1931 in the Research Studies of the State College of Washington; and 6 in 1936 in Madroño.

LILIACEAE.

Allium dictuon, n. sp. Fig. 1. Rhizome wanting; roots clustered, from a cordate suprabasal pad; bulbs obliquely lanceoloid, whitish or yellowish, 1-1.5 cm. long; outer bulb-coats whitish, closely reticulate, the reticulations oblong to rhomboidal, irregular, both walls heavy, not in regular rows, progressively larger towards the middle, the meshes 0.1-0.5 mm. long; inner coats with sinuous reticulations; scapes slender, terete, striate, but not winged, 20-27 cm. tall; leaves 2, linear, channeled or flat, 1.5 mm. wide, about 10 cm. long, much exceeded by the scape; bracts 2, the body elliptic-lanceolate, 3-nerved, 1-2 cm. long, produced into a slender acuminate tip, 5-10 mm. long; umbel round-topped, usually many-flowered; pedicels slender, but obconic beneath the receptacle, 10-23 mm. long; perianth campanulate, brilliant magenta-pink throughout, or at least above, with the base paler or whitish, the segments, especially the outer, saccate at base, both narrowly lanceolate, acuminate and prominently serrulate, the single nerve strong and carinate, the sepals 10-15 mm. long, the petals 8-14 mm. long; stamens on the bases of the perianth segments, unequal, anthers oblong, apiculate, the sacs parted at base, 1.5 mm. long, filaments subulate, those opposite the sepals 3-4 mm. long, those opposite the petals 4-5 mm. long; style and stigma about equalling the stamens; capsule not crested, globose, 3 mm. long; seed angular or rounded, black, wrinkled, 2 mm. long.

Planta erhizomata bulbis lanceolatis, tunicis inaequaliter rhomboideo-

reticulatis, scapis teretibus exalatis 20–27 cm. altis, foliis 2 linearibus 1.5 mm. latis, bracteis acuminatis, petalis sepalisque valde serrulatis angustate lanceolatis acuminatis, 8–15 mm. longis, ovariis ecristatis.

Washington: dry soil near Weller's Butte, T. 7 N., R. 41 E., Wenaha (now the Umatilla) Forest Reserve, Blue Mountains, Columbia Co., July 18, 1913, *H. T. Darlington* 114 (type in Herb. State College of Washington). This was determined by Prof. C. V. Piper as *A. acuminatum* and was distributed under that name.

Allium dictuon is an interesting addition to the group of species with reticulate bulb-coats and serrulate petals. It is certainly most closely related to *A. acuminatum* Hook., yet its inner bulb-coat has delicate sinuous reticulations, suggestive of those in *A. collinum* Dougl. *A. acuminatum* has the bulbs ovoid to globose, the roots basal; the reticulations quadrate (or hexagonal) mostly uniform and in regular vertical rows; the bracts 5–7-nerved; and the sepals entire, 8–12 mm. long. As useful distinguishing characters, *A. dictuon* has the bulbs obliquely lanceoloid, the roots suprabasal; the reticulations irregular, oblong to rhomboidal, not in regular rows; the bracts 3-nerved; and the sepals serrulate, 10–15 mm. long.

The specific name is a Greek noun, used in apposition, *δίκτυον*, a net.

Smilacina stellata (L.) Desf., forma **paniculata** new forma. Differing from the species, with which it grows, in having the inflorescence paniculate. It is large, with the upper portion racemose, but the two lower nodes bear paniculate branches.

Floribus paniculatis.

Washington: Silverton, 1899, *Mrs. L. A. Bouck* 185 in part (type in Herb. State College of Washington).

CRUCIFERAE.

Sisymbrium longipedicellatum Fourn., var. **glandulosum** (O. E. Schulz) new comb. *Descurainia longipedicellata* (Fourn.) O. E. Schulz, var. *glandulosa* O. E. Schulz, Pflanzenreich IV, fam. 105, heft 86 : 325, 1924.

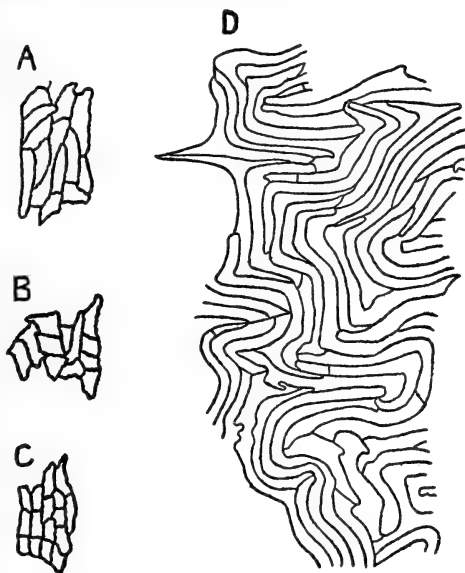
This variety seems worthy of retention and of transfer to the genus *Sisymbrium*. From the species which has the inflorescence glabrous or remotely stellate, the variety differs in having its inflorescence densely stalked glandular. It was based upon *Cusick* 745 from Oregon and *A. Nelson* 7311 from Wyoming. The following additional material can now be cited.

Washington: sandy places, Whidby Island, April 25, 1897, *N. L. Gardner* 20; Columbia River Valley, Stevens Co., May, 1911, *Mary B. Gabby*; Kettle Falls, Stevens Co., May 26, 1923, *C. H. Spiegelberg* 415.

FIGURE I.

Allium dictuon St. John, new species.

- A. Reticulations of upper part of outer bulb-coat, x 10.
- B. Reticulations of middle part of outer bulb-coat, x 10.
- C. Reticulations of lower part of outer bulb-coat, x 10.
- D. Reticulations of inner bulb-coat, x 30.



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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE SOUTHERN RACES OF THE GREAT ANT-SHRIKE,
TARABA MAJOR.

BY PIERCE BRODKORB.



When reviewing the forms of the great ant-shrike,¹ Mr. J. T. Zimmer was handicapped by lack of adequate material from Paraguay and Bolivia. We have recently received specimens from both sides of the Rio Paraguay, and through the courtesy of Mr. W. E. Clyde Todd I have also been able to study the Carnegie Museum's fine series of Bolivian birds. This material demonstrates the presence of three races in the southern part of the range of the species.

Taraba major major (Vieillot).

Thamnophilus major VIEILLOT, Nouv. Dict. d'Hist. Nat., nouv. éd., 3, 1816 : 313.—Based on Azara, Paraguay; now restricted to East Paraguay.

Thamnophilus magnus LESSON, Traité d'Orn., 5, 1830 : 375—same basis. *Thamnophilus rohdei* BERLEPSCH, Journ. für Orn., 35, No. 177, January, 1887 : 16.—Lambaré, East Paraguay; a melanism.

Characters.—Bill large (culmen 26–27.5 mm.; depth of bill at posterior end of nostrils 9.5–10 mm.). Male with black bands on lateral rectrices 6–8 mm. wide, the white interspaces rather narrower; white tips to wing coverts reduced in extent. Female with upperparts ochraceous-tawny to dull amber brown; flanks, belly, and crissum strongly ochraceous.

Range.—Northeastern Argentina in northern Entrerios (Santa Elena) and Corrientes; Paraguay, east of the Rio Paraguay; western São Paulo (lower Rio Tieté); Goyaz (Rio Araguaya); southern Matto Grosso.

*Taraba major albatu*s, subsp. nov.

Type.—No. 90849, University of Michigan Museum of Zoology, male, 265 kilometers west of Puerto Casado, Paraguayan Chaco, 8 February, 1936, Alberto Schulze, original number 1647.

Characters.—Bill short, less attenuate, less deep (culmen 24–26 mm.;

¹Am. Mus. Novitates, No. 668, October 23, 1933.

depth of bill 8.5–9 mm.). Male with black bands of lateral retrices reduced (3–5 mm. in width), the white intrspaces wider; white tips to wing coverts more extensive. Female with upperparts much paler (ochraceous-tawny); flanks, belly, crissum, and auriculars more whitish, less ochraceous.

Range.—Paraguayan Chaco. Birds recorded from the territories of Formosa and Chaco and the Province of Santa Fé, northern Argentina, probably also belong here.

Taraba major virgultorum Cherrie.

Taraba major virgultorum CHERRIE, Bull. Am. Mus. Nat. Hist., 35, June 16, 1916 : 391.—Todos Santos, Rio Chaparé, Bolivia.

Taraba major kriegi LAUBMANN, Wiss. Ergebn. Deutsch. Gran Chaco Exped., Vögel, 1930 : 172.—Santa Cruz, Bolivia.

Characters.—Bill large, as in *major*. Male indistinguishable from *major*. Female with back more olive in tone than *major*, more reddish than *albatus*; auriculars pale as in *albatus*; underparts possibly even more strongly ochraceous than in *major*.

Range.—Northwestern Argentina in provinces of Tucumán, Salta, and Jujuy; Yungas of eastern Bolivia, north to Reyes and Trinidad.

This is rather an unsatisfactory form, scarcely differing from *major*, except in characters which are an approach to those of *albatus*. On the other hand its geographical position is by no means intermediate between *major* and *albatus*.

MATERIAL EXAMINED.

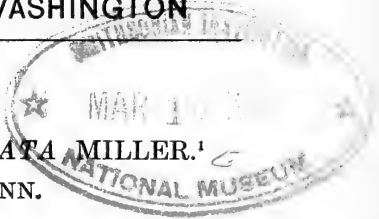
Thamnophilus major major.—East Paraguay: 20 km. south of Rosario, 6 ♂♂, 4 ♀♀.

Thamnophilus major albatus.—Paraguayan Chaco: 265 km. west of Puerto Casado, 5 ♂♂, 3 ♀♀.

Thamnophilus major virgultorum.—Salta: Embarcacion, 2 ♂♂, 2 ♀♀. Bolivia, Prov. Tarija: Yacuiba, 1 ♀. Prov. Santa Cruz: Buenavista, 2 ♂♂; Guanacos, 1 ♂; Palmarito, 1 ♂; Puerto Suarez, 3 ♂♂, 3 ♀♀; Rio Surutu, 1 ♂; Santa Cruz, 3 ♂♂.

4.0673

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



THE STATUS OF *HYLA EVITTATA* MILLER.¹

BY EMMETT REID DUNN.

Hyla evittata was described by Gerrit Miller in 1899 (Proc. Biol. Soc. Washington 13, p. 75). The type, U. S. N. M. 26291, came from Four Mile Run, about halfway between Alexandria, Va., and Washington, D. C. It was recorded from Georgetown, Cecil Co., Md., by Fowler in 1915 (Copeia 22, p. 38). Stejneger and Barbour add New Jersey in the first edition of the Check List (1917, p. 33). New Jersey appeared in the range in the second edition of the Check List (1923, p. 30), but does not appear in the third. It was dropped at my insistence since no other printed reference has ever appeared recording the form from New Jersey, no specimens from New Jersey have been seen by Stejneger, Barbour, or myself, and the authors of the Check List are at present unable to explain why New Jersey was added to the range in the first place.

In 1918, after examination of the then available material from Virginia, I (Copeia 53, p. 21) referred to *evittata* as a race of *cinerea* (*Calamita cinereus* Schneider, 1799, Hist. Amph. 1, p. 174, type locality Carolina). This suggestion was adopted in the second edition of the Check List (1923, p. 30). I referred all Virginia specimens of the species to the race *evittata*. It is thus scarcely justifiable to say, as do Noble and Hassler (1936, Copeia 1, p. 63) that Wright and Wright (1933, Handbook of Frogs and Toads) "assumed" the respective ranges of *evittata* and *cinerea* to be what they had been stated to be by previous authors.

Noble and Hassler record *Hyla cinerea cinerea* from Cove Point and Solomon's Island, Calvert Co., Md., on the basis of 32 specimens. The whole matter is thus open to reconsideration, and I have examined the entire National Museum collection from South Carolina north, the Philadelphia Academy collection from the same area, 23 specimens from Mount Vernon, Va., in the Museum of Comparative Zoology, collected by myself, and 21 specimens from Cove Point collected by Noble and Hassler. The total material amounts to 126 specimens from Virginia and Maryland.

Miller separated *evittata* from *cinerea* on the absence of the lateral light stripe in the former, as his name implies. He also says that *evittata* has a

¹Contribution from the Department of Biology Haverford College, No. 33.

broader head, and higher snout. Noble and Hassler say, and I agree, that the two can not be separated by head width. They say that *evittata* has "a more vertical, less sloping profile to the snout." The type, and topotypes, of *evittata* can not, with any degree of certainty, be separated from Carolina *cinerea* on this basis. Differences of preservation tend to obscure differences in this character that may have existed in life. Furthermore, in many species of Hylidae the male has a sloping snout and the female a blunt one, and this may be the case in *cinerea* and in *evittata*.

The status of the two really depends on the lateral stripe. This may be absent in Carolina (U. S. N. M. 75122 from Charleston). It may be fully developed in Maryland (U. S. N. M. 92598 from Cambridge, Dorchester Co.) or in the Potomac (U. S. N. M. 66208 from Four Mile Run).

In the area of the tidewater Potomac from Cedar Point and Quantico to Four Mile Run, out of a total of 53 specimens 35 have no trace of a lateral stripe, 4 have a trace anteriorly, 4 have a stripe reaching to the appressed elbow, 1 has a stripe to midbody, and 9 have a complete stripe to groin. In this area a considerable majority have no stripe at all, and if those with stripes not reaching the midbody be considered *evittata*, 81% of this population is of the *evittata* type, a percentage surely sufficient for racial recognition. In my own Mt. Vernon collection 19 were without any trace of stripe, three had a trace, and in one the stripe reached the level of the appressed elbow.

Of thirteen specimens from Hampton, Virginia Beach, Surry, and Yorktown, seven have no stripe or a short one, and six have a long one. Of 21 specimens from the west side of the Chesapeake at Cove Point, Md., 8 have no stripe or a short one, 13 have a long one. On the Delmarva peninsula, of 29 Maryland specimens 11 have no stripe or a short one, 18 have a long one; of 10 Virginia specimens 4 have no stripe or a short one, 6 have a long stripe.

To sum up: 81% in the upper tidewater Potomac area have no stripe or a short stripe; 41% in other parts of Maryland and Virginia have no stripe or a short one. Carolina material available to me is not very extensive, but it would seem that there only 25% have no stripe or a short stripe, whereas 75% have a long stripe. Reports from further south indicate that 100% long stripe occurs in the far south, especially on the Gulf Coast.

We are, therefore, faced with two opposed populations, obviously different. One occurs in the upper tidewater Potomac; the other occurs in the far south. An intermediate population occurs over a wide area. Unfortunately a somewhat intermediate population, that of the Carolinas, was named first. This seems to be nearer that of the far south, so that *Hyla cinerea cinerea* may be properly applied to specimens of *Hyla cinerea* from the Carolinas south. The name *Hyla cinerea evittata* may be properly applied to the upper tidewater Potomac population. The rest of the Maryland and Virginia populations are, and should be considered, intermediate between *cinerea* and *evittata*.

The most northern locality yet known is the western end of the Chesapeake-Delaware canal in Cecil Co., Md., reported to me by Mr. Joseph Cadbury. It is unknown from Delaware or from the eastern side of the Delmarva peninsula.

4.0673

PROCEEDINGS
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NOTES ON SOME COLOMBIAN REPTILES.¹

BY EMMETT REID DUNN.

Some reptiles recently sent me through the kindness of Hermano Niceforo Maria are sufficiently interesting to warrant the following notes.

An *Anadia* from Pamplona, near Cúcuta, Prov. Norte de Santander, has affinities with two described species; *pulchra* Ruthven (1926, Occ. Papers Mus. Zool. Univ. Michigan 177, La Cumbre, Santa Marta, Colombia, 7000 feet) and *bitaeniata* Boulenger (1903, Ann. Mag. Nat. Hist. (7), 12, p. 420, from Escorial and Culatá, Venezuela, 10,000 feet). The former was described from a single specimen; the latter from a series. The Pamplona specimen is from the Colombian base of the Venezuelan virgation of the Andes, the Sierra Nevada de Merida, and consequently geographically nearer to *bitaeniata* than to *pulchra*. In technical anatomical characters (I have made use of Loveridge, 1929, Proc. Biol. Soc. Washington, 42, p. 101) the Pamplona specimen is intermediate.

Femoral pores: *bitaeniata* 8-10, Pamplona 6, *pulchra* 6.

Supraoculars: *bitaeniata* 4, Pamplona 4, *pulchra* 3.

Scale rows: *bitaeniata* 34-36, Pamplona 40, *pulchra* 41.

Scales from occipitals to vent: *bitaeniata* 34-40, Pamplona 40, *pulchra* 43.

Preanals: *bitaeniata* 4 anterior, 6 posterior; Pamplona the same; *pulchra* 6 anterior, 8 posterior.

The Pamplona specimen is practically unicolor, thus differing from both *bitaeniata* and *pulchra*. The chin shields are as described for both. There are 16 scales between chin shields and collar (12-16 in *bitaeniata*, not mentioned for *pulchra*). Nasal single as in *bitaeniata* (*pulchra*?). The fronto-nasal is longer than wide as in *bitaeniata* (*pulchra*?). I record the characters of this specimen but do not name it, as I feel that it is an intermediate, and that *pulchra* should be regarded as a race of *bitaeniata*.

A *Liotyphlops* from Cúcuta has: 26 rows of scales; three upper labials; ocular in contact with third labial; eye plainly visible; two preoculars, upper in contact with frontal; frontal broad, in full contact with rostral; a supraocular between frontal and ocular; three post frontals, outer in contact with supraocular; white, an anterior dark spot on each scale;

¹ Contribution from the Department of Biology, Haverford College, No. 35.

tail darker, tip white; snout white; length 163 mm.; tail length 5 mm., tip decurved; diameter of body 4 mm.

The only *Liotyphlops* described as having 26 scale rows is *L. anops* (Cope), the types of which are no longer in existence. The description appeared posthumously (1899, *Sci. Bull. Philadelphia Museums* 1, p. 10, pl. 4, f. 1). The locality was simply "Colombia."

The description differs from the specimen at hand as follows: "eye invisible . . . five scales border the prefrontal and first labial between the frontal and second labial." In the Cúcuta specimen the two preoculars alone intervene between frontal and second labial, and nasal contact with second labial eliminates any question of the first labial. Cope's figure shows nasal contact with second labial and does not agree with his description—" . . . seven scales separate the first median scale from the third labial." In the Cúcuta specimen the outer postfrontal, the supraocular, and the ocular alone intervene. The figure shows a number of irregular small scales here which do not exist in the present specimen nor in any *Liotyphlops* I have seen. The true scalation of these small snakes is difficult to make out. ". . . dark brown, the scales of the dorsal half of the body with a darker center . . . head yellow . . . tail and anal region uniform with the body . . . 372 mm.; tail, 6 mm. . . . as long as, or a little longer than, wide."

Not being able to examine the types, I prefer not to name the present form as new, especially as I do not have too much confidence in either descriptions or figures of these snakes. Aside from the smaller head scales there is no real discrepancy. However, I have set down enough to serve in the advent of further material.

A *Leimadophis* from Cúcuta is what is currently called *L. taeniurus bipraeocularis*. The specimen has: 17 scale rows; 145 ventrals; 73 caudals (yg.); oculars 1-2; temporals 2-2; 8 upper labials, 4-5 in eye; upper labials and under surfaces white; a white collar; a dark dorsal stripe 5 scales wide; scale row 6 light; scale row 5 dark, broken into elongate dark spots anteriorly; scale rows 4-1 light, dark spots anteriorly on row 2.

A *Pseudoboa newwiedii* from Cúcuta has no unusual characters save the absence of the loreal on the right side. Male, scales 19; temp. 2-3; vent. 206; caudals 86 single; 1 anal; upper labials 8, 4-5 in eye.

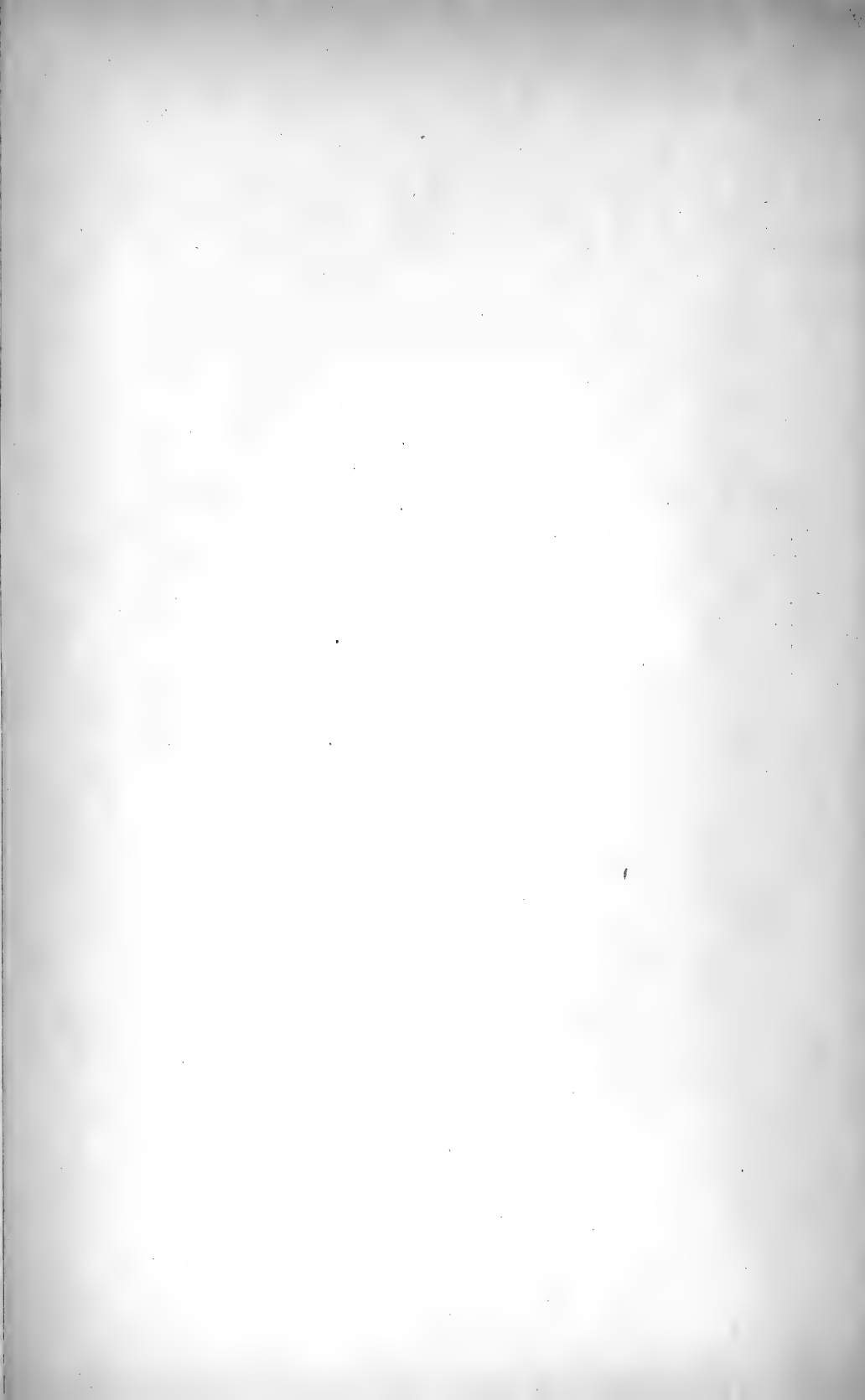
A *Eudryas quinquilineatus* from Cúcuta has: 17 scales; 189 vent.; caudals 97 (♂); upper labials 9, 3-4-5 in eye; on body scale rows 6, 7, 8, and vertebral are dark; 4-5 are light; 1 and half of 2 somewhat lighter; a trace of darker on 3 and half of 2; three definite dark stripes on neck.

A *Leptodeira* from Cúcuta is extremely close to *L. rhombifera* of Central America. It has: 19-21-19 scale rows; 184 ventrals; 86 caudals (♂). This makes six more ventrals and one more caudal than has any male Central American specimen. I have observed this difference in a number of Colombian *Leptodeiras*, but I am not ready to distinguish them from *rhombifera*.

A *Tantilla semicineta* from Cúcuta has: first lower labials in contact; nasal and preocular separated; oculars 1-2; temporals 1-1; 15 scale rows; 164 ventrals; two anals; 70 caudals (♂); upper labials 7, 3-4 in eye, seventh

largest; lower labials 6, first pair in contact, 4 pair in contact with anterior chinshields, which are longer than posterior; head black with white spotting on internasals, on supraoculars, on nasals and second and first upper labial, and on fifth upper labial; a white collar, split medially, involving part of seventh labial; a black collar behind it reaching ventrals, and having a narrow connection with the black of the head; ground color white; a row of dots on scale row 1 anteriorly, on 2 posteriorly; paired black dorsal blotches incompletely separated by a narrow white dorsal line; blotches fuse into bars on hind half of tail; beneath white, tip of chin black.

A Bothrops from La Pedrera, "a place on the banks of the Coquetá River, near the Colombo-Brazilian boundray," seems to be a third specimen of *B. neglecta* Amaral (1923, Proc. New England Zool. Club 8, p. 100) from Bahia, Brazil. A paratype was from British Guiana. The present specimen has 160 ventrals (four less than type, one more than paratype); is a female with 45 caudals (type a male with 52, paratype a male with 47); 9 upper labials, second in pit (type with 8, second in pit); 10 lower labials (type 11-12); dorsals 25 (type 25, paratype 24). The agreement in major characters is sufficiently close to justify recording a third locality for what must be a rare and widespread form. Minor details are: a very long and narrow subocular, separated from supralabials by a single scale row; three scales between supraoculars, the median (frontal?) quite large; no markings except quadrangular spots with lighter centers, which frequently meet each other in the middorsal line and form cross bars with lighter centers; length 480 mm., tail 56 mm.



9.0673

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF SPATHACANTHUS FROM
GUATEMALA.¹

BY E. C. LEONARD.



Of the genus *Spathacanthus* (family Acanthaceae) only three species have hitherto been known, *S. Hahnianus* of Mexico, *S. Hoffmanni* of Costa Rica, and *S. Donnell-Smithii* Lindau, of Guatemala. The last species was originally described as *Macfadyena simplicifolia* Donn. Smith, and should be known as *Spathacanthus simplicifolius*, the change of species name by Lindau having been unnecessary.

To these must be added a new species recently collected in Guatemala by Dr. Alexander F. Skutch, which is described herewith. Among American Acanthaceae the genus is easily recognized by its shrubby habit, spathaceous calyx, and tubular white flowers.

***Spathacanthus parviflorus* Leonard, sp. nov.**

Frutex vel arbor parva; caules glabri; folia oblongo-elliptica, apice acuminata, basi angustata, utrinque glabra vel subtus axillis nervorum pubescentia; racemi terminales vel axillares, glabri, internodiis compressis; bracteae minutae triangulares; calyx spathaceus, ovatus, apice lepidotus, minute 5-lobatus; corolla alba, lobis parvis.

Shrub or small tree up to 7 meters high, much branched; stems glabrous; petioles 1 to 1.5 cm. long, glabrous; leaf blades oblong-elliptic, up to 13.5 cm. long and 5 cm. wide, short-acuminate at apex, the tip often curved, unequally acute or acutish at base, both surfaces glabrous, or the lower bearing clusters of yellowish spreading hairs (up to 0.5 mm. long) in the axils of the lateral veins, the upper surface bearing numerous minute cystoliths; flowers few, borne in axillary or terminal racemes up to 7 cm. long, the racemes usually with one or more leaves near the base, the rachis glabrous, the internodes about 1 cm. long, flattened; bracts minute, triangular, acuminate, 1 to 2 mm. long, 0.75 mm. wide at base, glabrous;

¹ Published by permission of the Secretary of the Smithsonian Institution.

pedicels 5 to 6 mm. long, glabrous; calyx spathaceous, greenish-yellow, ovate, 1 to 1.5 cm. long, 8 to 10 mm. broad, acute at apex (the tip minutely 5-toothed), splitting anteriorly on expansion of the corolla, glabrous, lepidote near tip within; corolla white, 2.5 cm. long, glabrous without, pubescent below attachment of stamens within, the tube 4 mm. broad at base, narrowed to 3.5 mm. immediately above base, thence gradually enlarged to 6 mm. but narrowed again to 5 mm. at mouth, the limb 5-lobed, the lobes rounded, about 2 mm. long and broad; one filament of each pair of stamens 11 mm. long, the other 7 mm., all glabrous, the anthers 3.5 mm. long, 1.5 mm. broad; style 13 mm. long, glabrous, the stigma lobes oblong, spoon-shaped, 0.75 mm. long; ovary 7 mm. long, glabrous.

Type in the U. S. National Herbarium, no. 1,637,895, collected in the heavy forests of Volcán Zunil, Department of Quezaltenango, Guatemala, altitude about 1750 meters, August 7, 1934, by Alexander F. Skutch (no. 961). Hatch and Wilson's no. 342, collected on the south slope of Volcán Atitlán, Guatemala, is also of this species.

Distinct from *S. simplicifolius* (Donn. Sm.) Leonard,² the only species of the genus hitherto known from Guatemala, in its exceptionally small corolla and calyx, the corollas of *S. simplicifolius* being as much as 6.5 cm. long and the calyx 3 to 4 cm. long.

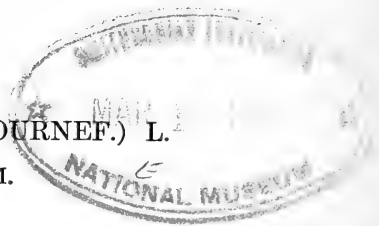
² *Macfadyena simplicifolia* Donn. Smith, Bot. Gaz. 16: 198. 1891. *Spathacanthus Donnell-Smithii* Lindau, Bull. Herb. Boiss. 3: 371. 1895.

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PROCEEDINGS
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NOTES ON ASTRAGALUS (TOURNEF.) L.

BY IVAR TIDESTROM.



In his *Institutiones Rei Herbariae*, Tournefort enumerated a number of species under this large genus. He had these species distributed under the genera *Astragaloides* (page 399), *Astragalus* (p. 415), *Tragacantha* (p. 417), and perhaps in other places. In all Tournefort enumerated about 30 species.

Linnaeus had 36 species, distributed under *Astragalus* and *Phaca*, in his first edition of *Species Plantarum* (1753), and 42 in his second edition of 1763. In the fourth edition (Willdenow) the number of known species had been augmented to 174 of *Astragalus* and 11 of *Phaca*. The Willdenowian enumeration includes species now referred to *Oxytropis*. The latter genus was established by De Candolle in 1802. Since the fourth edition of *Species Plantarum* (vol. 3) was published in 1800 (at least the first part), Willdenow probably had no knowledge of the new Candolleian genus. Willdenow, however, knew of the keel character upon which *Oxytropis* was based; for under *Astragalus campestris* (p. 1318) he notes this: "*Corollae flavae carina acuminata basi purpurascens.*" With the appearance of Sprengel's *Systema Vegetabilium* (3 : 291-309. 1826), the number of species of *Phaca* had grown to 56 and that of *Astragalus* proper to 219. Since that time the genus *Oxytropis* seems to have been well established until Hegi published his *Flora von Mittel-Europa* in 1906. The latter author rejects the genus *Oxytropis* and refers all the species under *Astragalus*.

According to Dr. Greene, Michel Angelo Tilli described his genus *Astragaloides* as early as 1723. Later in that century Necker published *Spiesia* and *Aragallus*. Dr. Greene has discussed the cases of *Spiesia* and *Aragallus* in *Pittonia* (3 : 208-212. 1897). Thus we have witnessed the shifting of our "*Oxytropis* species" first to *Spiesia*, then to *Aragallus* and after the

adoption of the International Code back to *Oxytropis*. It should be stated that Necker characterized the fruit of his *Aragallus* as being 2-celled. In our American species the pod may be either completely 2-celled or partially so.

When De Candolle published his genus *Oxytropis* only a fraction of the 1500 species of *Astragalus* now known had been described. According to Dalla Torre and Harms (Genera Siphonog. 235) about 150 *Oxytropis* are known. Since the time of De Candolle a number of disturbing elements have been described, so much so that the late M. E. Jones transferred *Astragalus nothoxys* Gray and *Astragalus acutirostris* Wats., first to the genus *Oxytropis* in 1891 and later to *Spiesia* in 1895. Thus it becomes apparent that the only character upon which *Oxytropis* is based is common to the two genera, and that these should be merged into one genus as has been done by Hegi. If *Oxytropis* included only species with an acaulescent habit, the genus might well stand as it is, but with caulescent elements like *O. splendens*, *O. deflexus* and others, these species are better referred to *Astragalus*.

Rydberg in North American Flora (24 : 251-462. 1929) has given us an excellent view of our Astragali. He, however, splits up the accepted genus into its component parts and gives these generic standing. In so doing, Rydberg is consistent in maintaining *Oxytropis* as a distinct genus. Rydberg proceeds from the species with 1-celled pods and prominent sutures (*Kentrophyta* and *Homalobus*) through his various genera ending with *Geoprimum*, species with indehiscent fleshy 2-celled pods. His treatment of *Oxytropis* has not yet appeared. However, it seems that the logical position of *Oxytropis* as a section of *Astragalus* would be between *Atelophragma* with imperfectly 2-celled pods and *Diphysus* of the Rydbergian sequence. I have placed it here in an unpublished revision of the genus.

The following species grow within the limits of United States and Canada :

1. **Astragalus splendens** (Dougl.).
Oxytropis splendens Dougl.; Hook. Fl. Bor. Amer. 1 : 147. 1834.
- 1a. **Astragalus splendens Richardsonii** (Hook.).
Oxytropis splendens Richardsonii Hook. op. cit. 148. 1834.
2. **Astragalus Belli** (Britton).
Spiesia Belli Britton; J. M. Macoun, Can. Rec. Sci. 1894 : 148. 1894.
3. **ASTRAGALUS DEFLEXUS** Pallas, Act. Acad. Petrop. 32 : 268, pl. 15. 1779.
Oxytropis deflexa DC. Astrag. 96. 1802.
- 3a. **Astragalus deflexus foliolosus** (Hook.).
Oxytropis foliolosa Hook. op. cit. 146. 1834.
4. **Astragalus Bisontum**.
Oxytropis multiceps Nutt.; T. & G. Fl. N. Amer. 1 : 341. 1838. Not
Astragalus multiceps Wall; Bunge, Astrag. 2 : 69. 1869.
- 4a. **Astragalus Bisontum minor** (Gray).
Oxytropis multiceps minor Gray, Proc. Amer. Acad. 20 : 2. 1885.
5. **Astragalus Blankinshipii** (A. Nels.).
Aragallus Blankinshipii A. Nels. Erythea 7 : 58. 1899.

6. **Astragalus Tomae.**
Oxytropis nana Nutt.; T. & G. Fl. N. Amer. **1** : 340. 1838. Not
Astragalus nanus DC. 1802.
7. **Astragalus Lagopus** (Nutt.).
Oxytropis Lagopus Nutt. Journ. Acad. Phila. **7** : 17. 1834.
8. **Astragalus septentrionalis.**
Oxytropis podocarpa Gray, Proc. Acad. Phila. **6** : 234. 1864. Not
Astragalus podocarpus C. A. Meyer.
9. **Astragalus oreophilus** (Gray).
Oxytropis oreophila Gray, Proc. Amer. Acad. **20** : 3. 1885.
10. **Astragalus parryanus.**
Oxytropis Parryi Gray, op. cit. 1885.
11. **ASTRAGALUS NIGRESCENS** Pallas, Astrag. 65. *pl.* 53. 1800.
- 11a. **Astragalus nigrescens arctobia** (Bunge).
Oxytropis arctobia Bunge, Mem. Acad. Imp. Sci. St. Petersb.
22 : 114. 1874.
12. **ASTRAGALUS LEUCANTHUS** Pallas, Astrag. 59. *pl.* 47. 1800.
13. **Astragalus viscidus** (Nutt.).
Oxytropis viscida Nutt; T. & G. Fl. N. Amer. **1** : 341. 1838.
14. **ASTRAGALUS CAMPESTRIS** L. Sp. Pl. 761. 1753.
Oxytropis campestris DC. Astrag. 74. 1802.
- 14a. **Astragalus campestris johannensis** (Fernald).
Oxytropis campestris johannensis Fernald, Rhodora **1** : 88. 1899.
15. **Astragalus gaspensis** (Fernald et Kelsey).
Oxytropis gaspensis Fernald & Kelsey, Rhodora **30** : 141. *pl.* 171.
1928.
16. **ASTRAGALUS SORDIDUS** Willd. Sp. Pl. **3** : 1313. 1800.
17. **Astragalus albertinus** (Greene).
Aragallus albertinus Greene, Proc. Biol. Soc. Washington **18** : 15.
1905.
18. **Astragalus alpicola** (Rydb.).
Aragallus alpicola Rydb. Mem. N. Y. Bot. Gard. **1** : 252. 1900.
19. **Astragalus Rydbergianus.**
Aragallus villosus Rydb. Bull. Torrey Club **28** : 36. 1901. Not
Astragalus villosus Michx. 1803.
20. **ASTRAGALUS LAMBERTII** (Pursh) Spreng. Syst. **3** : 308. 1826.
Oxytropis Lambertii Pursh, Fl. Amer. Sept. 740. 1814.
- 20a. **Astragalus Lambertii Bigelovii** (Gray).
Oxytropis Lambertii Bigelovii Gray, Proc. Amer. Acad. **20** : 7.
1884.
21. **Astragalus albiflorus** (A. Nels.).
Aragallus albiflorus A. Nels. Erythea **7** : 62. 1899.
22. **Astragalus coronaminis** (Fernald).
Oxytropis coronaminis Fernald, Rhodora **30** : 151. 1928.

A number of synonyms have been omitted.

Astragalus Gilmani Tidestrom, sp. nov.

Annuus (vel perennis) caespitosus, caulibus 10–20 cm. longis strigosis; foliis 4–5 cm. longis; foliolis 5–6-jugis, oblongis vel obovato-oblongis, obtusis vel retusis, 5–10 mm. longis, strigosis; pedunculo folio brevior; calyce campanulato, 4 mm. longo, hirsutulo, dentibus triangulari-subulatis 1 mm. longis; corolla atropurpurea parte inferiore alba, 7–8 mm. longa, vexillo albo-lineato; legumine uni-loculari, inflato, ovato-acuto, strigoso, sessili, 2 cm. longo.

Cespitose annual or perennial; stems strigose, 10–20 cm. long; leaves 4–5 cm. long; leaflets 11–13, oblong or obovate-oblong, obtuse or retuse, 5–10 mm. long, strigose; peduncles shorter than the leaves; calyx campanulate, 4 mm. long, hirsutulous, the teeth triangular-subulate, 1 mm. long; corolla dark-purple, white below, 7–8 mm. long, banner with white striae; pod 1-celled, inflated, ovate-acute, strigose, sessile, 2 cm. long.

Type specimen in the United States National Herbarium, no. 1,630,909, collected in Death Valley Canyon, Panamint Mountains, California, July 2, 1935, by M. French Gilman (no. 1861); also collected at the head of Hanaupah Canyon, Panamint Mountains, alt. 9,350 feet, no. 44, *Coville and Gilman*, Sept. 16, 1931.

Astragalus spatulatus simplex.

Astragalus simplex Tidestrom, Contr. U. S. Nat. Herb. **25** : 330. 1925.

Astragalus visigothicus.

Homalobus retusus Rydb. Bull. Torrey Club **50** : 186. 1923. Not *Astragalus retusus* Willd. 1794–95.

Astragalus Gynophoraria.

Gynophoraria falcata Rydb. N. Amer. Fl. **24** : 280. 1929. Not *Astragalus falcatus* Lam. 1783.

Astragalus convallarius diversifolius (Gray).

Astragalus diversifolius Gray, Proc. Amer. Acad. **6** : 230. 1864.

Astragalus campestris diversifolius Macbr. Contr. Gray Herb. **65** : 35. 1922.

Astragalus convallarius hylophilus (Rydb.).

Homalobus hylophilus Rydb. Mem. N. Y. Bot. Gard. **1** : 247. 1900.

Astragalus stenophyllus filipes (Torr.).

A. filipes Torr.; Gray, Proc. Amer. Acad. **6** : 226. 1864.

Astragalus Macgregorii (Rydb.).

Homalobus Macgregorii Rydb. Bull. Torrey Club **50** : 270. 1923.

Astragalus Diholcos.

Diholcos micranthus Rydb. Fl. Rocky Mount. 500. 1917. Not *Astragalus micranthus* Desv. 1814.

Astragalus chloridae (Jones).

Astragalus remulcus chloridae Jones, Rev. Astrag. 210. 1923.

Astragalus curtifolius.

Astragalus shortianus brachylobus Gray, Proc. Amer. Acad. **13** : 367. 1878.

Not *A. brachylobus* DC. 1825.

Xylophacos brachylobus Rydb. Bull. Torrey Club **52** : 154. 1925.

Astragalus Blyae (Rose).

Xylophacos Blyae Rose, N. Amer. Fl. **24** : 303. 1929.

***Astragalus cinerascens* (Rydb.).**

Pterophacos cinerascens Rydb. N. Amer. Fl. 24 : 309. 1929.

***Astragalus datilensis* (Rydb.).**

Pisophaca datilensis Rydb. N. Amer. Fl. 24 : 328. 1929.

***Astragalus stictocarpus* (Rydb.).**

Pisophaca stictocarpa Rydb. N. Amer. Fl. 24 : 328. 1929.

***Astragalus lenophyllus* (Rydb.).**

Phaca lenophylla Rydb. N. Amer. Fl. 24 : 341. 1929.

***Astragalus tularensis* (Rydb.).**

Phaca tularensis Rydb. N. Amer. Fl. 24 : 358. 1929.

***Astragalus Preblei* (Rydb.).**

Phaca Preblei Rydb. N. Amer. Fl. 24 : 361. 1929.

***Astragalus Merrillii* (Rydb.).**

Cystium Merrillii Rydb. N. Amer. Fl. 24 : 410. 1929.

***Astragalus sierrae* (Jones).**

Astragalus lentiginosus sierrae Jones, Contr. West. Bot. 10 : 63. 1902.

***Astragalus tehachapiensis* (Rydb.).**

Cystium tehachapiense Rydb. N. Amer. Fl. 24 : 414. 1929.

***Astragalus Gooddingii* (Rydb.).**

Hamosa Gooddingii Rydb. Bull. Torrey Club 54 : 20. 1927.

***Astragalus mollissimus Earlei* (Greene).**

Astragalus Earlei Greene; Rydb. N. Amer. Fl. 24 : 444. 1929.

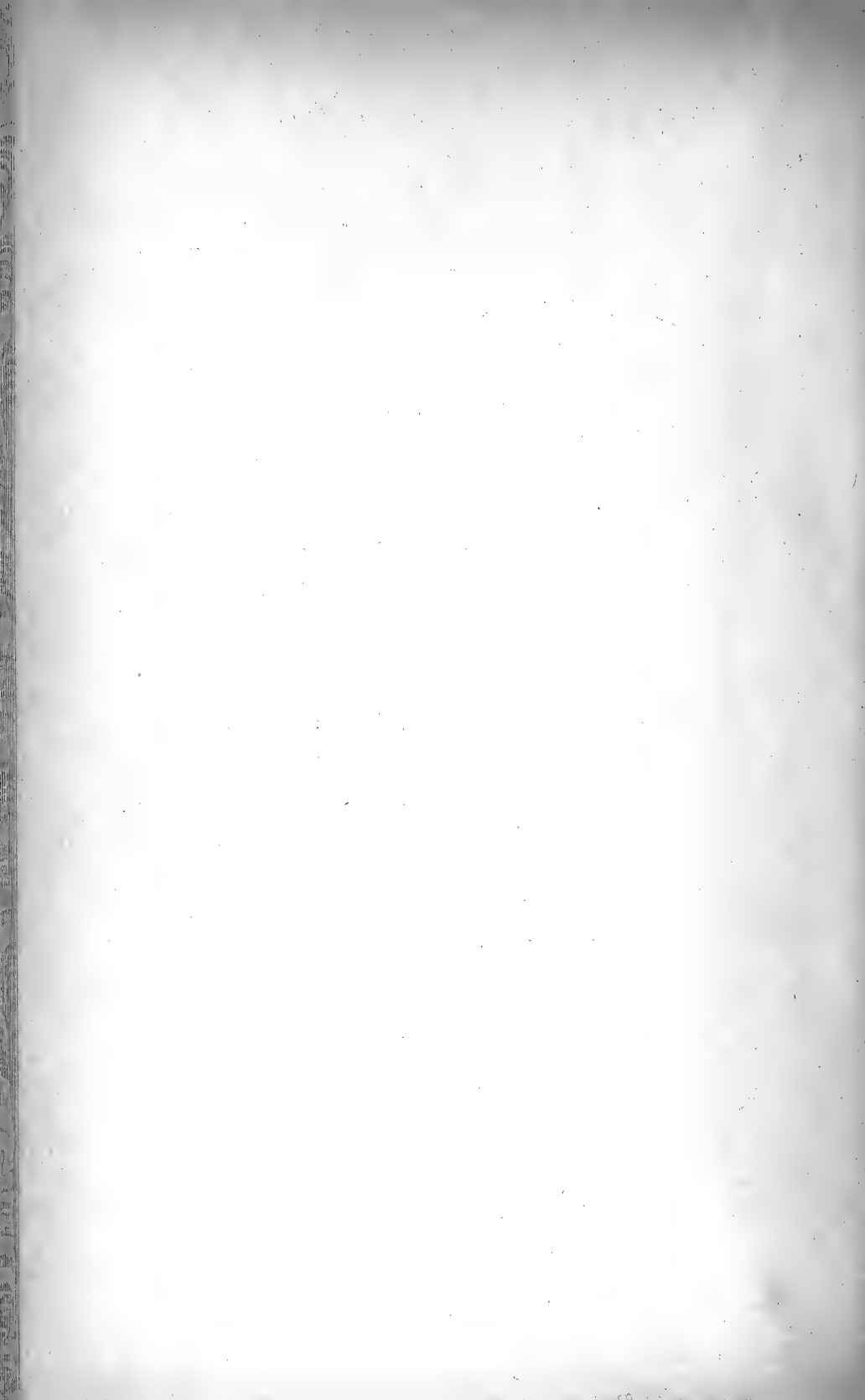
***Astragalus mollissimus Coryi*.**

Astragalus argillophilus Cory, Rhodora 32 : 5. 1930.

***Astragalus dispermus obispensis* (Rydb.).**

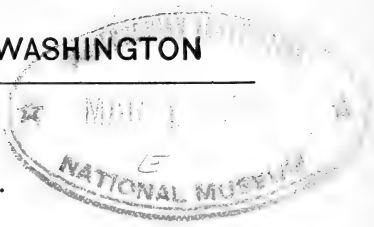
Hesperastragalus obispensis Rydb. Bull. Torrey Club 53 : 167. 1926.

A number of synonyms have been omitted.



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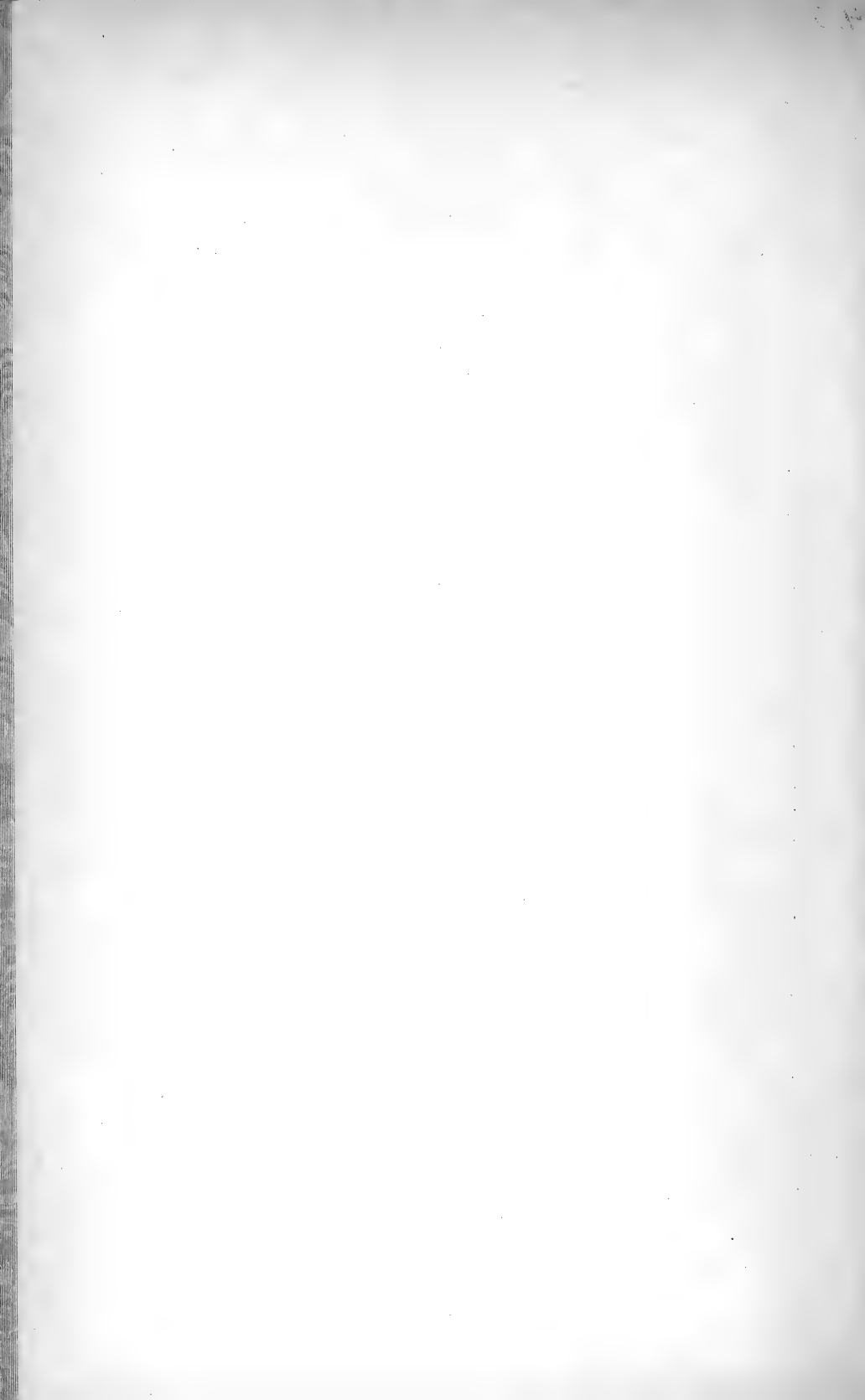
GENERAL NOTES.

CRITICAL REMARKS ON THE LONG-BILLED MARSH WREN.

Of this species I have examined a number of specimens from eastern Massachusetts (including the type-series of *dissaëptus* from Wayland), some from eastern Pennsylvania (topotypical of *palustris*) and New Jersey (Cape May), and others from Virginia and the District of Columbia. I am unable to verify the color-differences which according to Bangs (Auk, XIX, 1902, 352) are said to be diagnostic of his supposed race *dissaëptus*. The difference in size is certainly inconsequential. Thus I find myself in full agreement with Ridgway (Bull. U. S. Nat. Mus. No. 50, III. 1904, 490) as to the status of *dissaëptus*. Moreover, not long before his death Bangs himself had expressed to me the opinion that the form had no standing. The last edition of the A.O.U. Check-List, however, revives the name for the Marsh Wren of the northern interior United States and southern Canada, which Ridgway (Proc. Biol. Soc. Washington, XVI, 1903, 110) called *iliacus*. Ridgway's type-specimen came from Wheatland, Indiana. Efforts to secure additional specimens from this locality have failed, but in June, 1935, Mr. Arthur C. Twomey at my request made a special trip to southern Illinois for Marsh Wrens. Where the birds used to occur he found most of the marshes drained, but finally succeeded in securing two specimens. These agree closely with breeding specimens from northern Illinois and Indiana, and with a series from northwestern Pennsylvania (Presque Isle and Linesville). A breeding bird from Webster, South Dakota (Collection Chicago Acad. Sci.) is also the same.

The type of *iliacus* (No. 90,199, Collection U. S. Nat. Mus.), which has been examined in this connection, is appreciably more rufescent, less brownish, above and on the flanks and crissum, than the "general run" of specimens from the Mississippi Valley region, but since its peculiarities are not shared by other specimens from neighboring localities they must be due to some other cause (possibly post-mortem changes in the skin). The real difference between the interior form and the typical eastern race is not so much in the color of the flanks, as claimed by Ridgway, as in the extent and intensity of the black white-streaked area on the interscapular region. This area is usually well pronounced in *palustris*, and reduced in *iliacus*. The occasional exceptions obvious in a series are of course to be expected, but prove the rule. According to my views the name properly applying to the race of the interior (east to the Appalachians) is *iliacus* instead of *dissaëptus*, which is inseparable from true *palustris* of the Atlantic coast region, from Virginia northward.

W. E. CLYDE TODD,
Carnegie Museum Pittsburgh, Pa.



PROCEEDINGS
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NORTHWESTERN MEXICO.

BY A. J. VAN ROSSEM.



A few years ago I was interested in the appearance of a Derby flycatcher, taken by Frazar at Alamos in extreme southern Sonora, which differed from the race of central and eastern Mexico in several particulars. In the absence of more than one specimen it seemed advisable to examine further material, even though the Frazar bird varied in characters analogous to numerous other tropical subspecies which occupy the same region. Later, two specimens were examined from Agiabampo (Nat. Hist. Mus.), and finally a single bird, taken by Chester C. Lamb, was seen, thanks to the courtesy of Mr. Lamb, from Basacori Island, which is off shore from Agiabampo. All of these differ from typical *derbianus* of Texas and eastern and central Mexico, and may be known as

***Pitangus sulfuratus palliatus*, subsp. nov.**

Type.—222617, Museum of Comparative Zoology; a male adult collected by M. A. Frazar at Alamos, Sonora, Mexico, on March 8, 1888.

Subspecific characters.—Similar to *Pitangus sulfuratus derbianus* (Kaup) of central, eastern, and northeastern Mexico, but coloration paler (primrose, not lemon yellow) below and paler (less brownish, more grayish) above; tail (89 mm. in type) with an average length of 88 as compared with a range of 95 to 101 mm. in fully adult males of *derbianus*.

Range.—Extreme southern Sonora, south to Nayarit.

Remarks.—In coloration, *palliatus* bears much the same relation to *derbianus* that *Myiozetetes similis primulus* does to *M. s. superciliosus*, another species of tyrant flycatcher of similar color and pattern.

Kaup's type of *derbianus* (P. Z. S., 1851, p. 43) came, through Wollweber, from an unknown locality in Zacatecas. His plate which accompanies the description is clearly that of the bright yellow race and therefore (as seems

certain in the cases of other Wollweber birds) probably came from the eastern part of that state.

Specimens examined.—*palliatu*s, Sonora, 4; Nayarit, 1 (intermediate): *derbianu*s, Texas, 12; eastern and northeastern Mexico, series: *guatimalen*sis, series.

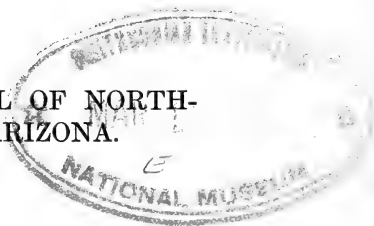
In conclusion, I wish to thank Dr. L. B. Bishop for certain Texas specimens and Mr. J. L. Peters for his selection of seasonably comparable material from Texas and northeastern Mexico.

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THE FERRUGINOUS PIGMY OWL OF NORTH-
WESTERN MEXICO AND ARIZONA.

BY A. J. VAN ROSSEM.



Ferruginous pigmy owls which have been acquired by the Dickey collections from northwestern Mexico and Arizona during the past several years are so distinct from *Glaucidium brasilianum ridgwayi* of southern Mexico and Central America that they unquestionably constitute a well-marked race. A name and the distinguishing characters are given below.

***Glaucidium brasilianum cactorum*, subs. nov.**

Type.—Breeding male adult, 30225, Dickey collections at the California Institute of Technology; giant cactus grove between Guaymas and Empalme, on the coast of Sonora, Mexico; collected by A. J. van Rossem on April 24, 1930, original number 12940.

Subspecific characters.—Compared with *Glaucidium brasilianum ridgwayi* Sharpe of southern Mexico and Central America; wing shorter and tail longer; coloration in all phases paler and very much grayer; tail in the gray phase banded with brown and buff or brown and rufous, not dark brown and white as in the gray phase of *ridgwayi*.

Range.—Southern Arizona south to Nayarit.

Remarks.—Like most owls of this genus the present species has a red phase, a gray phase, and a rather variable type which is intermediate and is often called the "mongrel" phase. While the series of *cactorum* exhibits these three phases it is rather difficult to compare them with the corresponding phases of *ridgwayi*. Ignoring the matter of tail bands, the color of the upper parts may be relatively compared as follows:

Southern Mexico and			
Central America.....	Red	Mongrel	Gray
Arizona and Sonora.....		Red	Mongrel Gray

In other words the red extreme of *cactorum* falls between the mongrel and gray phases of *ridgwayi* in color, but even so is paler in tone.

Texas specimens are not included in the above comparisons even though they approximate very closely the measurements and tail characters of

cactorum. It is my impression at the moment that in color they are best referred to *ridgwayi*, but insufficient material has been examined to be certain as to their systematic status. Ridgway (Birds of North and Middle America, 6, 1914, 798) was inclined to consider them distinct from *ridgwayi*, but whether they constitute still another race can not be decided at present.

As to phase tendencies in regard to sex, there is a marked average difference in that females tend to redness and the males to grayness. However, both extremes of coloration are represented in both sexes.

Specimens examined.—*G. b. ridgwayi*, Central America, 35; Mexico, 24; *G. b. cactorum*, Arizona, 4; Sonora, 15; Nayarit (not typical), 1.

MEASUREMENTS—ADULTS.

	MALES	
	Wing	Tail
27 from range of <i>ridgwayi</i>	89-94	56-59
10 from range of <i>cactorum</i>	85-90	59-64
	FEMALES	
14 from range of <i>ridgwayi</i>	94-100	57-64
7 from range of <i>cactorum</i>	91-95	63-67

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A NEW MOUNTAIN SHEEP FROM LOWER
CALIFORNIA.

BY E. A. GOLDMAN.

Reports of the occurrence of mountain sheep in the Sierra de la Giganta (Mountains of the Giant), of southern Lower California first came to my attention while on an overland journey by pack train the length of the peninsula with E. W. Nelson in 1906. The possibility that some wild sheep might remain in that remote region was discussed with the hunter-naturalist F. Carrington Weems who became much interested in a field investigation to settle the uncertainty and that would perhaps result in a material contribution to our knowledge of the group. Years passed, but slowly evolved plans matured, and March 26, 1936, found us on our way across the Gulf of California. A third member of the party was my son, Luther C. Goldman, and our activities were to include general faunal investigations in the field. A yearlong closed period has properly been set up for the protection of mountain sheep under the game laws of Mexico. Through the courtesy, however, of Señor Juan Zinser, chief of the game section of the Department of Forestry, Game, and Fish, we were provided with a special permit to take a limited number of specimens for scientific purposes. A special dispensation of the Mexican War Department authorized us to enter Lower California with our rifles.

The Sierra de la Giganta is a narrow range, isolated by low gaps to the north and south, extending for a distance of 60 or 70 miles, close along the coast of the Gulf of California. The range is strongly uptilted toward the east. The western slope, therefore, is more gradual, but along the crest the east front breaks away precipitously in a great series of gorges, ridges, and minor

peaks and crags with contours labyrinthine in complexity. The highest peak, the Cerro de la Giganta, at the extreme north end, rises to 5,500 feet, but the altitude of the general crest varies from about 3,500 to 4,500 feet. Permanent water is scarce, but the annual rainfall, as attested by the vegetation, is somewhat more copious than in the central desert section of the peninsula. Light frosts sometimes occur in winter, but the prevailing temperatures are high.

The vegetation of the Sierra de la Giganta includes elements representing northern extensions of the peculiar subtropical flora centered in the Cape Region of the peninsula south of La Paz. One of the most conspicuous trees, owing to the whiteness of its bark, is the "palo blanco" (*Lysiloma candida*). The gathering of the bark for tanning purposes is one of the leading industries of the region. Another conspicuously white-barked tree is the wild fig, or "salate" (*Ficus palmeri*). It may be a well-shaped tree but more typically assumes fantastic forms, the trunk dividing and flattening out to embrace a rock, or spreading over the face of a cliff. A still more remarkable tree—a veritable plant monstrosity—is the "copalquin" (*Pachycormus discolor*). The short, thick trunk tapers rapidly from the ground upward to the slender tips of the peculiarly contorted branches. The giant beargrass (*Nolina beldingi*) grows on the higher peaks. It is known elsewhere only from the high mountains of the Cape Region. Tall fan palms (probably *Erythea brandegeei*) add a tropical or subtropical touch, especially in the vicinity of water. In this exotic setting, below latitude 26°, mountain sheep reach their farthest south in America. General habitat conditions appear to be very favorable, but we found the fresh tracks of a mountain lion on the fresh trail of sheep in local terrain too rugged to be favored by the mule deer. The most urgent need, however, is adequate protection from man if the small remnant of this hitherto undetected geographic race is to endure.

***Ovis canadensis weemsi*, subsp. nov.**

SOUTHERN LOWER CALIFORNIA MOUNTAIN SHEEP.

Type.—From Cajon de Tecomaja, Sierra de la Giganta, about 30 miles south of Cerro de la Giganta, southern Lower California (altitude 2,000 feet). No. 261696, ♀ adult, skin and skull, U. S. National Museum (Bio-

logical Survey collection), collected by F. Carrington Weems, April 13, 1936. X—catalogue number 27590.

Distribution.—Sierra de la Giganta, southern Lower California and northward, grading toward *Ovis canadensis cremnobates* of northern Lower California in the Sierra de San Borjas in the central part of the peninsula.

General characters.—Size large and color dark for a desert subspecies; horns remarkably long and gradually tapering; pelage very short. Most closely allied to *Ovis canadensis cremnobates* of northern Lower California; size similar, but pelage shorter; color usually darker, varying to very dark brown more or less distinctly mixed with black; cranial details distinctive. Similar in size to *Ovis canadensis gaillardi* of southwestern Arizona, but usually darker and skull characters, including the broader premaxillae, different. Color darker than in *Ovis canadensis nelsoni* of eastern California, *Ovis canadensis mexicana* of Chihuahua, or *Ovis canadensis texiana* of Texas, and a marked departure in cranial features from each is exhibited.

Color.—*Type* (fresh pelage appearing through faded winter coat): General color (ignoring faded hairs) above and below very dark brown—near Mars brown (Ridgway 1912)—with a blackish admixture especially on posterior part of back, legs and tail; rump patch white as usual in the group, nearly completely divided along a narrow median line by longer blackish brown hairs; fore and hind legs with white areas extending down inner surfaces to hoofs; muzzle whitish; ears brownish gray. In other specimens the toes are dusky all around.

Skull.—Closely approaching that of *cremnobates* in size and general contours, but horns of rams apparently less widely spreading, and of lesser diameter at base; premaxillae broader anteriorly, with more widely extended lateral shelves along median line between anterior palatine foramina; anterior palatine foramina usually longer; nasals broader; basioccipital usually broader; interpterygoid fossa usually wider; dentition similar. Compared with that of *gaillardi* the skull is similar in general size, but horns of rams apparently less widely spreading, and of lesser diameter at base; premaxillae broader anteriorly, with more widely extended lateral shelves along median line between anterior palatine foramina; nasals longer; interpterygoid fossa usually wider; dentition about the same. Similar in general size to that of *mexicana*, but diverging in detail; nasals longer, narrower, less flattened; premaxillae shorter, broader anteriorly, more developed laterally along median line between anterior palatine foramina. Contrasted with *texiana* the premaxillae are decidedly shorter and the nasals usually longer. The skull differs from that of *nelsoni* most obviously in larger size and heavier proportions.

External body measurements.—*Type*: Total length, 1887 mm.; tail vertebrae, 90; hind foot, 400. A young-adult female topotype: Total length, 1296; tail vertebrae, 77; hind foot, 375; height at shoulder, 775. girth of chest, 940. An adult male from 20 miles north of Calmalli: Total length, 1626; height at shoulder, 1029; girth of chest, 1006. Two adult females from 26 and 30 miles northeast of Calmalli, respectively: Total length, 423, 398; height at shoulder, 965, 940; girth of chest, 991, 965.

Cranial measurements.—*Type* and a young-adult female topotype,

respectively: Greatest length (median line), 294, 268.5; basioccipital length, 283.5, 260.8; width between posterior margins of orbits, 153, 145.2; width of braincase at concavities on outer sides of squamosals (just above origin of squamosal arm of zygoma), 76.3, 74.4; least interorbital width (near union between jugals and lachrymals), 111.9, 100; length of ascending branch of premaxilla, 102.4, 90.9; length of premaxillae as exposed along median line below, 57.3, 56.3; width of premaxillae anteriorly, 28.2, 25.7; width of expansion of median division of premaxillae near posterior ends between anterior palatine foramina, 11.4, 7.8; width of basioccipital (near middle between auditory bullae), 32.8, 29; length of nasals, 113.9, 103.7; width of nasals (near fronto-lachrymal suture), 43.7, 37.7; length of horn (anterior curve), 375, 325; circumference of horn at base, 175, 143; greatest spread of horns (between tips), 451, 338; maxillary toothrow (alveoli), 88.8, 82.2.

A young-adult male topotype (fronto-nasal sutures partly closed): Greatest length (median line), 298.5; basioccipital length, 285.2; width between posterior margins of orbits, 168.8; width of braincase at concavities on outer sides of squamosals (just above origin of squamosal arm of zygoma), 81.7; least interorbital width (near union between jugals and lachrymals), 118.6; length of ascending branch of premaxilla, 96.6; length of premaxillae as exposed along median line below, 59.1; width of premaxillae anteriorly, 31.8; width of expansion of median division of premaxillae near posterior ends between anterior palatine foramina, 9.8; width of basioccipital (near middle between auditory bullae), 35.2; length of nasals, 119; width of nasals (near fronto-lachrymal suture), 55.8; length of horn (anterior curve), 803; circumference of horn at base, 350; greatest spread of horns (between tips), 410; maxillary toothrow (alveoli), 88.2. Greatest spread of horns of old male from vicinity of type locality, 524.

Remarks.—*Ovis canadensis weemsi* requires no very close comparison with any of the subspecies of *O. canadensis* except its geographic neighbor, *cremnobates*. Specimens from the Sierra de San Borjas are similar, but not quite so extreme in dark coloration, and share some of the distinctive cranial features of *weemsi*, but the massive, widely spreading horns of the rams approach those of *cremnobates*. The latter detail, however, is mentioned with reservations as it appears to be of limited value as a character in the group as a whole. Among more reliable characters are the form and dimensions of the nasals and premaxillae. The new form is based on two females, skins and skulls, and two males, skulls only, from the vicinity of the type locality, and four males and three females, skins and skulls, from the Sierra de San Borjas, 20–50 miles northeast of Calmalli. It is a pleasure to dedicate the subspecies to the collector, Colonel F. C. Weems, whose keen interest in the welfare of big game in particular, and wild life in general, has been manifested during many years.

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ADDITIONS TO THE AVIFAUNA OF PARAGUAY.

BY PIERCE BRODKORB.



The birds in the following list represent forms as yet unrecorded from Paraguay. Unless otherwise stated, they were collected by Alberto Schulze in the Chaco near the Bolivian border, 265 kilometers west of Puerto Casado, at about lat. 22° 10' S., long. 60° 15' W.

Nothoprocta cinerascens (Burmeister). 1 ♂, July 11, 1936.

Nothura boracuíra (Spix). 1 ♂, July 11, 1936.

Colymbus chilensis (Lesson). 1 ♂ ad., June 24, 1 ♀ ad., July 2, 1936.

Accipiter guttifer Hellmayr. 1 ♂ im., May 3, 1936.

Pardipallus maculatus maculatus (Boddaert). Horqueta, East Paraguay, 1 ♀, October 13, 1935; 1 ♂, October 29, 1935; 1 ♀, October 27, 1934, A. Schulze.

Chunga burmeisteri (Hartlaub). 1 ♂, June 21, 1936.

***Otus choliba wetmorei*, subsp. nov.**

Type.—No. 92570, University of Michigan Museum of Zoology, ♀ adult, 265 kilometers west of Puerto Casado, Paraguayan Chaco, July 12, 1936, Alberto Schulze, original number 1949.

Characters.—Similar to *Otus choliba choliba* (Vieillot) from East Paraguay, but ground color paler in both red and gray phases; shaft stripes and cross vermiculations less bold; feet more heavily marked with brown bars.

Wing 161-176, tail 85-97 mm. (12 specimens, sexes alike.)

Range.—Chaco of Paraguay and northern Argentina (Gob. Formosa) and the Yungas of eastern Bolivia (Prov. Santa Cruz and Tarija). The screech owl recorded from Tucumán possibly belongs here.

Remarks.—The paleness of the Chaco form is most noticeable on the wing coverts and the forehead, the ground color of the latter part being almost white in the gray phase. There is every conceivable gradation between the red and gray phases, and needless to say it is important to compare birds in the same stage of plumage.

Besides four skins from the type locality, I have been able to examine, thanks to the good offices of Mr. W. E. Clyde Todd, the Carnegie Museum's series of eleven screech owls from eastern Bolivia. Eleven specimens of

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Otus choliba choliba from East Paraguay (Horqueta) have been available for comparison.

In recognition of his work on the birds of Paraguay, this new form is dedicated to Dr. Alexander Wetmore, Assistant Secretary of the Smithsonian Institution.

Ceophloeus schulzi major (Dabenne). 1 ♀, June 24, 1936.

Drymornis bridgesii (Eyton). 1 ♂, July 9, 1936.

Coryphistera alaudina campicola Todd. 1 ♀, June 24; 1 ♀, July 12, 1936.

Cranioleuca pyrrhophia pyrrhophia (Vieillot). 1 ♀, June 29; 1 ♂, July 3; 1 ♀, July 4; 1 ♂, 1 ♀, July 7, 1936.

Asthenes baeri (Berlepsch). 1 ♀, June 27; 1 ♂, July 5, 1936.

Phacellodomus sibilatrix Selater. 1 ♀, June 28; 1 ♀, June 29; 2 ♂♂, 1 ♀, July 4; 1 ♀, July 6, 1936.

Pseudoseisura lophotes (Reichenbach). 1 ♂, June 21, 1936.

Thamnophilus caerulescens dinellii Berlepsch. 1 ♀, July 6; 1 ♂, July 12, 1936.

Stigmatura budytoides budytoides (Lafresnaye and D'Orbigny). 1 ♂, May 9; 1 ♀, June 28; 1 ♂, 2 ♀♀, June 29, 1936.

Troglodytes musculus rex Berlepsch and Leverkühn. 1 ♂, July 4, 1936.

Myospiza humeralis tucumanensis Bangs and Penard. 1 ♂, June 26; 1 ♂, July 8, 1936.

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STUDIES IN AMERICAN SPIDERS: THE GENUS
AIGOLA CHAMBERLIN.

BY C. R. CROSBY.

There has been great uncertainty as to the genera in which many of the American species of Linyphiidae should be placed. As a first attempt in this direction we here bring together the species congeneric with *Microneta crassimana* Emerton. All of these species are very rare and the females are either unknown or there is considerable uncertainty as to how they should be matched with the males.

AIGOLA Chamberlin.

N. Y. Ent. Soc. Jour. 29 : 36, 1921.

Type.—*Aigola paulina* Chamberlin which equals *Microneta crassimana* Emerton.

The species here placed in *Aigola* are all rather closely related to each other. They form a compact group in that great complex of species comprised in the old genera *Lepthyphantes* and *Microneta*. It is very difficult, if not impossible, to differentiate this genus on general characters, such as form of thorax, number and position of teeth or spines, or eye arrangement, but a good character is to be found in the genital bulb. In this group of species the radix is broader than usual, roughly triangular, the apex produced so far forward that it forms a notch in which the embolus lies. The embolus is not of the long, thin, folded and strongly curved type of *Lepthyphantes* and *Microneta* (in the wide sense), but is much more simple, smaller, and built on a different plan as described under the various species.

Aigola crassimana Emerton.

Figs. 1-2.

Microneta crassimana Emerton, Conn. Acad. Sci. Trans. 6 : 75, pl. 24, f. 3. 1882.

Gonyglidium tuberosum Emerton, Conn. Acad. Sci. Trans. 20 : 150, pl. 2, f. 5. 1915.

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Aigola pauliana Chamberlin, N. Y. Ent. Soc. Jour. 29 : 37, pl. 3, f. 3-4. 1921.

Aigola tuberella Chamberlin, N. Y. Ent. Soc. Jour. 29 : 37, pl. 3, f. 5-6. 1921.

The types of *crassimana*, *tuberosum*, *pauliana* and the so-called type of *tuberella* were compared May 24, 1935, and reexamined Nov. 17, 1936. The female paratypes of *tuberella* as left in the Museum of Comparative Zoology by Chamberlin consist of six specimens. Of these, three specimens are like the one figured by Emerton, one is a *Bathyphantes*, and there are two others. The one that I consider as probably being the female of *crassimana* is described below.

Male.—Length, 3.6 mm. Cephalothorax reddish orange yellow, the radiating lines orange, viewed from above, a little broad, rounded on the sides to the first coxa and then very slightly concave, broadly rounded across the front. Sternum golden yellow, a dark band around the edge, wider posteriorly. Labium clear orange. Chelicerae reddish orange, slightly divaricate at tip. Legs and palpi reddish orange. Abdomen gray above and below.

Posterior eyes in a very slightly recurved line, equidistant, separated by the diameter. Anterior eyes in a straight line, the median smaller than the lateral, separated by the radius and from the lateral by the diameter.

Femur of palpus distinctly thicker distally, curved inward at base. Patella rather long, convex above, less strongly concave below, one of the dorsal hairs a little larger than the others and sinuous. Tibia viewed from the side moderately swollen below, depressed at base above and then moderately convex; viewed from above, a little constricted at base, the mesal side gently convex, the lateral side swollen, abruptly narrowed at tip, the dorsal margin narrow, smooth; tibia clothed with many long hairs, none of which are much larger than the others. Cymbium rounded on the back, a low blackish rounded ridge on upper margin of cavity for the insertion of base of paracymbium; on the ventral side between the bulb and the tibia are two thin longitudinal teeth or plates with a narrow opening between them; the mesal one is the modified mesal angle of the cymbium and the other seems to be attached to a prolongation of the cymbium beyond it; both teeth fit into small notches in the lower distal margin of the tibia. Paracymbium has a flat area on the basal part under the edge of which is a row of five long stiff hairs; paracymbium curved to form a notch which when viewed from behind appears oblique with divergent sides; the posterior part has a heavy black ridge; the posterior margin bears a blunt projection, the edge of which is finely serrate; beyond this point the paracymbium is rather narrow to the bend; beyond the bend it bears a large triangular tooth on the outer margin and two teeth at the end, the upper one large and rounded, the terminal one smaller and pointed; from certain angles it looks like the tail of a whale. The median apophysis has a very stout, black, curved tooth. Radix enormously developed, broad, curved in a semicircle and covering a large part of the bulb; much narrowed

before the tooth; the distal angle broadly triangular, tip rounded. Embolus small and delicate, slightly enlarged where attached to the radix, then very narrow till it suddenly becomes greatly expanded, folded back into the bulb and hollowed out to form a large deep cavity, the mesal margin of which is armed with a small black tooth; the duct opens through a small black tubercle on the opposite side of the cavity at the base of an oval rounded lobe; mesally from it is a slender acute process. Terminal apophysis very broad, semicircular, the lateral margin convex, thickened, smooth; the side next to the embolus nearly straight, thin, frayed.

Female.—Length, 3.5 mm. Similar to the male in form and color. The visible part of the epigynum transverse with the ends rounded. The receptacles are evident as rather large, black, somewhat angulate spots separated by the diameter. The scape seems to be folded back as in many *Micronetas* but the tip is not evident from below. The oblique clefts on the base of the scape are clearly evident. I am not absolutely sure that this female is correctly matched.

Type locality: Hermit Lake, Mt. Washington, N. H.

New Hampshire: Hermit Lake, Mt. Washington, June 4, 1877, 2 ♂ and 2 ♀ of different species.

New York: Summit of Mt. MacIntyre, July 1, 1923, 1 ♂; Summit of Mt. Whiteface, Oct. 23, 1936, 1 ♂ (Dietrich).

Labrador: Battle Harbor, July 30, 1912, 1 ♂, 1 ♀ (C. W. Leng). (These are the types of *Gongylidium tuberosum* Emerton); Makkovik, June, 1928, 1 ♂ (Austin).

Alaska: Iditarod, Feb. 18, 1918, 1 ♂; St. Pauls Id., 1910, 1 ♂ (type of *Aigola pauliana* Chamberlin).

***Aigola filicata*, new species.**

Figs. 3-4.

Male.—Length, 2.4 mm. Cephalothorax orange yellow, thorax slightly darkened by minute reticulations; viewed from above evenly rounded on the sides to the first coxae, very slightly constricted at the cervical groove, broadly rounded across the front, the eyes in profile. Sternum and labium yellow, slightly and narrowly grayish at the margin. Endites and chelicerae orange yellow. Legs and palpi yellow tinged with orange. Abdomen gray over white above on front two thirds, white on the sides and above the spinnerets, venter broadly gray in the middle.

Posterior eyes in a gently recurved line, the median a little smaller than the lateral, separated by the diameter and a little farther from the lateral. Anterior eyes in a straight line, the median smaller than the lateral, separated by less than the radius and from the lateral by the diameter.

Femur of palpus curved inward and distinctly thicker distally. Patella short, the dorsal hair not much longer than the others. Tibia viewed from above broadest in the middle, the distal margin thin and broadly rounded. Cymbium smoothly rounded over the back without projections at the base. Paracymbium approaches most nearly that of *crassimana*, but the basal part is not so deeply concave, the posterior projection is not so thick or

heavy, the ridge on the inner surface of the horizontal arm follows a more sinuate course, the tooth on the outer edge before the expanded terminal part is much smaller, the end does not look so much like a whale's tail, the notch is very shallow, the outer angle only slightly expanded and is broadly rounded; the inner angle is extended even farther than in *crassimana*; the horizontal part is long and narrow and the terminal part is folded sharply back over it. The median apophysis is black and strongly chitinized, the tooth short and stout, the opposite angle upturned to form a short process armed with minute claw-like teeth. Radix V-shaped with a deep notch in which lies the embolus and with a sharp tooth on the mesal side; the distal angle ends in a thin, double, blackish point. Lying across the base of the embolus is a small process which ends in two unequal black teeth on the mesal end; the duct opens on a rather large hyaline bluntly pointed process; between this process and the tip of the cymbium is a long, slender, pointed tooth, which is really a branch of the embolus.

Holotype male, trail from railroad to Denver Glacier, three miles from Skagway, Alaska, June 25, 1936.

Aigola flava Emerton.

Figs. 5-6.

Microneta flava Emerton, Conn. Acad. Sci. Trans. 20 : 152, pl. 3, f. 2. 1915.

Male.—Length, 2 mm. General color of whole spider pale orange yellow. Cephalothorax more orange, triangular spot on back of head yellow; viewed from above, rather broad, rounded on the sides to the front of front coxa and then narrowed in a straight line, broadly rounded in front. Sternum, labium and endites all light. Chelicerae slightly divaricate at tip. Abdomen yellow lightly suffused with gray.

The palpus is much like that of *flavescens*; femur, patella and tibia are almost exactly the same; the dorsal distal margin of the tibia is oblique, the lateral angle broadly and shallowly excavated from the lateral side. Cymbium smoothly rounded over the back. Paracymbium much like *flavescens* but the posterior projection is longer, the ridge on the posterior side of the middle part is shorter and rounded above, the outer arm is broader, the ridge is much higher and forms a double tooth; it is well shown in Emerton's figure. The tooth of the median apophysis is a little more slender. The radix is of the same general form but the proximal expansion is shorter and more broadly rounded. The armature of the distal end of the radix is entirely different; on the lateral side are two thin ribbon-like processes, the basal one acute, the other longer, curved, aciculate. The embolus depressed in the middle with a ridge on each side, the dorsal one broadly rounded, the ventral one acute, bearing the duct.

Female.—Similar to the male in form, color and size. Epigynum rather protuberant, the posterior margin broadly rounded with a slight indentation in the middle where the tip of the scape appears.

Type locality: Lake Louise, Alberta, Aug. 10, 1905, 1 ♂, 1 ♀.

Redescribed from the types.

Aigola flavescens, new species.

Figs. 7-8.

Male.—Length, 1.6 mm. Cephalothorax dull yellowish, lightly suffused with gray, the radiating lines and the triangular area on the back of the head darker, margin broadly gray, viewed from above, rounded on the sides, but narrowed behind and abruptly narrowed in front from the front coxa. Sternum dark gray over orange yellow. Labium dark. Endite light orange yellow, gray on the sides. Legs and palpi straw yellow. Abdomen dark gray.

Posterior eyes in a straight line, the median separated by the radius and from the lateral by half the radius. Anterior eyes in a straight line, the median smaller than the lateral, almost touching and only a little farther from the lateral.

Femur of palpus rather short, strongly compressed, curved inward at base. Patella very short below, moderately convex above. Tibia short, a little swollen below, gently convex above, the dorsal distal margin broadly rounded. Cymbium rounded on the back without a protuberance. Paracymbium very large and extending out at right angles to the palpus, rather narrowly attached to the cymbium, it is first directed obliquely backward and provided with a rounded notch to fit around the end of the tibia; the middle part of the paracymbium is narrow, directed laterally, and provided on the posterior side with a sharp ridge which ends in a sharp angle next to the tibia, the outer arm is short, incurved and armed on the outer side at the bend with an erect triangular tooth. The tooth of the median apophysis is short and black; the opposite angle is upturned to form a blunt black tooth. The radix is triangular in form with a broad notch into which the embolus fits, the basal arm is rather broad, pointed and not constricted; posteriorly the radix is expanded into a long, round-pointed plate; the distal angle has a sharp ridge on the ventral side, followed by a deep notch beyond which there is a triangular enlargement. The terminal apophysis is short and armed with three short teeth, the mesal one blunt, the other two acute; behind them is a much longer, slender black process. The embolus is broadly triangular with the duct opening through a minute tubercle at the tip.

Holotype male; allotype female, Wawbeek, N. Y., Oct. 23, 1934; two paratypes with same data.

New York: Moores, Sept. 26, 1936, 2 ♂, sifted from moss in bog; Jordenville, Nov. 21, 1936, 1 ♂, from moss in swamp.

Aigola rectangulata Emerton.

Fig. 9.

Microneta rectangulata Emerton, Conn. Acad. Sci. Trans. 18 : 217, pl. 2, f. 5. 1913.

Male.—Length, 2-2.2 mm. Cephalothorax orange yellow, the margin narrowly blackish, the radiating lines, the triangular area on the back of the head and lines running to the posterior eyes, gray; viewed from above rather broad, evenly convex on the sides to the first coxa and then gently

concave, broadly rounded across the front. Sternum and labium almost black over yellowish. Endites dark gray over orange. Chelicerae swollen in front, constricted towards the tip, strongly excavated on the inside, attenuate and divaricate at tip, an oblique row of three stiff hairs on the face, the lower one, at the edge of the excavation borne on a tooth-like tubercle. Legs dusky yellow orange. Palpi yellow, tarsus black. Abdomen very dark gray to black above, usually darker below.

Posterior eyes in a straight line, equidistant, separated by three-fourths the diameter. Anterior eyes in a straight line, the median smaller than the lateral, separated by a little less than the radius, and from the lateral by the diameter.

Femur of palpus a little thicker distally, curved inward. Patella viewed from the side straight below, moderately convex above. Tibia rather long, slender at base, widened distally on the lateral side, the dorsal margin smooth, rounded. Cymbium rounded on the back without protuberances, the mesal angle is produced ventrally into a thin, transparent plate. Paracymbium attached obliquely to the cymbium, armed at base with a row of five stiff hairs, the basal arm somewhat constricted, the posterior outer angle square, the outer arm thick and heavy, nearly straight but ending in a broad, thin, flat rounded, light colored lobe, the notch somewhat curved, not very deep on the outer side, outer angle of paracymbium bears several stiff hairs. The tegulum provided with a high, oblique, transversely wrinkled bezel as in the *Erigoneae*. In the untreated bulb the distal part of the median apophysis is not visible, the basal end occupies the mesal concavity of the cymbium; it is thick and rolled over towards the radix, the tip without the tooth present in *Microneta*. The radix very large covering a large part of the ventral surface of the bulb, roughly triangular with the posterior angle rounded and the front margin deeply excavated; the base is not evidently constricted and appears squarely truncate, but the end is really narrow and turned under; the distal end bears on the inner side two short processes, the terminal one is rather broad, thin and transparent in the middle and black on the sides, the end truncate with the margin minutely denticulate and a larger tooth at each angle; the process next to the embolus is a thin transparent plate, rounded at apex and with the ventral margin black and roughened. The embolus attached to the middle of the radix, narrow at base but greatly enlarged distally where it is provided with two nearly parallel flanges, at the base of the lateral flange a minute transverse quadrate black tooth, the mesal flange semitransparent, rounded, the lateral one has a straight black edge; the duct opens in the distal angle of this flange.

Type locality: Readville, Massachusetts.

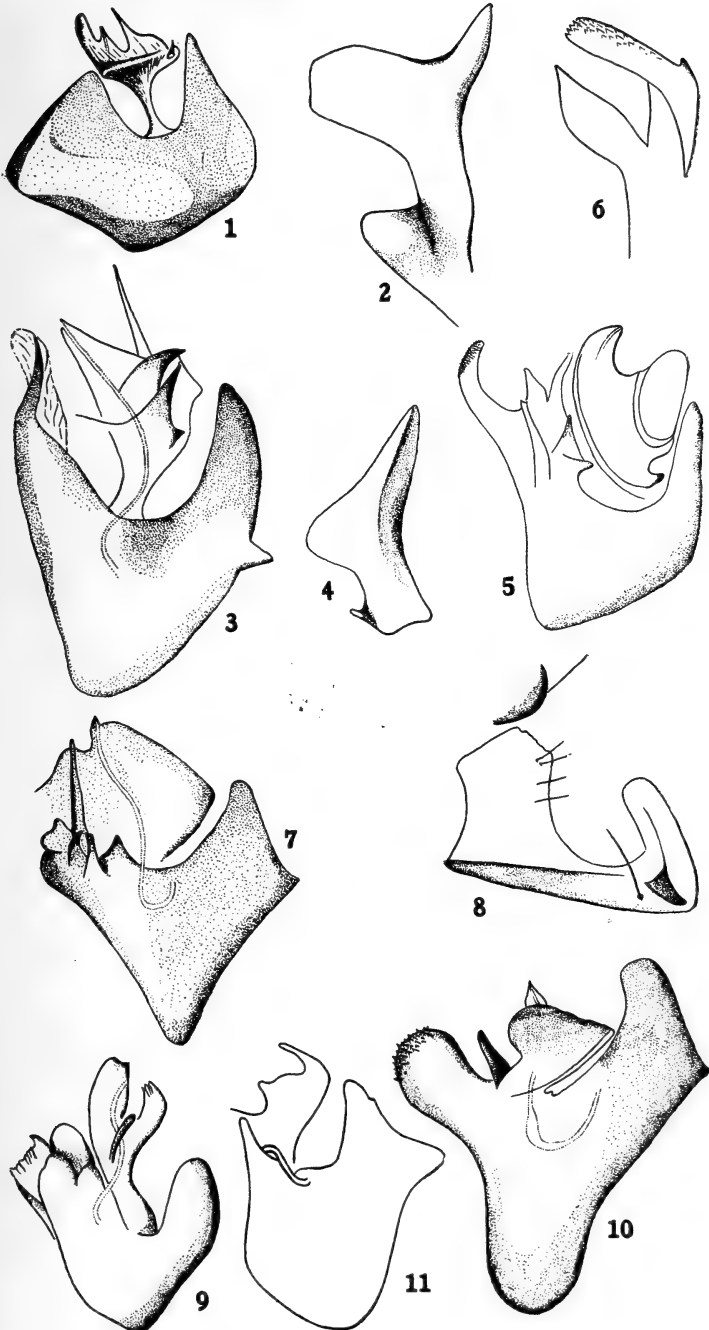
New York: Ithaca, April 2, 1933, 3 ♂.

Aigola recurvata Emerton.

Fig. 10.

Bathyphantes recurvatus Emerton, Conn. Acad. Sci. Trans. 18 : 218, pl. 2, f. 8. 1913.

Male.—Length, 3 mm. Cephalothorax pale dusky yellow, more grayish





at the margin, head with three rows of stiff black hairs converging posteriorly. Cephalothorax viewed from above evenly rounded on the sides except for a slight depression at the cervical groove, broadly rounded across the front. Sternum and labium dark gray, nearly black. Endites grayish orange yellow. Chelicerae reddish orange yellow, rather long, attenuate and somewhat divergent at tip. Legs and palpi dull grayish yellow. Abdomen dull grayish white above with transverse black bars. Venter dark.

Posterior eyes in a straight line, equal, the median separated by the diameter and from the lateral by the radius. Anterior eyes in a gently recurved line, the median smaller than the lateral, separated by less than the radius and from the lateral by two-thirds the diameter.

Femur of palpus nearly straight, cylindrical. Patella armed dorso-laterally with a very long hair. Tibia short, somewhat swollen ventro-laterally. Cymbium armed at base with a sharp horn which curves laterally over base of the paracymbium. Paracymbium stout, armed near the anterior end of the basal part with a distinct triangular tooth and clothed with a cluster of long stiff hairs; the posterior angle broad and rounded, the surface distinctly rugose, the horizontal part broad and heavy; the outer arm short, incurved. Tooth of the median apophysis rather long, black and curved; another tooth on the opposite angle obscured by membrane. Radix large and heavily chitinized, the base broadly rounded, produced posteriorly as a long rounded lobe to the edge of the tibia, armed laterally from the embolus with a sharp black conical tooth and with a compressed, rounded and distally widened terminal apophysis. The enlargement of the duct to form a vesicle in the radix is elongate, not round. The duct opens through a minute triangular tooth on the anterior side of the transverse, rounded, convex embolus.

Type locality: Gore Mt., Norton, Vermont.

New York: Summit of Mt. Whiteface, Oct. 23, 1936, 1 ♂ (Dietrich).

Aigola rotunda Emerton.

Fig. 11.

Micrometa rotunda Emerton, Conn. Acad. Sci. Trans. 18 : 216, pl. 2, f. 4. 1913.

Male.—Length, 2 mm. Cephalothorax yellow orange with a yellow area on back of head; viewed from above, rather broad, rounded on the sides to the first coxa and then gradually narrowed with a very slight constriction at the cervical groove; front broad, rounded. Sternum, labium and endites yellow. Chelicerae orange yellow, lighter on inside at tip, very slightly divergent at tip, the furrow normal, upper margin with a regular series of five or six teeth. Legs orange yellow, rather hairy. Abdomen gray.

Femur of palpus a little thicker distally, curved inward. Patella short, moderately convex above. Tibia short, a little swollen below, the dorsal distal margin rounded. Cymbium rather short, smoothly rounded on the back without protuberances. Paracymbium rather heavy, curved in a

semicircle, the point acute, broadly expanded on outside before base of narrow point; a ridge extends the whole length with a break at the base of the point. Emerton's figure gives a good idea of the paracymbium. The median apophysis has a rather stout black tooth. Radix a broad plate like a tail-piece, very broad at base ending in two broad triangular points, moderately constricted, the posterior margin rounded, the embolus lies in a notch in the front of the radix; it is roughly W-shaped, the mesal tooth is pale, slender, and longer than the others, the middle one short, black, blunt, the lateral tooth pale, slender, acute. The terminal apophysis is long, slender, gently curved, black on the outer margin, pale on the inner.

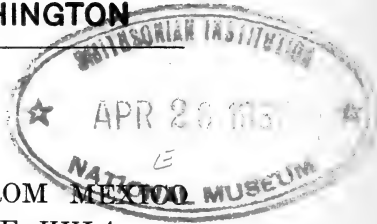
Redescribed from the type, Moosilauke Mt., N. H., May 29, 1912.

EXPLANATION OF FIGURES.—PLATE I.

- Fig. 1. *Aigola crassimana* ♂, radix and embolus.
- Fig. 2. *Aigola crassimana* ♂, tip of paracymbium.
- Fig. 3. *Aigola filicata* ♂, radix and embolus.
- Fig. 4. *Aigola filicata* ♂, tip of paracymbium.
- Fig. 5. *Aigola flava* ♂, radix and embolus.
- Fig. 6. *Aigola flava* ♂, processes on tip of radix.
- Fig. 7. *Aigola flavescens* ♂, radix and embolus.
- Fig. 8. *Aigola flavescens* ♂, paracymbium.
- Fig. 9. *Aigola rectantulata* ♂, radix and embolus.
- Fig. 10. *Aigola recurvata* ♂, radix and embolus.
- Fig. 11. *Aigola rotunda* ♂, radix and embolus.

All drawings are made from the right palpus or in the case of figure 11, where only the left palpus was available, reversed so as to be easily compared with the other figures.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



NEW SPECIES OF HYLID FROGS FROM MEXICO
WITH COMMENTS ON THE RARE *HYLA*
BISTINCTA COPE.

BY EDWARD H. TAYLOR.

In the collections made by Dr. Hobart Smith and myself in Mexico, I find three forms of the genus *Hyla* which appear to be new. The descriptions follow:

***Hyla robertmertensi*, sp. nov.**

Plate II, figs. 3-7.

Holotype.—No. 2270, E. H. T.—H. M. S. Coll., collected near Tapachula, Chiapas, August 24, 1935, by E. H. Taylor and Hobart M. Smith. Taken at night clinging to plants surrounded by water.

Paratypes.—Nos. 2269, 2271, near Tapachula, Chiapas, August 24, 1935; nos. 2272-2280, near Tonolá, Chiapas, Aug. 27, 1935; 2281-2287, 2289, 2290, near Asuncion, Chiapas, Sept. 1, 1935, all collected by E. H. Taylor and Hobart M. Smith.

Diagnosis.—A very small hyla, maximum size about 30 millimeters; the snout not depressed; rounded canthi which, when projected, form an angle less than a right angle where they meet anteriorly; eye about as long as the distance between eye and tip of snout (measured on median line); interorbital width about once and one half the width of the upper eyelid; tympanum apparently covered with skin, but very distinct, its diameter about half the length of eye; digits with well developed terminal digital disks; the fingers about one fourth webbed; the subarticular tubercle of outer finger double; toes about three fourths webbed, the web reaching the base of the terminal disks on at least the outer side; the tibiotarsal articulation reaches middle of eye; above, lavender to pinkish-vinaceous; in males the dark pigment tending to form longitudinal lines; no pigmentation on thighs, save a scattering of minute flecks at knee; a brownish lateral stripe.

Description of holotype.—Adult female. Anterior profile of head somewhat acuminate, the snout at nostrils as deep as head in interorbital region; the canthi form an angle less than a right angle on the point of the snout; lores

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sloping, not concave; eye moderately prominent, about equal to the length of the snout (from a line drawn in front of eyes to tip on median line); the distance from eye to nostril about equal to distance between nostrils; vomerine teeth in two rather large, slightly diagonal groups, closely approximated, lying directly between the choanae; choanae moderately large, not concealed by overhanging jaw, separated from each other by a distance greater than that between nostrils; tongue large, rounded, not emarginate behind; not, or but slightly, free behind; tympanum distinct, covered with thin pigmented skin, its diameter about one half the length of eye; skin on body and limbs smooth, save the surface of the abdomen, which is covered with large granules, and the medial part of the thighs in which the granules are somewhat less pronounced; a more or less distinct fold on breast.

Fingers about one fourth webbed, the tips dilated strongly, the disks nearly the size of the tympanum; first finger smaller than second; a slight dermal margin to disks evident; a large flat palmar tubercle at base of first finger, and two small outer tubercles; subarticular tubercles large, salient, the distal tubercle of outer finger distinctly double; foot about three fourths webbed, the webbing reaching inner side of disk of fifth toe, to the distal subarticular tubercle of the fourth toe, and the inner side of the disks of the three inner toes; a large flat inner metatarsal tubercle; a small indistinct outer (sometimes not or scarcely visible). When limbs are folded at right angles to the body the heels overlap about two millimeters; tibiotarsal articulation reaches to near middle of eye; the tarsal fold not or scarcely indicated (often distinct in males).

Color in life.—Above on head and body the general color is pinkish lavender, slightly stronger anteriorly and bordered by a narrow silvery line from tip of snout along canthi and dorsolateral regions to groin; upper surface of tibia and distal part of arm a lighter pinkish-lavender becoming nearly yellowish on feet; the entire thigh is yellowish flesh save a few minute flecks of pigment at knee; sides with a brownish stripe, darkest where it joins the silvery line, and tending to narrow and disappear along the posterior part of body.

Variation.—The series shows very constant characters. The males, however, are smaller and more slender than females and possibly have a slight difference in the amount of webbing on the feet. The figures show variation in markings.

Remarks.—The species was found breeding in pools in cleared areas, together with *Hyla staufferi*, and a small *Hypopachus*. In habits and voice they are much like *Hylella picta*. They appear to be related to *Hyla phlebodes* and *Hyla underwoodi*.

The species is named for the noted European herpetologist, Dr. Robert Mertens of the Senckenbergian Museum, Frankfurt am Main, Germany.

MEASUREMENTS OF *Hyla robertmertensi*, sp. nov.

Number.....	2270	2276	2271	2213	2282	2278	2281	2286	2287
Sex.....	♀	♀	♂	♂	♂	♂	♂	♂	♂
Snout to vent.....	29	27.1	26.6	26.5	25.5	25.5	24	24.8	23.5
Head width.....	9.2	8.6	8.2	8	8	8	7.5	7.6	7.4
Head length.....	9.1	8	8	7.8	7.6	7.8	7.2	7	7.1
Tympanum.....	1.6	1.5	1.3	1.3	1.2	1.1	1.1	1	1
Diameter of eye.....	3	2.8	2.9	3	2.8	2.8	2.7	2.5	2.5
Eye to snout tip.....	3	2.9	3	2.9	2.8	3	2.9	2.7	2.8
Interorbital width.....	2.7	2.7	2.5	2.3	2.2	2.2	2.4	2.1	2.2
Eyelid.....	2	2	2.2	2.2	2.1	2.2	2.1	2	1.8
Foreleg.....	15.2	14.2	13	14.2	12.6	12.8	13.2	12.2	13.2
Hind leg from vent.....	43	40.2	39	38	37	38.2	39	37	35
Tibia.....	14.5	13	13.5	12.8	12	12.5	12	12.2	11.2
Foot.....	20.6	18.3	18	18	16.8	17.8	16.3	16.3	15.8

Hyla pinorum, sp. nov.

Plate II, fig. 2.

Type.—No. 5972. Collected in pines on Mexico-Acapulco highway between kilometers 350 and 351, near a spring known as Agua del Obispo, between the towns of Rincon and Cajones, July 25, 1936; E. H. Taylor, collector.

Diagnosis.—A small hyla, with vomerine teeth equally spaced between very large choanae, which are at least three times the area of a single group of teeth; tongue cordiform deeply emarginate behind; snout not projecting beyond mouth; nostrils separated by a distance very slightly less than narrowest distance between upper eyelids; canthus rostralis moderately angular; tympanum completely concealed beneath skin; a well-defined supratympanic fold; if limbs are folded, heels overlapping one or two millimeters; tibiotarsal articulation reaching beyond the tip of the snout; no fold on breast; hand about one-fourth webbed, the width of the pads on the two outer fingers contained in eye diameter twice; distal subarticular tubercle on fourth finger double; a strong continuous fold on outer ventral edge of arm; toes two-thirds to three-fourths webbed; outer metatarsal tubercle wanting or very inconspicuous; skin above minutely corrugated; abdomen and under thighs strongly granular; chin, throat and breast indistinctly granulate.

Description of the type.—Head above slightly broader than long, the eyes prominent, in dorsal view extending beyond profile of jaw; the upper eyelid only slightly (about one-seventh) less than distance between the eyelids; the longitudinal diameter of the eye equal to the length of the snout from a line drawn between anterior edges of eye; snout almost as deep at nostrils as at eye; in lateral profile the snout very truncate almost vertical from lip; nostrils at extreme upper edge; area about nostrils somewhat raised with a noticeable depression between them; canthi obtusely angulate, the lores sloping rather abruptly some distance below canthus, then sloping more gently to lip, leaving loreal region slightly concave; profile of jaw from ventral view nearly circular.

Tongue definitely cordiform, the posterior emargination rather deep, curving rather than angulate; vomerine teeth in two small transverse groups, their distance from the very large choanae about that of distance between the two groups; choanae completely visible from ventral view; no trace of a tympanum; the supratympanic fold distinct, terminating above arm; no glandular thickening or folds at or near jaw angle.

Web between the first two fingers very narrow; that between the second and third more extensive, while that between the outer finger still larger is equivalent to between one-fourth and one-third of the total area; the webbing extended along edge of fingers as a narrow fold; digital pad of the first finger scarcely wider than digit; those of other digits larger, subequal, about as wide as half the length of eye; distal subarticular tubercle of fourth finger double, that of third irregular, partially divided, of other fingers, single, rounded; proximal tubercles of two outer fingers small; fingers flattened with numerous, irregular supernumerary tubercles or

granules on ventral surfaces of fingers and on palm; an elongate tubercle on base of first finger and a large outer palmar tubercle; a skin fold on outer edge of fourth finger, continuous with a strong fold on outer ventral surface of arm.

Feet about three-fourths webbed, the terminal pads smaller than those on fingers; subarticular tubercles rather small, those at base of disks rather prominent; the granular, supernumerary tubercles less prominent than those on hands; an oval inner metatarsal tubercle, the outer metatarsal tubercle wanting; a sharp-edged tarsal fold present, curving somewhat at its proximal end; a few small pustules on heel; skin on dorsal surface of body and hind limbs finely corrugated; on arms the corrugations are coarser; on chin, throat and breast the granulation low, rather indistinct; on abdomen, and over the greater part of the ventral surface of femur and region below anus the granulations are coarse, the granules irregular in size; posterior surface of femur smooth for the most part.

Color in life.—Above generally brownish with some ten or eleven large scattered spots of dark brown ringed about with blackish dots; numerous smaller spots on head; a fine black dorsal median line beginning on the interorbital region and extending nearly the length of the body; loreal and tympanic regions somewhat grayish with numerous black flecks or short irregular lines; an irregular narrow silver line on upper lip extending to angle of jaw; three prominent brown bars on forearm, two or three less distinct across hand and one on upper arm. On sides, grayish brown with black dots, these a little larger and irregular along edges of abdomen; on femur a narrow grayish brown stripe edged with darker brown, broken by very short transverse bars, four on each femur; the anterior femoral face lightly stippled with brown, the posterior face densely and evenly stippled with darker brown; a silvery gray, black-edged, irregular line above anus; the glandular pustules below anus silver-white; tibia with four well-defined transverse bars, bending onto the anterior face of tibia; bars on foot and toes less distinct; under surfaces of foot and hand stippled with brown; ventral surface of abdomen and limbs dirty whitish; chin and throat cream white, with a few black dots on edge of lower jaw; fold on forearm white, black edged. A dim whitish line on outer toe, continued to, and across heel; iris of eye golden with a minute stippling of black; a stippling of black pigment on roof of mouth anterior to the choanae.

Measurements (in mm.).—Snout to vent, 27.6; width of head at jaw angle, 11.2; upper eyelid, 2.5; interorbital width, 2.9; length of eye, 3.4; eye to nostril, 2.8; snout to line drawn between angle of jaws, 10.5; arm to tip of third finger, 19.2; hind leg (anus to tip of fourth toe), 47.7; tibia, 16; foot 20.

Relationship.—This small species offers little clue to its relationships with other Hylas. The concealment of the tympanum might suggest a relationship with other forms lacking a visible tympanum, but in itself I doubt that this shows its true relationship. I strongly suspect that the relationship is with the group including *underwoodi*, *robertmertensi*, and perhaps *phlebodes* and *leonhard-schultzi*, forms characterized by the double

sub-articular tubercle on the outer finger. However, the mode of pigmentation of the femur and coloration fail to confirm this association.

Remarks.—The holotype was collected at night in a tiny rain pool during a downpour. When discovered, it was almost wholly hidden by a piece of wood and immediately concealed itself under it. No other specimens of the species were found.

***Hyla erythromma*, sp. nov.**

Plate II, fig. 1.

Holotype.—No. 5976; collected in pines along Mexico-Acapulco highway at km. 350, near a spring known as Agua del Obispo, between Rincon and Cajones, July 23, 1936; E. H. Taylor, collector.

Diagnosis.—Head not or scarcely wider than the body; vomerine teeth in two transverse groups, which are closer to each other than to the choanae, and not, or scarcely reaching a line drawn between the anterior edges of the choanae; tongue somewhat cordiform, emarginate posteriorly; snout rather obtusely pointed, not, or extending but slightly, beyond mouth; eye large and prominent, its length equal to the length of snout, canthus rostralis distinct; nostrils separated by a distance a little less than that between upper eyelids; width of upper eyelid about a fifth less than distance between upper eyelids; tympanum moderately distinct, the diameter contained in length of eye two and one half times; a well-defined straight supratympanic fold conceals the upper part of tympanum; if limbs are folded, the heels overlap one and one-half millimeters; the tibiotarsal articulation reaches a little behind anterior edge of eye; no skinfold on the breast; three outer fingers about one-fourth webbed; toes about one-fourth webbed; a low, more or less continuous fold on forearm; outer metatarsal tubercle moderate; a very small outer tubercle present; skin above very smooth; chin and breast with a faint suggestion of granulation; abdomen strongly granular as is part of the ventral and posterior face of the femur; lip with a narrow discontinuous white line, widening into spots below eye; sides of body with large white spots more or less confluent, bordered by irregular blackish spots; a white spot on upper arm; eye reddish.

Description of holotype.—Width of the head very slightly greater than the length measured from a line connecting angles of jaws; the eyes prominent, in dorsal view extending beyond outline of jaw; the upper eyelid only slightly narrower than the interorbital width (about one-ninth); the longitudinal diameter of eye equal to the length of the snout; snout distinctly deeper at eye than at nostril; area about nostrils not raised and no depression exists between them, their distance from the most anterior point of snout about one millimeter; the canthi projected forward would intersect above the extreme tip of snout; lores sloping, very slightly concave; tympanum moderately distinct, the upper part partially concealed by the tympanic fold.

Tongue very large, more or less cordiform, the posterior emargination shallow, but distinct; groups of vomerine teeth closely approximated, separated from choanae by half the length of one group; choanae more than

one half larger than a single group of teeth, and about three times as large as the openings of the eustachian tubes and smaller than the choanae in *Hyla pinorum*; region in front of choanae lacking pigment.

Skin above on body and limbs completely smooth; below, the chin, throat and breast show only a faint suggestion of granulation; abdomen completely granulate; ventral face of femur with granules, the greater part of which are double the size of those on the belly; disks on outer fingers about size of the tympanum; the outer subarticular tubercle of fourth finger divided; only a trace of an interdigital membrane between first and second fingers; remaining digits one-fourth webbed, the depth of the membrane 1.5 to 1.8 mm.; no well-defined fold along edge of outer toe, the skinfold on forearm only moderately distinct; pad at base of thumb moderate; two palmar tubercles, the inner more or less divided; numerous supernumerary tubercles or granules on fingers and palm; when limbs are folded at right angles to body, the heels overlap a little more than two millimeters; hind limb brought forward, the heel reaches the anterior edge of eye; toes about three-fourths webbed, the webs not reaching pads save on outer toe, the digital pads smaller than those on outer fingers; inner metatarsal tubercle moderate; outer present, but small; none or only a faint suggestion of a tarsal fold.

Color in life.—Above somewhat purplish olive with a few indistinct dark flecks or spots, the spot on snout rather large and prominent; lores without a black bar, the lip edged with a silver line which extends to angle of jaw, widening irregularly to form a light spot below eye; a few darker spots or reticulations border this; a series of white areas more or less contiguous, are bordered by black on the sides from axilla to groin, and a similar spot runs along proximal dorsal part of arm; the femur is clouded grayish and brownish above; the anterior and posterior faces are uniformly pigmented with brown; tibia, fibula with dimly evident bars; a rather indistinct line on outer edge of foot to heel; and one on hand extending to elbow; a whitish line above anus, and a larger one below; no unpigmented areas on hands or feet; below nearly paper white with three or four tiny black dots on jaw.

Measurements (in mm.).—Snout to vent, 28.4; head width, 10.2; head length to angle of jaw, 9.8; length of eye, 3.3; length of snout, 3.7; inter-orbital width, 3.1, upper eyelid, 2.85; eye to nostril, 2.9; distance between nostrils, 3; arm, 15; leg from anus, 43.1; tibia, 14.2; foot, 18.5; tympanum, 1.3.

Remarks.—This small species was collected in pine country under a fallen pine log in the afternoon. This type of habitat is doubtless a very unusual one as search for several days in this region revealed no further specimens under the very large number of logs examined. The specimen is female, apparently young.

Relationships.—On first examination this species suggests *Hyla taeniopus*, from which species it differs in having a head no wider than the body; the snout not projecting beyond lip; absence of well-defined bars on limbs; snout longer than eye, lesser amount of webbing on foot (since web does not reach disk of third finger); tarsal fold not present, and concealed parts of limbs pigmented.

It shows certain characters in common with young *Hyla bistincta* but differs in numerous points. It differs in a smaller eye in proportion to the snout length, a smoother skin, a larger tympanum, a more flattened head, lack of spotting on the anterior and posterior faces of femur, in a somewhat greater extent of webbing between toes and fingers, the lesser development of the thumb pad and a different eye color. Whether horny areas are present in the male can not be determined now. Numerous other differences are obvious on a comparison of descriptions, especially the absence of the curious anal flap present in *H. bistincta*.

Hyla bistincta Cope.

Plate III, figs. 1 and 2.

This species, long known from a single type specimen, was rediscovered and a small series taken. These have been compared with the type and agree with it in essential details. The curious anal flap (perhaps somewhat distorted in the type), and the horny spinules on the second finger are present in the type. Two other specimens, which I identify as this species (U. S. N. M. Nos. 38266-38267 from Cordova, Mexico), likewise agree in having the elongate anal flap. The exact type locality is unknown, but the recognition of specimens from Cordova lends weight to Kellogg's suggestion that the type locality is "most probably" Vera Cruz (State).¹

The following specimens were taken:

Nos. 5888-5895 collected about 2 miles directly north of Cuernavaca, Morelos, Mexico, July 12, 1936, at night, H. M. Smith and E. H. Taylor, collectors; and Nos. 5886, July 18, 1936, and 5887 Aug. 6, 1936, Uruapan, Michoacán, Mexico, H. M. Smith, and 5896 between Cuernavaca and Mexico City, near Tres Cumbres (Tres Marias) at km. 63, elev. 9,000 ft. by E. H. Taylor Aug 4, 1936 (killed in road by auto).

Diagnosis.—A medium-sized hyla; head not wider than body; vomerine teeth in two closely approximated groups, a single group nearly once and a half the size of choanae, slightly converging; tongue subcircular, emarginate behind; snout projecting slightly; eye large, its length one fifth or one fourth longer than snout; upper eyelid about equal to or slightly greater than the interorbital distance; canthus rostralis distinct, more or less angular; tympanum oval, its width contained in eye length 3 to 3½ times, its height about 2½ times; a much thickened supratympanic fold; a very rudimentary web between fingers; digital pads of three outer fingers very much larger than tympanum; tibiotarsal articulation reaches to middle of eye; toes about three fourths webbed in males, less in females; above gray or brownish, without bars on limbs; a black reticulation on sides enclosing rounded white spots from axilla to groin, continues on anterior face of femur; posterior femoral face similarly colored; skin smooth or minutely corrugated above; below pustular granules on chin, throat and breast; abdomen densely granulate; anus covered by a flap, which throws opening nearly on a level with the ventral surface of the femur; first finger very greatly thickened at base, with a concealed pollex bone 3½ mm. long; a heavy,

¹ Kellogg, Bull. U. S. N. M. No. 160, 1930, p. 163.

horny deposit over the inner and dorsal face of first finger, extending to pad; inner surface of second finger likewise covered, sometimes a small patch on third.

Description of species (from No. 5888).—Head wide, distinctly wider than long, but narrower than body; canthi converging if projected, and intersecting posterior to tip of snout; region about nostrils not raised, area between them flat; anterior profile of snout semicircular, seen from side, projecting somewhat beyond the mouth; loreal region sloping obliquely, somewhat concave; upper eyelid slightly wider than the interorbital distance, nearly equal to distance of eye to nostril, and likewise equal to depth of snout at nostril; eye large, projecting; tympanum oval, its diameter (on longitudinal axis) contained in eye length more than three times; distance from eye one and a half its width; a thick glandular fold from eye to arm, curving slightly and concealing upper part of tympanum.

Vomerine teeth in two large, closely approximated groups, each much larger than the relatively small choanae, and converging slightly; they lie between choanae, reaching their upper borders and extending behind to posterior borders of choanae; openings to the vocal sacs posterior, near the inferior angle of the mouth; tongue subcircular, distinctly notched behind.

Arms heavy, the three outer digits with large terminal pads, the largest much greater than the tympanum, its width contained in the length of eye two times; web between fingers rudimentary, the greatest depth of the web between fingers a little less than one millimeter; distal subarticular tubercles large, single; proximal tubercles small; supernumerary tubercles in lines, indistinct; dermal flaps on sides of fingers barely indicated; first finger enormously thickened at base, the thickening covered by a deep brown, horny, spiny excrescence covering part of ventral surface, the inner and most of the dorsal surface of swelling and finger and extending to pad; a similar elongate patch of horny excrescences on inner edge of second finger, and a trace of a patch on third near pad; the swelling contains a bone, representing the pollex that is $3\frac{1}{2}$ mm. in length; no fold on arm; feet about two-thirds to three-fourths webbed, the membrane failing to reach the pads save as a narrow fringe; a flat, oval inner metatarsal tubercle, the outer apparently wanting; distal subarticular tubercles large; proximal tubercles very small, rather indistinct; supernumerary tubercles very indistinct; a rather indistinct tarsal fold, showing an edge broken by rather flat pustules; a narrow fringe on outer edge of fifth toe; the tibio-tarsal articulation reaches to middle of eye; when limbs are folded at right angles to body the heels barely overlap; a flap of skin, apparently with two lateral glandular areas, carries the anal opening some distance ventrad.

Skin generally smooth, save for very fine, rather indistinct corrugations below chin, throat and breast, with scattered pustules; surface of abdomen and ventral surface of femur granular.

Color in life.—Reddish brown above on all exposed surfaces; sides of head more reddish bronze, with a deeper brown stripe from nostril to eye and a dark brown mark following the supratympanic fold; lip very indistinctly lighter than lores; sides reticulated with black brown, inclosing canary-yellow spots; upper anterior face of femur and posterior face blackish

TABLE OF MEASUREMENTS IN MM.—*Hyla bistincta* Cope.

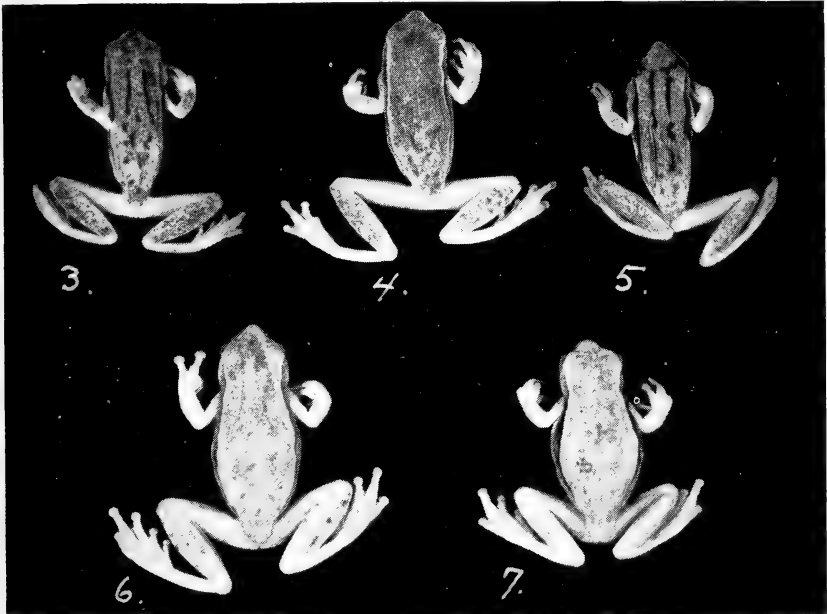
Number.....	5886	5888	5890	5893	5899	5887	5892	5894	5891	5895
Sex.....	♀	♂	♂	♂	♂	♀	♂	♂	♂	♂
Snout to vent.....	31	51	48.5	48	48	52	46	46	45	43
Snout.....	3.5	4.2	4.5	4.6	4.5	5.1	4.2	4.5	4.3	4.1
Head width.....	11.1	18.5	16.7	17.6	17.5	17.8	16	16	16	15.6
Head length (snout to jaw angle).....	10	14.5	15.5	14.1	14.1	14.8	13.5	12.8	13.5	12.8
Diameter of eye.....	4	5.7	5.3	5.5	5.5	5.8	5.3	5.1	5.3	5
Tympanic width.....	1	1.8	2	2	2	2.1	1.8	1.8	1.6	2
Tympanic height.....	1.3	2.6	2.8	2.7	2.6	2.1	2.1	2	2.1	2.2
Eye to nostrils.....	3	4.1	4.1	4	3.8	4.1	3.8	4	3.6	3.8
Between nostrils.....	3.2	3.5	3.3	3.3	3.3	4.1	3.3	3	3.3	3
Upper eyelid, width.....	3.3	4.7	4.3	4.9	4.7	4.7	4.3	4	4	4
Interorbital distance.....	3.3	4.2	4.5	4.8	4.2	5.1	5	4	4.5	4
Arm.....	21.2	32.5	34.5	35	31.5	34.2	32	31.8	29	30
Hind leg.....	41	75	73.8	79.2	75	75	73	71	72	71
Tibia.....	15.2	25	25	25	23	25	24.2	23.3	24	23
Foot.....	21	37	36	37.6	33	35	32	31.2	32	30.2



1.



2.



3.

4.

5.

6.

7.



2.



inclosing rounded canary-yellow spots; dorsal surface of femur lacking trace of bars; outer face of arm dark with small cream spots; toes and fingers with very indistinct lighter markings; edges of tibiae and feet darker with light spots; ventral surface cream, save that the chin has some small black spots.

Variation.—The most notable variation has to do with the dorsal coloration, variation not due to sex dimorphism. Another specimen, No. 5889, was light yellow green on all dorsal surfaces, the head more nearly leaf green; lateral light spots a greenish yellow. No. 5890, very pale leaf green, the green scarcely in evidence on the dorsal surface of feet; light spots on femur cream; ground color of posterior surface of thigh deep lavender as is dorsal surface of feet. Nos. 5891, 5892, 5893, similar to preceding, save that the dorsal surfaces are of a deeper green; 5894, dull olive above; grayish on dorsal surface of femur and feet; flesh color ventrally; posterior surface of femur olive-lavender; 5895, generally greenish, with a darker brownish mark on dorsal surface. No. 5887 is a brownish lavender above with numerous darker flecks on back and limbs; ventral surface flesh; posterior surface of thighs and sides darker lavender; light spots yellow. No. 5886, the smallest specimen (30.5 mm.) is generally grayish above with darker flecks and dim reticulations.

The two females (from Michoacán) have the webbing between fingers the same, save the fringes on fingers are somewhat more distinct than in the type, but the webbing between the toes is very distinctly less. A female specimen from near Tres Cumbres has the same type of webbing. Obviously, it is due to sexual dimorphism.

The table of measurements records variation in body proportions.

Remarks.—The Cuernavaca specimens, all males, were found by tracing their curious, rana-like call. In fact, we were so certain they were *Rana pipiens* that we totally disregarded them until one was discovered by Smith when its head was protruded from under a rock in the edge of the water. We then began to trace down other calls. All of the specimens were solitary. The character of the anal flap, the character of the pollex bone and the horny patches on the first and second fingers will easily distinguish this species from other known Mexican frogs.

EXPLANATION OF FIGURES.

Plate II.

- Fig. 1, *Hyla erythromma*, sp. nov. Type No. 5976, Agua del Obispo (km. 350, Mexico-Acupulco highway), Guerrero, Mexico, July 23, 1936.
- Fig. 2, *Hyla pinorum*, sp. nov. Type No. 5972, Agua del Obispo (km. 350, Mexico-Acupulco highway), Guerrero, Mexico, July 25, 1936.
- Fig. 3, *Hyla robertmertensi*, sp. nov. No. 2286, ♂, paratype, from near Asuncion, Chiapas, Mexico, Aug. 27, 1935, actual size.
- Fig. 4, Same. Paratype. No. 2271, ♂, near Tapachula, Chiapas, Mexico, Aug. 24, 1935.
- Fig. 5, Same. Paratype. No. 2287, ♂, near Asuncion, Chiapas, Mexico, Aug. 27, 1935.

Fig. 6. Same. Type. No. 2270, near Tapachula, Chiapas, Mexico, Aug. 24, 1935.

Fig. 7. Same. Paratype. No. 2276, near Tonolá, Chiapas, Mexico, Aug. 27, 1935.

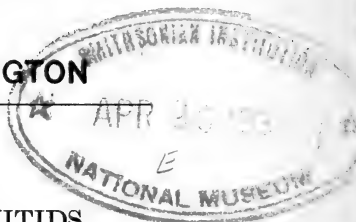
Plate III.

Fig. 1. *Hyla bistincta* Cope. No. 5890, from near Cuernavaca, Morelos, Mexico, July 12, 1936.

Fig. 2. Same. No. 5888. Same date and locality.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



FIVE NEW NORTH AMERICAN ZONITIDS.

BY J. P. E. MORRISON,¹

Aid, Division of Mollusks, U. S. National Museum.

In the course of work on the North American Zonitidae in the collections of the United States National Museum, the following new species were discovered:

Retinella (Glyphyalus) virginica, new species.

Plate IV, figs 14-16.

Shell markedly depressed, somewhat flattened above and below, umbilicate, vitreous, pinkish-horn colored. The radial grooves (major growth wrinkles) are rather closely, but irregularly spaced; minor growth wrinkles less prominent; with minute spiral striae above and below, less distinct than in *R. burringtoni*. The spire is lower than that of any of the related species, in some examples approaching a plane; whorls 5 to 6 in adult shells. The earlier whorls seen from above slowly increasing and closely wound; the last whorl not rapidly expanding as in *R. wheatleyi*. Umbilicus funicular, rapidly widened by the slight centrifugal growth of the body whorl, in immature shells contained about 5 times in the major diameter of the shell; in adult shells about 3¾ times in the major diameter of the shell. Aperture transverse, wider than high; upper end of peristome meeting the penultimate whorl horizontally well above its periphery.

The type (U. S. N. M. Cat. No. 421081) was collected on the west slope of the Blue Ridge, in Clarke Co., Virginia, some 3 miles west of Trapp, Loudoun Co., by Paul Bartsch and J. P. E. Morrison, and measures: Height 2.1 mm.; Maj. diam. 5.3 mm.; Min. diam. 4.6 mm.; Aperture height 1.7 mm.; Ap. diam. 2.1 mm.; Umb. diam. 1.4 mm.; Whorls, 5.2.

Four paratypes (U. S. N. M. Cat. No. 421082), from the same lot, measure:

	Maj. diam.	Min diam.	Ap. height.	Ap. diam.	Umb. diam.	Whorls
1.9 mm.	4.4 mm.	4.0 mm.	1.6 mm.	1.9 mm.	0.9 mm.	5.0
1.8	4.1	3.7	1.5	1.8	0.8	5.0
1.3	2.7	2.4	1.1	1.2	0.6	4.0
1.1	2.5	2.3	1.0	1.1	0.5	3.6

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This newly discovered form may be distinguished by its larger size; by the proportionately wider umbilicus of adults; by the greater number of more slowly increasing whorls, with a lower spire and proportionately smaller aperture.

Other colonies of this species have been found by the writer on the top of the Blue Ridge, 1 mile south of Snicker's Gap, Clarke Co., Va.; on the north end of Loudoun Heights, Loudoun Co., Va.; and on the west slope of this portion of the Blue Ridge, across the Shenandoah River from Harper's Ferry, in Jefferson Co., West Virginia. A single specimen from Lexington, Virginia, is also in the National Museum collections. Some individuals among those collected in a rock-slide on Loudoun Heights, Va., have hyaline shells, lacking the pinkish horn color; in other respects they are typical.

The radula is typical of the section *Glyphyalus*, s. s.; an immature specimen from the Loudoun Co., Va., colony having the formula: 17 to 19—3—1—3—17 to 19. The individual teeth are similar to H. B. Baker's figures of the radula of *R. burringtoni* Pilsbry.²

According to the sizes of live and dead shells collected in July, August, and October, this species is probably mature in the spring (with a one-year life history) as has been indicated by H. B. Baker for *R. burringtoni*, *R. cumberlandiana*, *R. roemeri*, and *R. cryptomphala*.³

Retinella (Glyphaloides ?) floridana, new species.

Plate IV, figs. 11–13.

Shell of five whorls, possessing the characteristic sculpture of the subgenus, with regularly and closely spaced major growth wrinkles, of about the size of *R. roemeri*, but with the base of the body whorl more deeply rounded near the umbilicus, which has consequently steeper walls. The spire is regularly depressed-conic, but constantly higher, as is the body whorl, than in the specimens of *roemeri* seen. The aperture is roundly lunate, widest below the middle; peristome more sharply rounded at the periphery and in the columellar region. Umbilicus deep, steep-walled; contained about four times in the major diameter of the shell.

The type (U. S. N. M. Cat. No. 421084) was collected by E. H. Sellards near Ocala, Marion Co., Florida, "from crevices and caverns in limestone. Pleistocene?" (collector's No. 8074), and measures: Height 2.6 mm.; Maj. diam. 4.5 mm.; Min. diam. 4.0 mm.; Aperture height 1.7 mm.; Ap. diam. 1.8 mm.; Umb. diam. 1.1 mm.; Whorls 5.2.

Nine paratypes (U. S. N. M. Cat. No. 421085) measure as follows:

²Proc. Acad. Nat. Sci. Phila. 80, pl. 4, fig. 3, 1928.

³Op. Cit., 82, pp. 200, 202, 205, 213, 1930.

Height.	Maj. diam.	Min. diam.	Ap. height.	Ap. diam.	Umb. diam.	Whorls.
2.4 mm.	4.5 mm.	3.9 mm.	1.7 mm.	1.8 mm.	1.2 mm.	5.0
2.4	4.1	3.7	1.6	1.6	1.1	5.2
2.4	4.1	3.6	1.7	1.6	1.1	5.2
2.4	4.1	3.7	1.6	1.7	0.9	5.0
2.4	4.3	3.8	1.6	1.8	1.0	5.0
2.3	3.8	3.6	1.5	1.4	1.0	5.0
2.3	4.0	3.6	1.5	1.7	0.9	4.9
2.1	3.9	3.5	1.5	1.7	0.9	4.7
2.4	3.8	3.5	1.6	1.5	0.9	5.0

Average of the ten measured types:

2.37 mm. 4.11 mm. 3.69 mm. 1.6 mm. 1.66 mm. 1.01 mm. 5.02

The many specimens in the original lot (U. S. N. M. Cat. No. 219003) are all dead shells, weathered to a chalky appearance. It appears unlikely that this species is Pleistocene as doubtfully noted by the collector. It may, however, be extinct at the present time. It should be found in the Ocala (Eocene) limestone area, wherever surface soil conditions are (or were) favorable.

***Retinella (Glyphyalinia ?) columna*, new species.**

Plate IV, figs. 8-10.

Shell small, depressed, polished, vitreous, with the imperforate base widely indented in the umbilical region. The whorls (4 in type) are closely wound, somewhat flattened above and below, the last expanding toward the aperture. Nuclear whorls 1.3, finely punctate. The shell is finely spirally striate, with the major and minor growth wrinkles equally indistinct above and below; there are perhaps ten widely spaced major growth wrinkles on the last whorl. Aperture transverse-lunate; peristome meeting the body whorl horizontally above, then slanting toward the regularly and evenly rounded periphery, and meeting the body whorl at a very acute angle below, almost parallel to the upper slope of the peristome. Base imperforate; umbilicus closed by a tongue-shaped callus as in *cryptomphala*. The columellar callus is relatively heavy, gradually thinned out basally, reaching almost to mid-basal point of peristome; centrally it is prominent, filling up the acute columellar angle of the aperture for a distance. This filling shows through the base of the shell as an area a little wider than the callus filling the umbilicus.

The type (U. S. N. M. Cat. No. 362009) was collected by C. E. Engberg, at Olga, Washington, and measures: Height 1.15 mm.; Major diameter 2.45 mm.; Minor diameter 2.15 mm.; Aperture height 0.9 mm.; Aperture diameter 1.1 mm.; Whorls 4.

This new form is so strikingly different, with its small size, glassy, almost smooth shell, and with the prominent columellar callus forming an internal pillar 0.4 mm. in diameter, that there is no hesitancy in describing it from the single specimen seen.

Paravitrea reesei, new species.

Plate IV, figs. 5-7.

Shell small, subdiscoidal, polished, the $5\frac{3}{4}$ whorls (of type) closely wound. Spire low, with shallow sutures. Periphery well rounded above and below, in an almost even curve from suture to umbilicus. Sculpture consisting of irregularly spaced growth wrinkles or radial grooves; spiral sculpture indistinct above and below. Umbilicus deep, well-like, exhibiting all the whorls to the apex, contained about 5 times in major diameter of the shell. Aperture transverse-lunate; lip thin, simple.

Internal armature consisting in the smallest shells seen (of 2 to $2\frac{1}{2}$ whorls and 1.0 to 1.3 mm. major diameter) of two conical teeth in a radial row, dividing the periphery into three almost equal sectors. In a specimen of 3 whorls and 1.4 mm. major diameter, two other teeth appear, a third prominent conical tooth basal to the earlier pair, and a fourth which is an indistinct callus or tubercle just beneath the suture. All the teeth are retained in the largest (adult) specimens; the uppermost prominent tooth is at the periphery, the two others in each row are evenly spaced on the base of the whorl.

The type (U. S. N. M. Cat. No. 423599) was collected on Peters Mountain, Monroe Co., West Virginia, along State highway #3, about $\frac{1}{4}$ mile from the Virginia boundary, by G. R. Hunt. It measures: Height 1.6 mm.; Major diameter 3.1 mm.; Minor diameter 3.0 mm.; Aperture height 1.2 mm.; Aperture width 1.45 mm.; Umbilical diameter 0.6 mm.; Whorls 5.75.

This new form may be easily distinguished by its small size; three prominent teeth in a radial row retained in large shells; and by an umbilicus narrower than that of *pilsbryana* Clapp. It is named in honor of A. M. Reese, who has inspired much recent work in the systematic Zoology of West Virginia.

Gastrodonta (Clappiella) saludensis, new species.

Plate IV, figs. 1-4.

Shell small, greenish, discoidal, about twice as wide as high. Spire almost flat; whorls five, tightly wound, practically in one plane, slowly and regularly increasing, well rounded above and below but somewhat flattened peripherally and separated by deep sutures on the spire and in the umbilicus. The last whorl is deflected slightly. Umbilicus wide, shallow, exhibiting all the whorls to the apex. Sculpture remarkable, consisting of regular rows of oval beads, projecting outward from the surface of the whorl, with the longer dimension radial, the whole giving the appearance of the grains on an ear of corn. The rows of beads, about 25 in number, extend from suture to suture. Nuclear whorls with the beaded ribs narrower than the interstices, but the ribs are gradually transformed into prominent rows of beads on later whorls, with the interstices inconspicuous. Aperture subrescentic, higher than wide; peristome nearly vertical, a little sinuous above. Lip thin, but showing the beads along its edge. Internal lamellae complex, consisting of 3 or 4 pair of lamellae in the last third of

the last whorl. The smaller basal lamella is high, triangular, with a sinuous radial base, the inner corner bent over toward the aperture, the peripheral end upright but strongly hooked toward the aperture. At a little greater distance within is the larger, chisel-like and somewhat double, peripheral lamella, which forms a transverse barrier, with the upper end strongly bent toward the aperture. Alternating at equal distances beyond are the remaining 4 to 6 lamellae seen. Apparently these lamellae are progressively resorbed as new ones are added with new shell growth.

The type (U. S. N. M. No. 423597) was collected by the writer on the south side of Walnut Mountain, on a slope along Fall Creek, a tributary of the Saluda River, in the Saluda Mountains, Greenville Co., South Carolina. This locality is about a mile south of the North-South Carolina boundary on U. S. route 25. The type measures: Height 1.5 mm.; Major diameter 3.5 mm.; Minor diameter 3.2 mm.; Aperture height 1.3 mm.; Aperture width 0.9 mm.; Whorls 5.0.

Eight paratypes (U. S. N. M. No. 423598) have the following measurements:

No. of whorls	Height in mm.	Maj. diam. in mm.	Min. diam. in mm.	Ap. height in mm.	Ap. width in mm.
5.4	1.6	3.5	3.3	1.2	0.9
5.0	1.5	3.2	3.0	1.2	0.9
5.0	1.5	3.2	3.0	1.2	0.9
4.8	1.5	3.1	2.9	1.2	0.9
4.4	1.3	2.9	2.8	1.1	0.8
4.3	1.3	2.7	2.5	1.2	0.8
4.1	1.3	2.7	2.5	1.1	0.8
4.0	1.2	2.4	2.2	1.0	0.7

This interesting little form was taken from the lower layers of leafmold on a steep slope in company with:

<i>Polygyra albolabris</i> (Say)	<i>Mesomphix perlaevis vulgatus</i> H. B. B.
<i>Polygyra wetherbyi</i> (Bland)	<i>Retinella indentata paucilirata</i> (Morelet)
<i>Polygyra christyi</i> (Bland)	<i>Zonitoides elliotti</i> (Redfield)
<i>Polygyra inflecta</i> (Say)	<i>Zonitoides limatulus</i> (Ward)
<i>Polygyra hirsuta</i> (Say)	<i>Gastrodonta interna</i> (Say)
<i>Mesomphix inornatus</i> (Say)	<i>Helicodiscus parallelus</i> (Say)

Although the anatomy of this new species has not been examined, the unique arrangement and shape of the apertural lamellae, which match those seen in the single (immature) specimen of *Gastrodonta (Clappiella) aldrichiana* Pils. in the National Museum collections, indicate its close relationship thereto. To the unaided eye, this form is almost if not identical with *Helicodiscus parallelus*; under magnification, the differences are at once apparent.

EXPLANATION OF FIGURES, PLATE IV.

Figs. 1-3. *Gastrodonta (Clappiella) saludensis*, n. sp. Holotype.

Fig. 4. *Gastrodonta (Clappiella) saludensis*, n. sp. Internal lamellae of a paratype.

Figs. 5-7. *Paravitrea reesei*, n. sp. Holotype.

Figs. 8-10. *Retinella (Glyphyalinia?) columna*, n. sp. Holotype.

Figs. 11-13. *Retinella (Glyphyaloides) floridana*, n. sp. Holotype.

Figs. 14-16. *Retinella (Glyphyalus) virginica*, n. sp. Holotype.

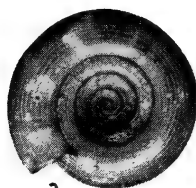
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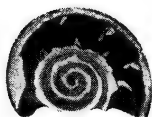
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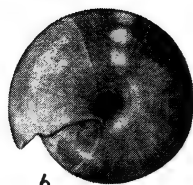
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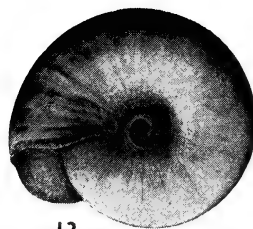
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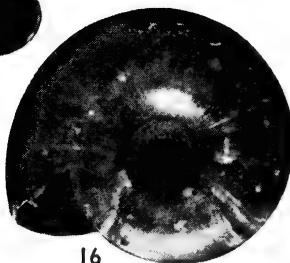
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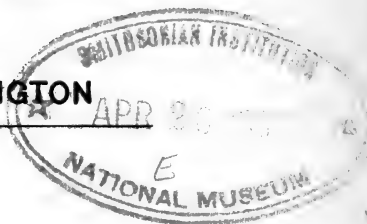
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PROCEEDINGS
OF THE
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THREE NEW BIRDS FROM THE MALAYSIAN
SUBREGION.

BY J. H. RILEY.¹

The three following birds from islands in the vicinity of Sumatra are believed to be undescribed. They may be known from the following descriptions:

Malacornis cinerea niasensis, subsp. nov.

Type.—Adult male, U. S. National Museum, no. 180,938, Mojeia River, Nias Island, western Sumatra, March 10, 1905. Collected by Dr. W. L. Abbott.

Similar to *Malacornis cinerea cinerea* (Eyton) of the Malay Peninsula, but averaging darker above and larger, especially the bill. Wing, 83.5; tail, 62; culmen, 17.

Remarks.—This form is founded upon three males, one female, and one unsexed from Nias. These have been compared with a good series from the Malay Peninsula and a small series from Banka, Sumatra, and Borneo. The series from the latter islands seem to agree with the mainland bird in color and size. While the color differences between Malay and Nias specimens are not great, the difference in size seems to be fairly constant.

Three adult males from Nias measure: wing, 79.5-83.5 (81.7); tail, 62-64 (63); culmen, 16-17 (16.7).

Ten adult males from the Malay Peninsula, measure: wing, 74-78 (76.3); tail, 59-63 (61.5); culmen, 15-16 (15.5).

Five males from Banka (1) and Sumatra (4), measure: wing, 73-78.5 (76.3); tail, 58-64 (61.6); culmen, 15.5-16 (15.8).

Six males from Borneo measure: wing, 71-78 (75.5); tail, 57.5-65 (59.9); culmen, 15-16.5 (15.7).

Macronus ptilosus batuensis, subsp. nov.

Type.—Adult male, U. S. National Museum, no. 179,984, Tana Bala, Batu Islands western Sumatra, February 13, 1903. Collected by Dr. W. L. Abbott.

Similar to *Macronus ptilosus ptilosus*, but averaging larger, especially

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the bill; the gray area of the breast more extensive. Wing, 72; tail, 64.5; culmen, 17.5.

Remarks.—This form is founded upon two specimens, the type and one unsexed, but almost certainly a male. They have been compared with a large series from the Malay Peninsula and a good series from Sumatra.

Ten males from the Malay Peninsula, measure: wing 62–70 (66.2); tail, 58.5–65 (61.2); culmen, 15–17 (16).

The two males from Tana Balla: wing, 70–72; tail, 60–64.5; culmen, 17.5–18.

Five males from Sumatra: wing, 66.5–71 (68.2); tail, 60–62 (60.9); culmen, 15.5–17 (16.3).

***Macronus ptilosus minor*, subsp. nov.**

Type.—Adult male, U. S. National Museum, no. 180,576 Klabat Bay, Banka Island, June 29, 1904, collected by Dr. W. L. Abbott.

Similar to *Macronus ptilosus reclusus* of Borneo, but averaging smaller, especially the bill; lighter below. Wing, 67; tail, 62; culmen, 16.

Remarks.—Both *Macronus ptilosus reclusus* and *Macronus ptilosus minor* differ quite widely from *Macronus ptilosus ptilosus* of Sumatra and the Malay Peninsula in lacking the gray chest patch of the latter, the upper- and lower-parts are a more tawny brown, and the black of the throat is more restricted. The present form is founded upon two males and one female from Banka and has been compared with four specimens from Borneo.

The three specimens from Banka, measure: wing, 66–68 (67); tail, 62–63 (62.3); culmen, 15.5–16 (15.8).

The four specimens from Borneo (two males, one female, and one unsexed) measure: wing, 70–73 (71.7); tail, 60–68 (63.6); culmen, 17–17.5 (17.1).

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NEW RACES OF THE GENUS *OTUS* FROM
NORTHWESTERN MEXICO.

BY ROBERT T. MOORE,
California Institute of Technology.

Two of the rarest owls of the genus *Otus* are *Megascops vinaceus* Brewster of Chihuahua and *Megascops hastatus* Ridgway of Sinaloa. Of the latter only four specimens hitherto have been recorded, including the type and one other from the Arid Lower Tropical Zone of Sinaloa. Of the former, the type from Durasno, Chihuahua, has been unique. These two species, although patently differentiated by diagnostic markings and noteworthy differences in the toes, have been confused by ornithologists. In his "Key to Species of American Owls," Nov. 1934, Leon Kelso, by an understandable misconception, was led into crediting *vinaceous* as taken at Guirocoba, Sonora (Dickey Collection No. 30832), and giving its range as the "Arid Tropical Zone." The unique type was taken at Durasno, a mining town on the high tableland of Chihuahua and the Guirocoba specimen is not *vinaceous*. This misconception was based on the faulty identification of it in van Rossem's "Sonora Land Birds," as the "second known specimen of *vinaceous*." The type of *vinaceous* was inspected on a visit to the Museum of Comparative Zoology in 1933, and, thanks to the courtesy of Dr. Friedmann of the United States National Museum, the type of *hastatus* was placed in my custody. Subsequently a correction was made in van Rossem's "Middle American Birds," stating that the Dickey Collection specimen "is *Otus hastatus hastatus* (Ridgway)." The gradual accumulation of nine new individuals, five similar to *vinaceous* and four to *hastatus*, makes necessary a reconsideration of this last statement.



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These accessions indicate that two new races are involved, one a true Arid Lower Tropical form of *vinaceus* inhabiting the cacti deserts of northwestern Sinaloa and the second a Transition and Arid Upper Tropical representative of the Arid Lower Tropical *hastatus*, the new form ranging from 1400 feet in extreme southeastern Sonora, to the mountains of Durango and southeastern Sinaloa. These are herewith described.

My acknowledgments are gratefully made to Dr. Herbert Friedmann and the Smithsonian Institution for the loan of the Type of *Megascops hastatus* and permission to examine the P. W. Shufeldt specimens from Campeche, to Mr. James L. Peters for permission to inspect the Type of *Megascops vinaceus* in the Museum of Comparative Zoology, to Mr. John T. Zimmer for courtesies in supplying necessary supplementary material from the American Museum of Natural History, to Mrs. Donald R. Dickey for permission to inspect the specimen mentioned and to Dr. Louis B. Bishop for the loan of a very important series of *cineraceous* and *xantusi*.

***Otus asio sinaloensis*, subsp. nov.**

SINALOA SCREECH OWL.

Type.—Male adult in full breeding condition; number 7332, collection of Robert T. Moore; original field number 19264; Guamuchil, northwestern Sinaloa, Mexico; March 19, 1934; altitude 45 feet; collected by Chester C. Lamb.

Subspecific characters.—Nearest to *Otus asio vinaceus* (Brewster), but grayer both above and below, distinctly less buffy on throat and upper back; light bars on outer webs of longest primary equal in width to dark bars, instead of narrower; light bars on proximal half of inner webs of same feathers much broader, wider than the darker interspaces; light colored marks on outer webs of exterior row of scapulars, where not vermiculated, much lighter buff; size smaller. *Sinaloensis* differs from *cineraceous* and *gilmani* of the southern border of the United States, in having the dark markings both above and below much finer and more delicately penciled and the legs heavily vermiculated with cinnamon or dark brown; a slightly more buffy cast both above and below and size smaller.

Range.—True *sinaloensis* is a bird of the cacti association of the Arid Lower Tropical Zone of northwestern Sinaloa. It probably nests in the several species of huge columnar cacti, having habits similar to those of *gilmani* of the cacti deserts of southern Arizona. The two specimens, taken on the Guirocoba Ranch, come from the higher altitude of 1460 feet, where the large cacti are scarce, streams bordered by enormous cypresses and the foothills heavily wooded with Palo Blanco. These birds are intergrades with *vinaceus*, but closer to *sinaloensis*, having the same wing markings, but a more buffy cast both above and below. One female from El Orito at a higher altitude in northeastern Sinaloa, Moore collection No. 8494, is closer to *vinaceus* than to *sinaloensis*, having the wing markings and deep buffy coloration of the latter, as well as deep buffy spots on the scapulars. Guamuchil marks the farthest south record for the species *asio*.

AVERAGE MEASUREMENTS OF *Otus asio sinaloensis* AND ALLIED RACES.

	Wing.	Tail.	Culmen from cere.
Males			
Type of <i>sinaloensis</i> from N. W. Sinaloa.....	142.1	75.2	12.6
1 adult from S. E. Sonora.....	146.9	78.2	12.3
Females			
2 adults from N. E. Sinaloa (intergrades)....	152.4	72.6	13.9
Type of <i>vinaceous</i> from Durasno, Chihuahua	151.0	76.0	14.0

Remarks.—The new race bears the same relation to *vinaceous* of the Mexican plateau that *gilmani* of the Arizona desert does to *cineraceous* of the upper Sonoran zone of eastern Arizona. Hitherto the type of *vinaceous* has been unique, but the discovery of the two specimens at El Orito, in extreme northeastern Sinaloa, close to the border of Chihuahua, indicates the validity of *vinaceous* as a distinct race.

Through their more buffy, so-called "pinkish," coloration above and below and heavily vermiculated buffy legs, both *sinaloensis* and *vinaceous* reveal affinities with *mccalli* of southern Texas. *Sinaloensis*, although a grayer bird than *vinaceous*, is distinctly more buffy throughout than *gilmani* and is closer to *xantusi* of Lower California. About the same small size as the last, it differs in its more dense vermiculation and finer streaking of the abdomen; more densely, brownish vermiculated legs; spots on the outer webs of the exterior scapulars much more restricted, almost completely vermiculated; the sides, beneath the wings, and the axillars, more ochraceous buff.

Mr. Lamb reported the testes of the type of *sinaloensis* as enlarged to full size. Since the ovaries of the two females, taken at El Orito, were noted as approaching breeding condition, on March 5th, it would seem that this species probably breeds during the latter half of that month.

All of the six specimens of *sinaloensis* and *vinaceous* are in the gray phase, and no specimens in the red or intermediate phase have been collected.

Specimens examined.—*Sinaloensis* 1 ♂ (Type), Guamuchil, Sin.; 1 ♂, 1 ♀, Guirocoba, Son.; *vinaceous* 1 ♀ (Type), Durasno, Chi.; 2 ♀s El Orito, Sin.; *mccalli* 25 (including Type), Texas, Tamaulipas, Nuevo Leon; *hasbroucki* 7 (including Type), Texas; *cineraceous* 28 (including Type), Arizona, N. Mexico and Texas; *gilmani* 14 Arizona, Calif. and N. Sonora; *xantusi* 27 (including Type), Lower California.

***Otus guatemalae tomlini*,¹ subsp. nov.**

TOMLIN'S SCREECH OWL.

Type.—Male adult in nearly unworn plumage; number 8189, collection of Robert T. Moore; La Guasimas, northeastern Sinaloa, Mexico; June 26, 1933; collected by J. T. Wright.

¹ It gives me great pleasure to commemorate a treasured friendship by naming this race for Dr. Francis H. Tomlin of Haddonfield, N. J., formerly an Associate Member of the A. O. U., who has shared with the author many a memorable "bird hunt."

Subspecific characters.—*Gray phase.* Nearest to *Otus guatemalae hastatus* (Ridgway), of the Arid Lower Tropical Zone of southwestern Sinaloa, but ground color of throat and breast more buffy, Cinnamon Buff,¹ and ground color of abdomen much lighter, almost pure white, as compared with the uniform pale brownish white ground color of the entire underparts of *hastatus*; mesial brown lines on underparts wider, more distinct, blackish Bone Brown as contrasted with Bister of *hastatus*; patches on scapulars, middle and greater wing coverts pure white instead of buffy; size slightly larger. Compared with *thompsoni* of Yucatan, *tomlini* has the brown markings below much darker and the ground color much whiter, is grayer above compared with *thompsoni*'s Verona Brown, and has a marked hoary whitish effect on the forehead and sides of pileum, absent in the type of *thompsoni*.

Intermediate phase.—My specimen from the mountains of southeastern Sinaloa, Rancho Santa Barbara, 2500 feet, represents this intermediate phase, having the back reddish brown, but not nearly so bright a red as the red phases of *guatemalae guatemalae*. It differs from three red phase specimens from Peten, Guatemala, in having the hastate markings on the back much more distinct and the dark markings on the inner webs of primaries, secondaries and rectrices pure black instead of dark brown. It resembles closely an intermediate phase *guatemalae* from Catacombas, Honduras, in the Museum of Comparative Zoology, Collection No. 158086, except that it is slightly "redder" all over and markings of wing and tail blacker, but true to the characters of *tomlini*, the ground color of the lower underparts is pure white in marked contrast with the darker breast and throat.

No true red phase representative has yet been obtained, as the Dickey Collection specimen, termed by van Rossem a "bright rufous phase," is not nearly so bright a red as red phase individuals of true *guatemalae*; in fact it is almost identical with my intermediate phase individual.

Remarks.—The white ground color of the posterior half of the underparts is the most striking feature of the new race, when compared with other races of *guatemalae*. Because of the darker Bone Black streaks the effect of the white underparts is conspicuous. Just as the underparts are whiter, the upperparts are darker than *hastatus*. *Hastatus* and *thompsoni*, both from the Arid Lower Tropical of opposite coasts of Mexico, have a uniform tone throughout, although differing in color value. The new form has the bare toes, characteristic of the entire *guatemalae* group.

Range.—Arid Upper Tropical and Transition Zones in the mountains of extreme southeastern Sonora and northeastern Sinaloa to mountains of southeastern Sinaloa and Durango and possibly to the same zones in Nayarit. The ♂ and ♀ from Chacala, Durango, are darker above and may intergrade between *tomlini* and some undiscovered form in the high mountains of Durango or Zacatecas. The individual from Tepic, described in the *Biologia Centrali-Americana Aves*, Vol. III, p. 23, as being "decidedly darker and the black spots, especially on the under surface, wider and more

² Names of colors in this paper, when capitalized, are taken from Ridgway's "Color Standards and Color Nomenclature," 1912.

distinct" than *hastatus*, seems to agree with the Chacala specimens, and hailing from a higher altitude, would seem to belong to the same race.

AVERAGE MEASUREMENTS OF *Otus guatemalae tomlini* AND ALLIED RACES.

	Wing.	Tail.	Culmen from cere.
<i>Males</i>			
3 adults (including Type) <i>tomlini</i>	154.2	82.1	12.6
1 adult (Type) <i>tomlini</i>	158.6	84.0	13.1
2 adults (including Type) <i>hastatus</i>	149.8	78.4	11.5
1 adult, intergrade from Durango.....	152.8	78.6	12.0
<i>Females</i>			
2 adults <i>tomlini</i>	150.9	81.9	12.5
1 adult, intergrade from Durango.....	153.6	81.0	12.6

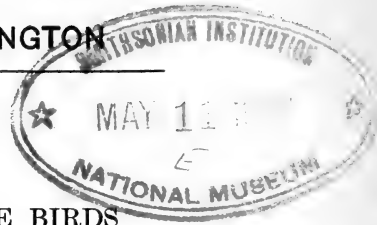
Specimens recently examined.—*Otus guatemalae tomlini* 3 ♂s, 2 ♀s (including Type) S. E. Sonora and Sinaloa, 1 ♂, 1 ♀ (probably intergrades), Durango; *Otus guatemalae hastatus* 2 (including Type), Sinaloa; *Otus guatemalae guatemalae* 12 (including Type *Marmoratus*), Guatemala; *Otus guatemalae thompsoni* 3 (including co-types), Yucatan, and 2 Campeche (probably intergrades); *Otus guatemalae cassini* 2 (including Type).

According to the author's concept, *Otus asio sinaloensis* is the most southern representative of *asio* group, while *Otus guatemalae tomlini* is the most northern representative of the *guatemalae* group. The two species are clearly differentiated from each other by characters, pointed out by Ridgway. *Guatemalae* has completely bare toes, whereas *asio* has them feathered or bristled. In reemphasizing this distinction, I am familiar with recent investigations, which indicate that many northern species of owls show a marked diminution in the feathering of the toes in their southern races. This is generally true of the *asio* group, but individual variation in the species, irrespective of latitude, is evident, for specimens of *kennicoti* from Vancouver Island show nothing but bristles and a *gilmani* from Arizona is heavily and completely feathered. On the other hand I have before me thirty-three specimens of the *guatemalae* group and have seen many more, both in the United States and European Museums, and not one exhibits either feathers or bristles on the toes. The discovery, here recorded for the first time, of the presence of representatives of both groups in the same locality, makes a comparison of their characters significant. True *asio sinaloensis* ranges from the Arid Lower Tropical Zone up to the Arid Upper Tropical Zone, whereas true *guatemalae tomlini* ranges from the Transition Zone down to the Arid Upper Tropical Zone and both forms are found in the Arid Upper Tropical at Guirocoba in southeastern Sonora and in the lower margin of the Transition Zone in extreme north-eastern Sinaloa. If the two species intergrade, we would surely find evidence of it here, but in no other locality are their respective characters more clearly marked. Every one of the five specimens of *sinaloensis* has bristled toes, as well as extremely narrow streaks above and below, whereas all five individuals of *tomlini* possess bare toes, wide hastate marks above and coarse vermiculations below. In addition these latter five, all gray

phases, are so heavily marked above and below with Pinkish and Cinnamon Buff that, when compared with the gray phase specimens of *sinaloensis*, they are as brown as intermediate phases of the *asio* group.

Griscom has already suggested (Bulletin, American Museum of Natural History, Vol. LXIV, p. 170) that *Otus cassini* Ridgway is best treated as a subspecies of *O. guatemalae*. The accumulation of specimens during the five years that have intervened now makes it necessary to go a step farther and suggest the conspecific relationship of *guatemalae* and *cassini* to *thompsoni*, *hastatus* and *tomlini*. This is not the place to discuss the details of the complicated relationships of this difficult genus. I shall only remark here, that these five new specimens from Sinaloa throw such new light on the affinities of the two Durango specimens with certain individuals from Guatemala, while two new specimens in my collection from Motzorongo, Vera Cruz, so illuminate the connection between *cassini* of the humid slopes of Orizaba with three specimens of *thompsoni* affinities in the Shufeldt Collection from Campeche and with three American Museum specimens from Nicaragua, that the conspecific relationship of all is clearly indicated and a new approach to the seeming idiosyncrasies of *guatemalae* required. I might add I am convinced that the geographical gap between Durango and Campeche contains an undescribed race, to which the individuals from Durango and Campeche both are related as intergrades. It will be well to await further material before describing it.

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REVISIONAL NOTE ON THE DIDINE BIRDS
OF RÉUNION.

BY THE MARQUESS HACHISUKA, PH. D., SC. D.

The existence of two types of Didine birds on Réunion, one of the Mascarene Islands, has long been suspected. Strickland, in his monumental book on "The Dodo and its Kindred" (1848), conscious of his inability to harmonize the contradictory elements in the four accounts of the Réunion Dodo which constitute our sole historical evidences of this bird, says that they give "us a clear proof that a second species of the same group of birds inhabited that island." Rothschild, in his "Extinct Birds" (1907), gives us two drawings of the Réunion Dodo, one in Didine form, another in Solitaire form, but he makes little or no comment on his conjectural figures. Oudemans, as recently as 1917, in his *Dodo-Studien*, dismisses the problem by assuming that all four accounts describe the same bird, namely, the White Dodo, any discrepancies in the four records being accounted for either by assumed inaccuracy on the part of the observer or by Oudemans' favorite theory of seasonal changes in the bird's stature.

After careful study of a feather-picture of a Didine bird dating from 1618, published by Dr. Casey Wood in the *Ibis*, pl. xix, 1927, I believe that I have found a satisfactory solution of this problem. Details of the picture indicate that it was carefully done, with the exception of the lower left corner, which is unfinished, thus giving the impression that the leg is poorly executed. Careful comparison of this picture with other pictorial evidences of the Dodo and the Solitaire has convinced me that we have here the picture of a bird very much like the male Solitaire of Rodriguez.

The Réunion Solitaire differs from that of Rodriguez in that it has a much larger head and a very high mandible which does not have a pronounced hook at the tip. The nostril opening is placed at the anterior

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edge of the mandible. The eye is surrounded by naked skin, the tarsus is long and heavy, the thighs muscular. The tail unlike that of the Rodriguez Solitaire, presents a tuft-like appearance which suggests that of an ostrich.

On the basis of comparison with the male of the Rodriguez Solitaire, I conclude that the two specimens known to us must be, because of their brown color, males, the female of this species being still unknown to us.

That it can not be identified, however, as *Pezophaps solitaria*, is clear from the circumstance that the latter is known as having inhabited only Rodriguez, an island which remained in a deserted and uninhabited state long after the other islands of the group had begun to be colonized. It was not visited, as far as we know, until in 1791, Leguat and his Huguenot companions established themselves there for two years. This was almost 200 years after the above-mentioned feather-picture was made in Italy. Even allowing for some previous knowledge of the island, without which such an adventurous colonization as that of Leguat could not have taken place, it is quite inconceivable that any products of Rodriguez had been brought to Europe as early as 1618. This same circumstance applies to the account of Lestrange, who speaks of having seen in 1638 "a strange fowl" which the keeper in London called a Dodo. Strickland and all later students of the Dodo have misidentified this bird as a Common or Grey Dodo of Mauritius, whereas it is clearly of the Solitaire type, being, as Lestrange himself says, "a great fowl somewhat bigger than the largest turkey-cock, and so legged and footed, but stouter and thicker and of a more erect shape, coloured before like the breast of a young phesan and on the back of dunn or dearc colour." But since Rodriguez was unknown at this time as well, this bird, while not to be identified as *Raphus cucullatus* (-*Didus ineptus*) can not be considered an example of *Pezophaps solitaria* if we wish to avoid anachronism. It will be seen that the feather-picture satisfies the description in every respect.

In addition to this, the accounts of Carré and DuBois, which have hitherto been recognized as constituting the chief discordant notes in the description of the White Dodo, not only specifically speak of them as Solitaires but also find their counterpart admirably in the Milan picture. Critics may be assumed to be correct in judging DuBois' account either as inaccurate or as confusing the appearance of two different birds, especially as pertains to colour, but his insistence upon an ostrich-like tail is extremely well substantiated by the bird figured by the Italian artist of 1618. This is a feature which distinguishes it from the Solitaire of Rodriguez.

I am convinced, therefore, that Reunion had two Didine birds, the one the well-known so-called White Dodo, clearly indicated in the accounts of Tatton and Bontekoe, and in the famous paintings of Holsteyn and Withoos, and closely related to the Common Dodo of Mauritius, the other this new type of Didine bird, hitherto overlooked, and closely related to *Pezophaps*.

Since all the nomenclature hitherto applied to the White Dodo, including *Ornithoptera solitaria* (de Sélys-Longchamps) (which must now be applied to the new type) was based upon the testimony of Carré's account of the Solitaire and DuBois' account of the *Oiseau Solitaire*, and since these must

now be thought of as descriptive of this new Didine bird, the true White Dodo becomes nameless. I therefore name it

Victoriornis imperialis, gen. et sp. nom. nov.

I have dedicated the naming of this bird to His Majesty King Vittorio Emmanuel of Italy, by His gracious permission, since an Italian picture furnished the clue toward the solution of this problem.

The White Dodo is generically distinct from the Common Dodo of Mauritius. The bill is much broader, has a rounded tip instead of a pronounced hook, and shows no signs of a moulting horny sheath, as does the Common Dodo. The shape, position and structure of the tail are also different.

These two Dodos, *Raphus* and *Victoriornis*, together constitute a family *Raphidæ*, distinct from that of the two Solitaires, *Pezophaps* and *Ornithaptera*. Both *Pezophapidæ* show the following characteristics in contrast to the two *Raphidæ*: tall stature, a small bill without transverse rugosities, strong sexual dimorphism, small head, relatively very little cancellous tissue in the cranium, four sternal ribs instead of five, and the wing tip equipped with strong horny growth. In addition to these marks, they are distinguished by more than 20 other osteological differences. The edibility of the Solitaire was superior to that of the Dodos.

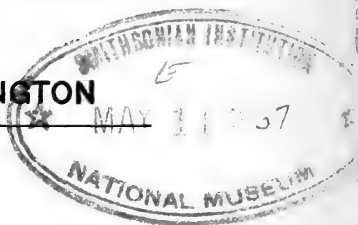
DESCRIPTION OF *Ornithaptera solitaria* (DE SÉLYS-LONGCHAMPS).

Caput cinerium; collum et corpus paululum obscuriora quam caput; alae, caudem et femora brunnea, inter colores brunneibenzoini et brunneicapilli; iris negra; irid caeruleum; rostrum superius colore dorsi; lingua rosacea; naris magna, posita ad anteriorem partem rostri et circumdata linea caerulea; tibiae et pedes tam obscura quam femue et maiores quam illi Meleagris gallopabonis.

The study of the Dodo has been much neglected, and I hope shortly to bring out a complete revisional analysis.



PROCEEDINGS
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A NEW RACE OF DACTYLORTYX FROM HONDURAS.

BY H. B. CONOVER.

Recently the author had occasion to check over the different races of *Dactylortyx thoracicus*. In so doing he was surprised to discover that specimens from southern Honduras did not belong to either of the relatively light colored Salvadorean races, but were even darker than *D. t. chiapensis*.

The Honduran birds, therefore, may be known as

Dactylortyx thoracicus fuscus, new subspecies.

Type.—From Alto Cantoral, Dept. Tegucigalpa, Honduras; No. 11,470, adult male in the Conover Collection, Field Museum of Natural History, Chicago; collected January 24, 1934, by C. F. Underwood.

Characters.—Closest to *Dactylortyx thoracicus chiapensis*. The males differ from that race by being much darker on the breast, flanks, crown of the head, lower back, rump, upper wing coverts and secondaries; the white shaft streaks on the feathers of the under parts are slightly narrower. Females in comparison with *chiapensis* have the breast slightly brighter red, the abdomen more buffy and the mantle redder; the lower back, rump, upper wing coverts and secondaries have a rich golden ochraceous tinge instead of a grayish buff one. From its nearest neighbor geographically, the race *taylori*, it differs by the same characters, but to a greater degree, as *taylori* is lighter than *chiapensis*.

Description of type.—Top of the head dark brown, the feathers washed on the edges with deep rusty; feathers of the back of the neck brown with wide buff centers; mantle grayish brown; lower back, rump, and upper tail coverts olive gray, indistinctly vermiculated with buff, the upper tail coverts irregularly blotched with small spots of the same color; tail dark brown barred irregularly with buff; tertials, wing coverts and secondaries dark brown finely vermiculated with sandy brown, the tertials and wing coverts blotched with black near the extremities of the inner webs; wing coverts with pale buff shaft streaks, and the tertials with the inner webs broadly margined with golden buff; primaries brown, lightly mottled with buff on the outer web and with a small buffy white spot at the tip of the

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shaft; superciliary stripe, cheeks and throat reddish chestnut; ear coverts and spot before the eye dark brown; chest, breast and flanks dark olive brown, each feather with a very narrow white shaft line, which become broader on the flanks; abdomen white; feathers of the thighs tipped with buff; under tail coverts golden buff with black centers. Wing (flat) 137; culmen (exposed) 15.5; tarsus 35; middle toe (without claw) 32.5 mm.

Range.—Southern Honduras.

SPECIMENS EXAMINED.

Dactylortyx thoracicus chiapensis.—Mexico, Chiapas, San Cristobal, 2 ♂ (including type), 1 ♀; Guatemala, Quezaltenango, 1 ♂, Volcan Santa Maria, 1 ♀.

Dactylortyx thoracicus salvadoranus.—El Salvador, Volcan San Miguel, 2 ♂ (including type), 1 ♀.

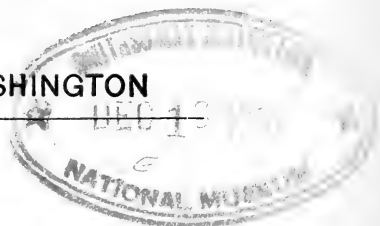
Dactylortyx thoracicus taylori.—El Salvador, Mt. Cacaguatique, 3 ♂ (including type), 3 ♀.

Dactylortyx thoracicus fuscus.—Honduras, Dept. Tegucigalpa, Alto Cantoral, 1 ♂, Cantoral, 1 ♂; Rancho Quemado, 1 ♀, San Juancito, 2 ♀.

For the loan of material used in this investigation I wish to express my gratitude to Dr. H. C. Oberholser, of the Biological Survey, to Mr. J. L. Peters, of the Museum of Comparative Zoology, Cambridge, to Mr. R. M. de Schauensee, of the Academy of Natural Sciences of Philadelphia, and to Mr. A. J. Van Rossem, of the California Institute of Technology, Pasadena. Thanks are also due to Dr. Herbert Friedmann for his assistance in the comparison of material.

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PROCEEDINGS
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A NEW KANGAROO RAT FROM SOUTHWESTERN ARIZONA.

BY E. A. GOLDMAN.

A review of the kangaroo rats of the *Dipodomys merriami* group in Arizona has led to the conclusion that specimens from the southwestern desert region warrant segregation as a geographic race. Some of these were collected as long ago as 1894 by Mearns and Holzner in connection with the work of the International Boundary Commission, but it was not until additional material was obtained from various localities that distinction became readily apparent.

Dipodomys merriami regillus, subsp. nov.

SOUTHWESTERN DESERT KANGAROO RAT.

Type.—From Tule Well, Tule Desert between Cabeza Prieta Mountains and Tule Mountains, Yuma County, Arizona (altitude 1,000 feet). No. 203017, ♂ young adult, skin and skull, U. S. National Museum (Biological Survey collection), collected by E. A. Goldman, December 4, 1913. Original number 22345.

Distribution.—Low desert plains of southwestern Arizona, including the lower part of the Gila River Valley and adjoining parts of Sonora, from the Colorado River east to Quitovaquito, Arizona, and Sonoyta, Sonora, intergrading to the east and north with *Dipodomys merriami merriami*.

General characters.—Distinguished by vivid buff coloration, the upper parts only slightly shaded by dark hairs. Most closely resembling *Dipodomys merriami arenivagus* of San Felipe, Lower California, but general tone of upper parts deeper and richer, near citrine buff (Ridgway, 1912), instead of pinkish buff; tail more dusky along under side; sides of head, including orbital areas, less extensively white; cranial details slightly different. Upper parts distinctly deeper and richer buff than in typical *Dipodomys merriami simiolus* of southeastern California. Similar in general to *D. m. merriami* of central Arizona but paler, the upper parts much less extensively mixed with black; dark caudal stripes above and below much lighter-brownish instead of blackish; blackish facial markings less distinct.

Color.—*Type* (winter pelage): Upper parts near citrine buff (Ridgway,

1912), purest along sides, the top of head and back thinly and inconspicuously mixed with black; under parts, fore limbs, hip stripes, tail at extreme base all around, postauricular and supraorbital spots pure white, as usual in the group; hind feet white above, a narrow brownish median line extending along under side from heels to base of toes, the toes white; facial markings brownish, rather narrow and indistinct; tail beyond extreme base brownish above and below, becoming white abruptly along sides to near terminal tuft, which is brownish all around. Summer pelages are similar, but the tendency is toward still brighter buffy coloration.

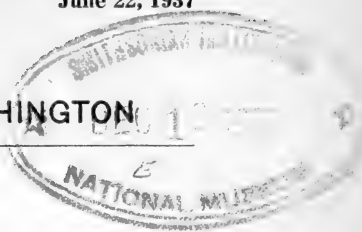
Skull.—Closely resembling that of *simiolus*. Very similar to that of typical *merriami*, many skulls being indistinguishable, but the interparietal and ascending branches of supraoccipital tend to be narrower, more depressed between mastoids. Also very similar to that of *arenivagus*, but mastoids usually smaller.

Measurements.—*Type*: Total length, 234 mm.; tail vertebrae, 141; hind foot, 36. Four adult topotypes: 249 (245–256); 149 (146–153); 37.5 (37.5–38). *Skull* (type): Occipitonasal length, 33.4; greatest breadth (between outer sides of auditory bullae), 22.3; breadth across maxillary arches, 18.5; length of nasals, 12.5; width of nasals (in front of incisors), 2.8; least width of supraoccipital (near interparietal), 1.6; maxillary toothrow, 4.5.

Remarks.—*Dipodomys m. regillus* approaches *D. m. arenivagus* in color and the two probably intergrade in the delta region of the Colorado River. Typical examples, however, are readily distinguished. Specimens from the general region have sometimes been referred to *simiolus*, but contrast still more strongly with that form in intensity of color tone.

Specimens examined.—Total number, 103, as follows:
 Arizona: Ajo (10 miles north), 3; Dome (3 miles east), 2; Gadsden (4 miles southeast), 4; Quitovaquito, 40; Tinajas Altas, southern end of Gila Mountains, Yuma County, 24; Tule Tank (near Mexican boundary), Yuma County, 1; Tule Well (type locality), 9; Wellton, 8; Yuma, 2.
 Sonora: Colorado River, 10 miles south of U. S. boundary, 2; Sonoyta, 8.

PROCEEDINGS
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THE DISTRIBUTION OF FLYING SQUIRRELS IN
WESTERN BRITISH COLUMBIA WITH THE
DESCRIPTION OF A NEW RACE.

BY IAN McTAGGART COWAN.

Since the publication by Howell, in 1918, of his revision of the American Flying Squirrels the number of specimens available from the Pacific northwest north of the 49th parallel has been steadily augmented. The majority of the new material comes from areas not represented in the series available at that time. It is therefore possible now to present a more detailed analysis of the variation and distribution than heretofore.

In order to carry out this study I have borrowed material from the Museum of Vertebrate Zoology through Dr. Joseph Grinnell and Dr. E. R. Hall, and from the Charles R. Connor Museum through Mr. A. S. Hyde, from Mr. J. A. Munro of Okanagan Landing, B. C., and from Mr. Kenneth Racey of Vancouver, B. C., to all of whom I wish to express my thanks.

Geographic variation in the flying squirrels of British Columbia is most apparent in dorsal and ventral coloration, amount of vinaceous or tawny in the tail, the amount of black in the tail; total body size, relative length of tail, width of tail, and in certain cranial proportions.

Within the flying squirrel population of the above described region there appear to be six well defined differentiation centres.

Southwest coastal area—*Glaucomys sabrinus oregonensis*. This area comprises the immediate coast, the lower Fraser Valley and the adjacent mountains to an elevation of about 2000 feet. The flying squirrel population is characterized by small size, relatively narrow tail, the extremely dark reddish dorsal coloration, the dusky and brownish ventral pigmentation, dark tail with much vinaceous-tawny obscured by the abundance of black tipped hairs. The skull is short and relatively broad (ratio greatest length to zygomatic width 60%), short rostrum and relatively long tooth row (ratio length of maxillary tooth row to diastema 94%). Flying

squirrels of this type are most abundant in the lower Fraser Valley, east as far as Hope but extend north at least to the lower slopes of the mountains bordering Kingcome Inlet.

Northwest coastal area—*Glaucomys sabrinus zaphaeus*. Includes the Alaskan coast adjacent to the Alexander Archipelago and north coastal British Columbia.

In external proportions there is little difference in the populations of the north and south coastal areas. The northern population, however, is characterized by its much broader tail, more tawny dorsal coloration (nearer Tawny Olive than Mikado Brown), by the brownish wash over the gray face, by the absence of any pronounced black nose and whisker spots, the reduction of the black caudal coloration so that the tail appears predominantly brown, rather than predominantly black. Underparts as heavily pigmented as in *oregonensis* but lacking the sooty infusion. The skull is of the short broad type. Squirrels of this strain probably penetrate southward along the coast of British Columbia at least as far as Gardner Canal, and unlike *oregonensis*, they extend their influence eastward onto the interior plateau. Specimens examined from Ootsa Lake though showing many characters of the Chilcotin type, tend toward *zaphaeus* in intensity of ventral pigmentation and in certain skull characters, and toward the Rocky Mountain form in length of tooth row, and length of tail.

Cascade area—*Glaucomys sabrinus fuliginosus*. In the Cascade and coastal mountains from the southern boundary of the Province north at least to the vicinity of Jervis Inlet is a population of flying squirrels sharply differentiated from that of the southern interior and that of the coastal region at low elevations by its large size (see table), extremely gray coloration, and long narrow skull (ratio zygomatic width to greatest length 57%). Of the specimens available none show intergradation with *oregonensis*. Our series of 24 specimens from British Columbia average much grayer than specimens from Washington, only 3 specimens are strictly similar to the 6 Washington specimens representing this race. Two specimens from Schoonover Mountain, Okanagan Valley, referred by Howell (Op. cit. p. 49) to *G. s. latipes*, appear to be intermediate between *columbiensis* and *fuliginosus*. They are larger and darker than typical *columbiensis*, but so far as I can discern possess no characters not readily explainable on the grounds of intergradation.

Okanagan area—*Glaucomys sabrinus columbiensis*. Okanagan Valley and adjacent mountains, north at least to Shuswap.

The flying squirrels inhabiting this area show a greater degree of color variation than is found in any other population. The majority of the specimens examined are characterized by their smaller size (see table), and lighter coloration, overwashed dorsally and ventrally with yellow. The resulting coloration is unique among British Columbia flying squirrels. Certain specimens, however, lack this yellow wash and are pale brown above, whitish below. In size and proportions the skull of *columbiensis* is identical with that of *fuliginosus* and as *columbiensis* in external measurements is smaller than *fuliginosus*, with shorter hind feet, it follows that the skull is relatively larger in the interior race. As has been mentioned above,

squirrels of this type blend into those of the *fuliginosus* type to the westward.

East central montane area—*Glaucomys sabrinus alpinus*. Rocky Mountains and mountains of eastern Cariboo and southeastern Omineca district. In the absence of topotypical material I have accepted *alpinus* as the name for the population of this region on the authority of Hall (Univ. Calif. Publ. Zool. 40, No. 9 : 374). The flying squirrels of this area have much the same cranial size and conformity as *columbiensis* and *fuliginosus*, the skulls in comparison with those of the coastal or Chilcotin populations appear long and narrow. They differ from these in usually exhibiting a marked process medially placed on the posterior palatal rim. In external proportions they are larger than *columbiensis* with longer tail and larger hind foot. Other differences between these populations is the dark, grayish ventral coloration, sometimes with brownish wash, darker tail, darker dorsal coloration and absence of yellow wash in *alpinus*.

In all these populations, with the exception of those of the coastal area, there appear occasional reddish individuals. Regardless of the race these individuals are of pale cinnamon color dorsally, white or whitish ventrally and with contrasting clear gray facial coloration.

In this color variant we perhaps see the genetic basis for the color which associated with certain pronounced cranial characters typifies the population inhabiting the Atnarko Valley, the Chilcotin Plateau and extending its influence east to Quesnel and north at least to Ootsa Lake. As this population appears to be without a name for convenient reference I here designate it as

***Glaucomys sabrinus reductus* (subsp. nov.).**

ATNARKO FLYING SQUIRREL.

Type.—Male adult, skin and skull, No. 689, Coll. of J. A. Munro; taken January, 1936, by R. A. Edwards at Lonesome Lake, B. C., on the Atnarko River, approximately 52° 10' N and 125° 45' W. Cotype female adult, skin and skull No. 692, Coll. J. A. Munro, same data as type. Type deposited in Provincial Museum.

Range.—Known only from the vicinity of the type locality and from the Chilcotin Plateau, probably has an extensive range in the Cascade region north of the range of *fuliginosus*.

Diagnosis.—A medium sized flying squirrel (average measurements of 6 individuals, 4 measured as dry skins): Total length 315 (304–323); tail 137 (120–151); hind foot 41 (39–44). Tooth row and diastema short.

Color.—In winter, color of upperparts from Drab (capitalized color terms are from Ridgway, 1912) to between Tawny Olive and Cinnamon. Undersurface of tail Light Drab to Drab Gray, occasionally of somewhat warmer tone; upper surface made dusky by many black tipped hairs. Sides of face and neck to upper side of ears clear gray; nose, whisker spot, eye ring and forward edge of ear, black. Underparts white lightly washed with yellow or yellowish brown; chin and throat white; fore and hind feet well furred, dusky above, white washed with yellowish below. Flying membranes dusky with pronounced white marginal fringe on lower side.

Skull.—Short and relatively broad, zygomatic width 60% of greatest length. Tooth row short, averaging 8.0 mm. (7.5–8.4). Posterior margin of hard palate usually concave, but occasionally with slight median eminence.

Comparisons.—From *zaphaeus* to the northward, *reductus* in winter pelage differs markedly in color, being paler, less reddish dorsally and much paler ventrally, entirely lacking pronounced tawny wash of *zaphaeus*, and having tail paler and without reddish underfur. Cranially *reductus* differs from *zaphaeus* most pronouncedly in short tooth row and long diastema, ratio of tooth row to diastema being 85% in the former, 91% in the latter.

Between *oregonensis* and *reductus* the distinctions are pronounced, the former being darker in color dorsally and ventrally with very much narrower tail; tooth row longer and diastema shorter (ratio tooth row to diastema 94% as opposed to 85%).

G. s. fuliginosus can be distinguished from *reductus* by its larger size (see table) larger skull, relatively and actually narrower (ratio zygomatic width to greatest length 57% as against 60%, much longer tooth row and longer diastema. Increase in tooth row is relatively greater than that of diastema so that ratio tooth row to diastema is 89% in *fuliginosus*, 85% in *reductus*.

In comparison with *alpinus* as represented by a large series from Bowron Lake and vicinity in the Barkerville district, *reductus* presents the following distinctive features: Dorsal coloration paler, ventral coloration markedly paler (white rather than grayish washed with brown), sides of face clear gray instead of brownish gray or sooty gray; tail lacking reddish suffusion and consequently grayish rather than reddish below. Zygomatic breadth approximately the same but skull shorter and therefore relatively broader. As in comparison with the other races the short tooth row is diagnostic. It is to be noted that the difference in greatest length of skull existing between these two races is almost completely accounted for in the anterior segment (tooth row and diastema) and in consequence though the actual difference in linear dimension is slight, the visible difference in the proportions of the cranium is great.

Since the anterior segment is known to be positively heterogonic it might be argued that the reduced size of this segment in adult *reductus* pointed to arrested development and the consequent juvenile proportions. The short tooth row, however, seems to me to mitigate against this explanation as do the external dimensions of the race, which are greater than is the case in the coastal races to the north and south.

Remarks.—The combination of characters described above as typical of the race *reductus* in so far as can be ascertained from specimens at my disposal is best developed in the vicinity of Lonesome Lake. Squirrels of the same type will doubtless be found to inhabit the heavily wooded and almost unexplored mountain ranges to the north and south. Specimens from Chezacut and Anahim in some instances have a pronounced brownish wash over the underparts but are still referable on grounds of cranial characters to *reductus*.

One specimen from Anahim is externally almost indistinguishable from

Indianpoint Lake specimens of *alpinus*. At the same time two specimens from Indianpoint Lake closely approximate the average coloration of Chilcotin specimens.

Specimens examined.—All from British Columbia except where otherwise stated.

G. s. reductus: Lonesome Lake 5; Anahim 2; Chezacut 6; ¹Quesnel 2.

G. s. alpinus: Indianpoint Lake 10, ¹Stuart Lake 2, ¹Ootsa Lake 3; skulls only, Cunningham Creek 24, Ahbau Lake 2, Bowron Lake 2, Lightning Creek 2.

G. s. zaphaeus: Helm Bay 4; Bradfield Canal 1; Etolin Island 1; Wrangel 5.

G. s. oregonensis: Huntingdon 2; Dollarton 1; Sumas Prairie 1; North Vancouver 1; Aldergrove 1; Vedder Crossing 1; Vedder River 2.

G. s. fuliginosus: Alta Lake 15; Cheakamus Lake 3; Blackwater Lake, Lillooet District 1; Seton Lake 1; Lillooet 4. From Washintgon: Mt. Adams, Twin Lakes, Whatcom Co.; Mt. Baker, Whatcom Co.; Owhigh Lakes, Pierce Co.; Glacier Basin, Pierce Co.; Goose Prairie, Yakima Co.

G. s. columbiensis: Okanagan 8; Okanagan Landing 2; Shutleworth Creek, Okanagan Falls, 1; Schoonover Mountain 2; Grand Prairie 1; Shuswap 1; Broadwater 1; Lumby 2.

¹ Indicates specimens exhibiting the effect of intergradation with adjoining races.

MEASUREMENTS OF FLYING SQUIRRELS FROM BRITISH COLUMBIA AND ALASKA.

	Total length	Length of tail	Width of tail	Length of hind foot	Greatest length of skull	Zygomatic breadth	Mastoid breadth	Greatest length of nasals	Length of maxillary tooth row	Diastema	Ratio greatest length to zygomatic width	Ratio tooth row to diastema	Number of specimens (external)	Number of specimens (cranial)
<i>oregonensis.</i>														
Mean.....	303	142	50	39	40.7	24.3	18.7	12.6	8.4	8.9	60%	94%	6	5
Minimum.....	264	128	48	36	39.3	23.5	18.4	12.0	7.8	8.5				
Maximum.....	325	152	53	41	42.0	25.4	19.1	13.4	9.0	9.4				
<i>zaphaeus.</i>														
Mean.....	312	145	58	41	41.3	25.1	18.8	12.8	8.3	9.1	61%	91%	5	7
Minimum.....	300	141	50	40	38.9	24.0	17.8	12.2	7.8	8.3				
Maximum.....	331	150	65	44	42.1	26.0	19.1	13.5	8.6	9.6				
<i>fuliginosus.</i>														
Mean.....	337	149	55	42	42.1	24.1	19.1	13.3	8.9	10.0	57%	89%	10	10
Minimum.....	304	127	45	40	41.0	22.9	18.3	12.5	8.5	9.6				
Maximum.....	380	165	60	44	43.5	24.8	19.8	14.6	9.6	10.5				
<i>columbiensis.</i>														
Mean.....	316	142	55	39	42.3	24.2	18.9	13.1	8.5	9.7	57%	88%	13	8
Minimum.....	290	130	49	32	38.9	23.7	18.5	12.0	8.0	8.7				
Maximum.....	340	165	60	42.5	43.0	24.7	19.5	14.0	9.0	10.4				
<i>alpinus.</i>														
Mean.....	334	154	60	42	42.0	24.7	19.4	13.2	8.6	9.7	59%	89%	7	30
Minimum.....	311	143	52	40	40.0	23.8	18.4	11.7	7.8	9.0				
Maximum.....	366	166	66	45	44.1	25.9	20.6	14.6	9.5	10.8				
<i>reductus.</i>														
Mean.....	315	137	58	41	40.8	24.6	19.4	12.5	8.0	9.4	60%	85%	6	8
Minimum.....	304	120	50	39	40.0	23.0	18.9	11.8	7.5	9.1				
Maximum.....	323	151	65	44	41.7	25.4	20.0	13.0	8.4	9.6				

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



A NEW SUBSPECIES OF THE LIZARD GENUS
SCELOPORUS FROM TEXAS.¹

BY HOBART M. SMITH.

Sceloporus merriami, which has long been considered a stable and rather well differentiated species of the genus, appears to consist of two subspecies differing from each other in scutellation, color and size. The typical subspecies seems to be restricted ecologically to canyons; its geographical range is along the Rio Grande from southeastern Val Verde county, Texas, to western Brewster county, northward in Terrell and Val Verde counties. The subspecies described below occurs in the mountains of southern and central Brewster county, and in Coahuila.

Two hundred and fifty-four specimens of *merriami* have been examined in this study;² further data have been taken from Stejneger (Proc. Biol. Soc. Wash., 17, 1904, pp. 17-20) and Wright and Wright (Proc. Biol. Soc. Wash., 40, 1927, pp. 57-64, pls. 1-3).

Sceloporus merriami annulatus, subsp. n.

Holotype.—EHT³ A787, collected on east slope of Chisos Mts., Brewster county, Texas, August, 1931, by Dr. Edward H. Taylor and Jack Wright.

Paratypes. UMMZ⁴ 66177-9, 66180(2), 66181(2), 66182, 66183(3), 66184(2), 66185(2), 66186(2), 66187(2), 66188(2), 66189(4), 66190(7), 66191, 72077, Glenn Spring, Brewster Co.; UMMZ 66192(2), 66193(2), 66194, two miles north of Glenn Spring; UMMZ 66208(2), 66209(2), 66215-7, 66219-24, 66227, 66234-5, Glenn Draw, Chisos Mts., Brewster Co.; UMMZ 66195-66200, 66201(2), 66202(2), 66203, 66204(2), 66205(2), 66206(2), 66228-30, Juniper Cañon, Chisos Mts.; UMMZ 66207, Boot

¹ Studies on the lizard genus *Sceloporus* are being conducted under the auspices of the National Research Council.

² I am much indebted to Mrs. Helen T. Gaige, Dr. Edward H. Taylor and Mr. C. D. Bunker for their permission to study these specimens, and for numerous other courtesies which have made possible this description.

³ Private collection of Dr. Edward H. Taylor.

⁴ University of Michigan Museum of Zoology.

Spring Basin, Chisos Mts.; UMMZ 69857, north side of Emory Peak, Chisos Mts.; UMMZ 66210-4, 66225-6, 66231-3, 69856(6), Chilicotal Mts., Brewster Co.; KU⁵ 15058-61, 15063, 15066-7, topotypes; Mus. Comp. Zool. 28086, Rocky Canyon, Glenn Draw, Brewster Co.; MCZ 31770-3, Glenn Spring.

Diagnosis.—A small species of the genus *Sceloporus*, maximum snout-vent measurement about 51 mm.; head scales slightly rugose; frontoparietals usually divided into two or three scales on each side, rarely separated medially; anterior section of frontal usually longitudinally divided; prefrontals rarely in contact medially; outer row of labiomentals rarely terminated anteriorly with the first scale wedged between first postmental and first infralabial; dorsal scales 47 to 62 from occiput to base of tail, average 53.3; scales around body 85 to 101, average 91.7; femoral pores 19 to 28, average 23.8; lamellae on free part of fourth toe 20 to 27, average 23.5; scales between series of femoral pores one to five, average 2.73; lateral scales on body and scales on posterior surface of thigh granular; no postfemoral dermal pocket. Adult males with the dark blue median borders of lateral abdominal marks confluent, covering the middle of the abdomen and extending over most of ventral surface of thighs; broad, dark blue convergent bands on throat; blue tail bands confluent on ventral surface of tail, or nearly so, in both males and females.

Description of holotype.—Head scales very slightly rugose, pitted; interparietal about one-half size of supraorbital area; parietal small, its posterior part broken into small scales indistinguishable from temporal scales; frontoparietals divided on one side, entire on other, in contact medially; posterior section of frontal entire; anterior section of frontal divided longitudinally, about one third larger than posterior section; supraoculars four-five, separated from median head scales by a single row of small scales, and from superciliaries by one complete and another incomplete row of scales; superciliaries five-five; prefrontals separated medially by an azygous scale; frontonasals normal, subequal in size, the lateral scales in contact with second canthal; two pairs of internasals, the posterior pair in contact with frontonasals and separated from first canthal by a single scale on each side; nasal extending downward, the nostril pierced near its upper border; four square scales behind rostral between nasals; subnasal present; two canthals on each side, the first in contact with lorilabials; a single loreal on each side; preocular divided, upper section keeled; subocular narrow, keeled; two small, strongly keeled postoculars; subocular separated from supralabials by a single row of lorilabials; a second incomplete row of lorilabials present on sides of head; supralabials four, infralabials five to a point below middle of eye.

Mental pentagonal, with a labial border about two-thirds that of rostral; seven-eight postmentals, the first scale of one series in contact with its fellow medially; other postmentals separated; outer row of labiomentals terminating anteriorly below posterior part of second infralabial; suture between first and second infralabials placed at about the middle of the lateral edge of first postmental; gular scales smooth, rounded, the anterior

⁵ Dyche Museum at Kansas University.

scales, between postmentals, largest; posterolateral gular scales (below ear) much smaller than median gular scales.

Auricular lobules five, elongate, smooth, pointed, larger than preceding scales, the longest less than half the greatest length (in body axis) of tympanum; temporal scales keeled, not mucronate, median scales smaller than others; scales between ear and arm granular, about size of scales on sides of body, larger than scales in and above axilla; lateral nuchal pocket present; a small group of enlarged scales above nuchal pocket, near dorsal scales; a rudimentary gular fold, present only in front of arm.

Dorsal scales keeled, not mucronate, not strongly imbricate (most of them separated from each other by narrow areas of extremely minute scales), in rather irregular rows, 56 from occiput to base of tail; nine dorsal scales to head length; lateral scales granular, merging gradually into dorsals and ventrals; a weak lateral fold between axilla and groin; ventral scales smooth, rounded, much smaller than largest dorsal scales, 88 from shoulder to anus; scales in gular fold region twice or three times as large as belly scales; preanal scales about half size of belly scales; scales around body 101.

Dorsal scales of foreleg keeled, weakly mucronate, about two-thirds size of dorsal scales on body, smaller at elbow and on hands; ventral scales of lower foreleg about one-third size of dorsal scales of same member, posteroventral scales keeled, anteroventral scales smooth; lamellar formula for fingers 9-?-?-21-17 (9-15-19-21-15).

Dorsal scales of hind leg keeled, very weakly mucronate, subequal in size to dorsal scales on body; scales on ventral surfaces of thigh smooth, decreasing in size toward femoral pore series; femoral pores 24-25; three scales between femoral pore series; scales on posterior surface of thigh granular; ventral scales on shank smooth, about two-thirds size of dorsal scales of same member; lamellar formula for toes 8-15-20-25-19 (8-13-20-25-20).

Dorsal caudal scales strongly keeled, mucronate, basal scales about two-thirds larger than dorsal scales on body; subcaudal scales keeled near base of tail, smooth farther distally, and keeled near tip of tail; no postfemoral dermal pocket; enlarged postanals present.

Measurements (in mm.): snout to vent, 47.5; snout to occiput, 8.5; snout to ear, 11.5; hind leg, 36.2; tibia, 10.1; 4th toe, 13.8; 5th toe, 6.8.

Color.—General ground color light gray, lighter spots scattered over sides, back and limbs; a series of ten, dark, indistinctly outlined spots on each side of mid-dorsal line; the spots at shoulder very distinct, and extending laterally to join the dark blue ventral coloration; a broken, dark, dorsolateral line extending from shoulder to rump; limbs with indistinct dark bands; posterior surface of thigh very indistinctly mottled; tail with dark blue bars, more distinct distally, extending completely around tail, more brilliant on ventral surface of tail; labial region barred; a dark vertical stripe through eye.

Gular region with broad, oblique blue bars, more distinct and broader near middle of throat; gular fold region white; a very broad area in middle of abdomen, a streak in front of shoulder, preanal region and ventral

surfaces of thighs dark blue; sides of abdomen deep vinaceous lavender; light areas between dark tail bands pale blue in color.

Comparisons.—Characters differing in *m. merriami* and *m. annulatus* may be summarized as follows (first form mentioned is *annulatus*, the second, in parentheses, is *m. merriami*): frontoparietals usually divided (usually entire); anterior section of frontal rarely entire (rarely divided); prefrontals rarely in contact (very frequently in contact); outer row of labiimentals rarely terminating with the first scale wedged between first postmental and first infralabial (rarely terminating posterior to this point); dorsals from occiput to base of tail average 53.3 (62.8); scales around middle of body average 91.4 (100.4); femoral pores average 23.8 (25.8); scales between femoral pore series average 2.73 (1.7); lamellae on free part of fourth toe average 23.5 (26.9); head scales definitely rugose (smooth); subcaudal surface distinctly banded (not or very indistinctly banded); throat bars extending to labial region, fused medially (confined to middle of throat, less distinct, usually separate); maximum snout-vent measurement 51 mm. (58 mm.).

The essential "key" characters distinguishing the two forms are the coloration and character of the labiimental scales. 100% of the adult specimens examined may be distinguished by the coloration alone; 95.3% of the total number examined of both subspecies may be distinguished on the basis of the labiimental scales.

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PRELIMINARY LIST OF THE BUTTERFLIES
OF VIRGINIA.

BY AUSTIN H. CLARK AND LEILA F. CLARK.

The butterflies of Virginia have attracted attention ever since 1587 when John White brought back to England a colored drawing of a female of the common yellow swallowtail (*Papilio glaucus*), which was published as a wood-cut in 1634. In colonial times and immediately afterwards many specimens were sent to Europe and a number of species were described and recorded from Virginia, especially in the works of Drury (1770-1782), Cramer (1779-1782), Godart (1819), and Boisduval and LeConte (1829-1837). Since the time of Boisduval and LeConte the published information on Virginian butterflies has been almost wholly in the form of incidental records, mainly by Strecker (1878), William H. Edwards (1868-1887), and Scudder (1889), and brief notes by various authors.

In the following list there are included the 133 species and subspecies that we believe have actually been taken in Virginia. We ourselves have taken 126 of these, and we have indubitable records of all the others except *Phyciodes gorgone*, *Hemiargus hanno*, *Terias jucunda*, and *Terias delia*. These four have not been found in the State within the past one hundred years, but we have no reason to believe that the early records of their occurrence are not correct.

In listing the species and subspecies we have used subspecific names when more than one subspecies occurs in the State, or when the subspecies found in the State is not the typical form, as in the case of *Polygonia faunus*, *Nymphalis antiopa*, *Basilarchia arthemis*, *Dione vanillae*, etc. In other cases the use of subspecific designations seemed superfluous.

The distribution, actual or probable, of each species and subspecies within the State is roughly indicated by a reference to the life zone or

zones in which it has been found at the height of its seasonal abundance, as follows:

- C. =Canadian
 T. =Transition
 U.A. =Upper Austral
 L.A. =Lower Austral

It must be remembered that the information regarding the local distribution of the endemic or visiting species is as yet very meager. No less than 16 are known from only a single record, or from a single locality, while many others are known from only a very few widely scattered localities. At least six species and possibly more are summer visitors only, arriving each summer from the south and dying out completely during the winter.

In the use of generic names we have followed "The Generic Names of the Holarctic Butterflies," vol. 1, 1758-1863, by Francis Hemming, published by the British Museum in 1934.

This is the British official list of names. We can see no reason why the painstaking and excellent work of Captain Hemming should not be accepted here as well as abroad. General acceptance of these names would go a long way toward stabilizing the nomenclature of our native, as well as of European, butterflies.

LIST OF BUTTERFLIES DEFINITELY KNOWN FROM VIRGINIA.

Family NYMPHALIDAE; subfamily Satyrinae.—*Neonympha gemma* (Hübner) [L.A.]. *Neonympha areolatus septentrionalis* (Davis) [L.A.]. *Neonympha eurytus* (Fabricius) [throughout]. *Neonympha sosybius* (Fabricius) [L.A.]. *Cercyonis alope alope* (Fabricius) [L.A.; U.A.]. *Cercyonis alope pegala* (Fabricius) [L.A.]. *Cercyonis alope maritima* (W. H. Edwards) [T.]. *Satyrodes eurydice* (Linné) [T.; L.A.]. *Enodia portlandia portlandia* (Fabricius) [L.A.]. *Enodia portlandia anthedon* A. H. Clark [T]. *Enodia creola* (Skinner) [L.A.].

Subfamily Nymphalinae.—*Polygonia interrogationis* (Fabricius) [throughout]. *Polygonia comma* (Harris) [throughout]. *Polygonia progne* (Cramer) [T.]. *Polygonia faunus smythi* A. H. Clark [C.]. *Nymphalis antiopa creta* (Verity) [throughout]. *Vanessa atalanta* (Linné) [throughout]. *Vanessa virginiensis* (Drury) [throughout]. *Vanessa cardui* (Linné) [throughout]. *Precis coenia* Hübner [throughout]. *Asterocampa celtis* (Boisduval and LeConte) [L.A.; U.A.]. *Asterocampa clyton* (Boisduval and LeConte) [L.A.; U.A.]. *Basilarchia arthemis astyanax* (Fabricius) [throughout]. *Basilarchia arthemis albofasciata* Newcomb [C.]. *Basilarchia archippus* (Cramer) [throughout]. *Euphydryas phaëton* (Drury) [T.]. *Phyciodes nycteis* (Doubleday and Hewitson) [U.A.; T.]. *Phyciodes tharos* (Drury) [throughout]. *Phyciodes batesii* (Reakirt) [T.]. *Phyciodes gorgone* (Hübner) [L.A.]. *Argynnis bellona* (Fabricius) [T.]. *Argynnis myrina* (Cramer) [T.]. *Argynnis idalia* (Drury) [U.A.]. *Argynnis diana* (Cramer) [T.; L.A.]. *Argynnis cybele* (Fabricius) [throughout]. *Argynnis aphrodite* (Fabricius) [T.; C.]. *Euptoieta claudia* (Cramer) [L.A.; U.A.; T.]. *Dione vanillae incarnata* Riley [L.A.].

Subfamily Danaiinae.—*Danaus plexippus* (Linné) [throughout].

Subfamily Libytheinae.—*Libythea bachmani* Kirtland [L.A.; U.A.].

Family RIODINIDAE.—*Nymphidia pumila* Boisduval and LeConte (= *Calephelis* or *Charis virginensis* auct.) [L.A.]. *Nymphidia borealis* (Grote and Robinson) [T.].

Family LYCAENIDAE; subfamily Gerydinae.—*Feniseca tarquinius* (Fabricius) [throughout].

Subfamily Lycaeninae.—*Lycaena phlaeas hypophlaeas* (Boisduval) [throughout].

Subfamily Plebeinae.—*Lycaenopsis argiolus pseudargiolus* (Boisduval and LeConte) [throughout]. *Glaucopsyche lygdamus* (Doubleday) [T.]. *Everes comyntas* (Godart) [throughout]. *Hemiargus hanno* (Stoll) [L.A.].

Subfamily Theclinae.—*Ailides halesus* (Cramer) [L.A.]. *Strymon titus mopsus* (Hübner) [U.A.]. *Strymon m-album* (Boisduval and LeConte) [U.A.]. *Strymon edwardsii* (Saunders) [T.]. *Strymon liparops* (Boisduval and LeConte) [T.]. *Strymon falacer* (Godart) [T.; U.A.]. *Strymon ontario* (W. H. Edwards) [U.A.]. *Strymon cecrops* (Fabricius) [L.A.; U.A.; T.]. *Strymon melinus* (Hübner) [throughout]. *Mitoura gryneus* (Hübner) [L.A.; U.A.]. *Incisalia augustinus* (Westwood) [T.]. *Incisalia irus* (Godart) [T.]. *Incisalia henrici* (Grote and Robinson) [U.A.]. *Incisalia niphon* (Hübner) [throughout].

Family PAPILIONIDAE; subfamily Pierinae.—*Ascia monuste* (Linné) [L.A.]. *Pieris rapae* (Linné) [throughout]. *Pieris protodice* Boisduval and LeConte [U.A.; L.A.]. *Euchloë genutia* (Fabricius) [throughout]. *Phoebis eubule* (Linné) [throughout]. *Zerene caesonis* (Stoll) [L.A.]. *Colias philodice philodice* Godart [throughout]. *Colias philodice eurytheme* Boisduval [throughout]. *Terias nicippe* (Cramer) [U.A.; L.A.]. *Terias jucunda* (Boisduval and LeConte) [L.A.]. *Terias lisa* (Boisduval and LeConte) [throughout]. *Terias delia* (Cramer) [L.A.].

Subfamily Papilioninae.—*Papilio philenor* Linné [throughout; var. *acauda* in spring, U.A.]. *Papilio polyxenes asterius* Cramer [throughout]. *Papilio cressphontes* Cramer [L.A.; U.A.]. *Papilio glaucus* Linné [throughout]. *Papilio troilus* Linné [throughout]. *Papilio palamedes* Drury [L.A.]. *Papilio marcellus* Cramer [throughout].

Family HESPERIIDAE; subfamily Pyrginae.—*Epargyreus clarus* (Cramer) (= *tityrus* auct.) [throughout]. *Urbanus proteus* (Linné) [L.A.]. *Achalarus lyciades* (Geyer) [throughout]. *Rhabdoides cellus* (Boisduval and LeConte) [T.]. *Thorybes bathyllus* (Smith) [throughout]. *Thorybes pylades* (Scudder) [throughout]. *Thorybes confusus* Bell [L.A.; U.A.]. *Pyrgus centaureae wyandot* (W. H. Edwards) [T.]. *Pyrgus communis* (Grote) [throughout]. *Pholisora catullus* (Fabricius) [throughout]. *Pholisora hayhurstii* (W. H. Edwards) [L.A.]. *Erynnis icelus* (Scudder and Burgess) [T.; U.A.]. *Erynnis brizo* (Boisduval and LeConte) [T.; U.A.]. *Erynnis perseus* (Scudder) [T.; U.A.]. *Erynnis lucilius* (Scudder and Burgess) [T.]. *Erynnis martialis* (Scudder) [throughout]. *Erynnis juvenalis* (Fabricius) [throughout]. *Erynnis horatius* (Scudder and Burgess) [throughout]. *Erynnis terentius* (Scudder and Burgess) [L.A.; U.A.].

Subfamily Hesperinae.—*Ancyloxypha numitor* (Fabricius) [throughout].

Hesperia metea Scudder [U.A.]. *Hesperia leonardus* Harris [T.]. *Hesperia sassacus* Harris [T.]. *Hylephila phylaeus* (Drury) [L.A.; U.A.]. *Atalopedes campestris* (Boisduval) [throughout]. *Polites verna* (W. H. Edwards) [throughout]. *Polites manataaqua* (Harris) [throughout]. *Polites themistocles* (Latreille) (= *cernes* auct.) [throughout]. *Polites peckius* (Kirby) [throughout]. *Polites breittus* (Boisduval and LeConte) [L.A.]. *Wallengrenia otho egeremet* (Scudder) [throughout]. *Poanes viator* (W. H. Edwards) [L.A.]. *Poanes hobomok* (Harris) [T.]. *Poanes zabulon* (Boisduval and LeConte) [throughout]. *Poanes aaroni* (Skinner) [salt marshes]. *Poanes yehl* (Skinner) [L.A.]. *Atrytone aragos* (Boisduval and LeConte) [L.A.; T.]. *Atrytone logan* [L.A.; T.]. *Atrytone dion dion* (W. H. Edwards) [Princess Anne and Norfolk Cos.]. *Atrytone dion alabamiae* Lindsey [Accomac Co.]. *Atrytone ruricola* (Boisduval) (= *vestris* auct.) [throughout]. *Atrytonopsis hianna* (Scudder) [T.; U.A.]. *Lerema accius* (Smith) [L.A.; U.A.]. *Amblyscirtes vialis* (W. H. Edwards) [T.]. *Amblyscirtes hegon* (Scudder) [T.]. *Amblyscirtes textor* (Hübner) [L.A.]. *Amblyscirtes carolina* (Skinner) (and var. *reversa* Jones) [L.A.]. *Lerodea l'herminier* (Latreille) (= *fusca* auct.) [L.A.; U.A.]. *Lerodea eufala* (W. H. Edwards) [L.A.]. *Calpodus ethlius* (Cramer) [L.A.]. *Panoquina panoquin* (Scudder) [salt marshes]. *Panoquina ocola* (W. H. Edwards) [L.A.; U.A.].

ERRONEOUS RECORDS.

The following species have been erroneously credited to Virginia: *Basilarchia arthemis arthemis* (Drury) [a northern form given by Emmons from Virginia.]. *Lycorella cleobaea* (Godart) [Virgin Islands; given by error as Virginia.]. *Ithomia drymo* (Hübner) [includes *diaphana* Cramer from Virginia, Minas Geraes, Brazil]. *Terias elathea* (Cramer) [Gulf region and tropical America; may possibly occur in Virginia]. *Colias alexandra* W. H. Edwards [includes *C. edwardsii* W. H. Edwards described from Virginia City, Nevada, later given as Virginia]. *Zegris olympia* (W. H. Edwards) [occurs in West Virginia, sometimes given as Virginia]. *Erynnis martialis* ab. *ausonius* (Lintner) [listed by Strecker from Virginia]. *Potanthus mingo* (W. H. Edwards) [a Philippine species originally described by error from West Virginia, given by Evans as Virginia]. *Augiades sylvanus* (Esper) [a species from Europe, north Africa, and Asia Minor given from Richmond, Virginia, by Holland].

SPECIES TO BE SOUGHT FOR IN VIRGINIA.

Species recorded from both north and south of Virginia, but not as yet reported from within the State: *Plebeius scudderi* (W. H. Edwards) [T.; C.]. *Strymon favonius* (Smith) [L.A.]. *Phoebis philea* (Linné) [L.A.]. *Tachyris iliaire* (Godart) [L.A.]. *Pieris virginiensis* W. H. Edwards [T.]. *Hesperia attalus* (W. H. Edwards) [L.A.; U.A.].

Species recorded from near the borders of Virginia, but not known from within the State: *Nymphalis l-album j-album* (Boisduval and LeConte) [Md.; W.Va.]. *Nymphalis milberti* (Godart) [W. Va.]. *Melitaea harrisii* Scudder [W. Va.]. *Argynnis atlantis* W. H. Edwards [W. Va.]. *Lycaena*

thoë (Boisduval) [D.C.]. *Erora laeta* (W. H. Edwards) [W. Va.]. *Zegris olympia* (W. H. Edwards) [W. Va.]. *Hesperia meskei* (W. H. Edwards) [N. C.]. *Polites mystic* (Scudder) [N. J.]. *Poanes massasoit hughii* A. H. Clark [Beltsville and Hyattsville, Md.]. *Atrytone conspicua* (W. H. Edwards) [D. C.]. *Atrytone bimacula* (Grote and Robinson) [Cabin John, Md.]. *Atrytonopsis loammi* (Whitney) [N. C.]. *Amblyscirtes alternata* (Grote and Robinson) [N. C.].



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NEW PLANTS FROM OREGON.

BY MORTON E. PECK.

In studying the 1936 collections of plants that have come to the herbarium of Willamette University, we find material apparently representing several undescribed species and varieties. These are in part the following:

***Fritillaria adamantina*, sp. nov.**

Caulis crassus paulum fistulosus 3-6 dm. altus, parte tertia infima nuda, parte tertia media foliosa, reliquo nudo prope ad inflorescentiam; folia linearia obtusa 7-12 cm. longa 4-6 mm. lata arcte adscendentibus; racemus usque ad 2 dm. longus, floribus 6-12, pedicellis brevibus crassis adscendentibus bracteis foliosis 5-8 cm. longis subtentis; perianthium forma crateris pallide rubens maculis purpureis notatum, segmentis 2-2.5 cm. longis oblongo-lanceolatis obtusis, glandulis obscuris apicibus non recurvatis; filamenta 1 cm. longa, antherae 9 mm. longae; stylus 11-14 mm. longus infra medium fissus; capsula (immatura) 15 mm. longa obovata ad basin valde angustata alata, alis ad basin non pertinentibus.

Type *M. E. Peck* 19290, on an open grassy slope, east bank of Diamond Lake, Douglas Co., July 13, 1936. The species is seemingly most closely related to *F. multiflora* Kell., but differing in the stout fistulose stem, characters of the bulb, form of the capsule and in other details.

***Limnanthes Bellingheriana*, sp. nov.**

Herba omnino glabra; caules complures e basi ramosa 8-15 cm. alti simplices adscendentes; folia pinnate divisa, segmentis 5-7 propinquis 5-10 mm. longis nonnullis bis partitis, omnibus anguste oblanceolatis acutis, foliis radicalibus in petiolis gracilibus 1.5-3 cm. longis, basi late dilatatis, foliis caulinis in petiolis brevibus vel summis sessilibus; pedunculi omnes axillares gracillimi saepe ex axillis omnibus, infimis saepe usque ad 5 cm. longis, summis 2 cm. longis vel minus; lobi calycis anguste ovati acuti 6-8 mm. longi ad basin sparse villosi; petala ut videtur alba oblonga angustiora paulumque breviora calyce retusa, ungui sparse piloso; filamenta 2-3 mm. longa; stylus infra medium fissus circiter ad medium nuclearum pertinens; nuculae obovoideae 4-5 mm. longae valde tubercu-

latae, ad apicem tuberculis magnis vix acutis in laminas radiatas pertinentibus, his dense papillois, tuberculis inferioribus humilibus rotundatis.

Type collected by Dr. and Mrs. Grover C. Bellinger, on a stony flat near Pinehurst, Jackson Co., April 15, 1936. Most nearly related to *L. gracilis* How., but differing in the broader calyx segments, shorter petals and stamens and in the more strongly tuberculate nutlets. It is a pleasure to dedicate this delicate little species to its collectors, both enthusiastic amateur taxonomists. Dr. Bellinger is Superintendent of the Oregon State Tuberculosis Hospital.

Navarretia prolifera Greene var. **breviflora**, var. nov.

Caulis sparse et minute puberulus; lobi calycis integerrimi valde inaequales; corolla circiter 5 mm. longa calyce multo brevior.

Type *M. E. Peck* 19234, dry open ground, north shore of Diamond Lake, Douglas Co., July 7, 1936. Typical *N. prolifera* is a species of central California and southward. The occurrence of this isolated variety in the Cascade Mts. is remarkable. It differs from the species mainly in the much smaller corolla,—about half the size of that of the species, and much shorter instead of longer than the calyx.

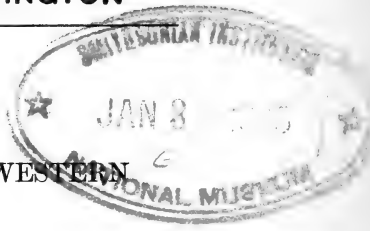
Downingia pulcherrima, sp. nov.

Caulis simplex vel e basi parce ramosus 6–12 cm. altus; folia anguste lanceolata obtusiuscula minute callosio-apiculata 1–1.5 cm. longa; sepala valde adscendentia lineari-lanceolata acuta; tubus corollae anguste campanulatus circiter 4 mm. longus, sinus limbi subter partem expansam labri inferioris extendentibus; lobi labri superioris oblongi ad apicem acutum abrupte contracti; labrum inferius 12–15 mm. latum, latius quam longum, lobis latis divaricatis mucronatis, caeruleum, area magna aurantiaca pallide lutea marginata notatum et eminentias binas oblongas et inter has maculam purpuream ferens; tubus staminum ad medium labri superioris pertinens, setis reflexis terminalibus brevibus subulatis.

Type *M. E. Peck* 18919, damp depression, Silver Cr. Valley, Harney Co., 10 mi. west of Riley, June 19, 1936. An attractive little plant with relatively large flowers; most nearly related to *D. Sikota* Applegate, but very easily distinguished by the large orange instead of greenish yellow area on the lower lip of the corolla and the less prominent folds in the throat.

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PROCEEDINGS
OF THE
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FOUR NEW BIRDS FROM NORTHWESTERN MEXICO.

BY ROBERT T. MOORE,
California Institute of Technology.

A recent airplane trip, taken on May 9, 1937, by the author and Dr. Francis H. Tomlin from Mazatlan to Parral for nearly three hundred miles obliquely across the entire range of the Sierra Madre of Mexico in a northerly direction, has provided another direct visual survey of the results of the climatic differences of the east and west slopes of this great range. Revealed by the experiences of Chester C. Lamb and the author during four years of collecting along the western front of the Mexican plateau and several penetrations deep into the range (see Proc. Bio. Soc. of Wash., Vol. 48, pp. 111-112), it has become clear that the dissected western slopes of the Mexican plateau are subjected to much heavier rain-fall than the eastern slopes. Records from scattered meteorological stations on the two sides of the Sierra Madre prove that precipitation is at least twice as heavy, while the experiences of our collectors and the author, as well as the statements of natives, indicate that it is probably much greater. Indeed, in some of the canyons of northeastern Sinaloa and southeastern Sonora, travel is decidedly perilous during the rainy season, due to the tremendous floods to which they are subjected, whereas in the barrancas of the eastern slope it is but little impeded.

Due to lack of knowledge of these contrasting meteorological conditions, our ornithologists and geographers have been led into erroneous statements concerning the identity of races on these two slopes. Not only do many species break up into well-marked races, characterizing the contrasting slopes, but in addition we now know a definite "break" occurs between two differentiation areas along some line dividing the highest

mountains of northeastern Sinaloa and the mountains of southwestern Chihuahua. Disregarding the differences due to the isolated high Temperate Zone on the top of Mt. Mohinora, the trees, mammals and birds of similar altitudes (6,000 to 9,000 feet) are sharply contrasted with those at San Feliz not twenty miles distant to the southwest. The Black-tailed deer replaces the White-tailed, the Thick-billed Parrot supplants Finsch's and the Macaw, the Hemlock and Poplar become prominent, while plant life is conspicuously different. It is these contrasting conditions which have developed several of the races described below.

My acknowledgments and thanks are given with a sense of deep indebtedness to Dr. Herbert Friedmann and the Smithsonian Institution of Washington for the loan of Types and numerous specimens, to Dr. Harry C. Oberholser and the Biological Survey of Washington for similar courtesies, to Mr. John T. Zimmer and the American Museum of Natural History of New York, Mr. James L. Peters and the Museum of Comparative Zoology of Cambridge, and to Mr. S. C. Simms and the Field Museum of Chicago, for the loan of other comparative material. I am also deeply indebted to Mr. W. S. Harrison and Mr. E. S. Plumb, the manager and assistant manager respectively of the Cia. Minera Wemeco, S. A. at Guadalupe y Calvo, whose unusual courtesy in arranging for mules and burros to take our equipment to our high altitude camp at 10,000 feet on Mt. Mohinora, made possible a successful reconnaissance.

***Catharus aurantirostris aenopennis*, subsp. nov.**

OLIVE-WINGED NIGHTINGALE THRUSH

Type.—Male adult in breeding plumage; number 9226, collection of Robert T. Moore; floor of Arroyo Hondo, about twenty miles north of junction of Rios Chinipas and Fuerte, southwestern Chihuahua, Mexico; May 29, 1934; altitude 4900 feet; collected by Robert T. Moore.

Subspecific characters.—Nearest to *Catharus aurantirostris clarus* Jouy, but much grayer and more olive on pileum, back and rectrices; less cinnamon on rump and upper tail coverts; exposed portions of primaries, secondaries and coverts less Ochraceous-Tawny¹, nearer Dresden Brown; anterior portion of inner web of primaries and secondaries less buffy; breast darker gray and abdomen whiter, creating more contrast; wing and tail smaller.

¹Names of colors in this paper, when capitalized, are taken from Ridgway's "Color Standards and Color Nomenclature," 1912.

Range.—Barrancas and canyons of the western slope of the main Sierra Madre, probably breeding from 4500 to 7000 feet, from southwestern Chihuahua to east central Sinaloa, extending, in an intergrading form, to southeastern Sinaloa, at least to Rancho Batel near Santa Lucia.

The birds of the same western slope of the mountains of southeastern Sinaloa are darker olive above and darker gray below, but of the same small size. These may have to be separated, but for the present until a larger series of breeding and winter specimens are secured, it would be well to retain them under the same name. In the winter many individuals of the new race drift down to lower levels, at least to 1500 feet; one bird was taken at 55 feet elevation at Rosario on Dec. 27th. The single April female from Tepic, Tepic, resembles very closely the darker form from the mountains of southeastern Sinaloa and is more olive above than the birds of Jalisco or Guerrero.

AVERAGE MEASUREMENTS OF *Catharus aurantiirostris aenopennis* AND *Catharus aurantiirostris clarus*.

	MALES.	WING.	TAIL.	EXPOSED CULMEN.
5 adults <i>aenopennis</i> from Chihuahua and N. E.				
Sinaloa.....		78.5	64.1	13.4
5 Topotypes <i>clarus</i> from Barranca, Ibarra,				
Jalisco.....		84.7	67.5	13.4

Specimens examined.—*Aenopennis* S. W. Chihuahua, 1 ♂ (Type) Arroyo Hondo, 1 (?) Barranca del Cobre, 1 ♂ San Jose; N. E. Sinaloa, 1 ♂, 1 ♀ Huassa, 1 ♂ San Lorenzo; S. Sinaloa, 1 ♂, 2 ♀ Rancho Batel, 1 ♂, 3 ♀ Palos Verde Mine, 1 ♀ Rosario; Tepic, 1 ♀ Tepic. *Clarus*, Jalisco, 5 ♂, 2 ♀ (including Type) Barranca Ibarra, 1 ♂ San Sebastian; Michoacan, 1 ♂, 1 ♀ Los Reyes, 2 ♂ Patzquaro; W. Chihuahua, 1 ♂ Bravo, 1 ♂ Jesus Maria; Guerrero, 2 ♂ Omilteme, 4 ♂, 1 ♀ Chilpancingo; Mexico, 4 ♂, 1 ♀ Temascaltepec; Morelos, 1 ♂, 1 ♀ Cuernavaca, 1 ♂ Jutepec, 1 ♀ Santa Maria, 1 ♂ Huitzilac; Puebla, 1 ♂ Atlixco; San Luis Potosi, 1 ♂ Alvarez. *Melpomene*, Vera Cruz, 2 ♂ Jalapa, 1 ♂ Teocelo, 1 ♀ Orizaba, 3 (?) Orizaba, 1 (?) Cordova, 1 ♀ Texolo, 1 ♀ Jaico; Oaxaca, 1 ♂ near Totontepec; Chiapas 2 ♂ Comitán.

Remarks.—Griscom expresses the opinion (Ornithology of Guerrero, p. 397) that, although the birds of Chihuahua represent a paler extreme than typical *clarus* he does not believe that the "formal separation of Chihuahua specimens of *Catharus melpomene* is necessary or advisable." With this I am in thorough accord, for Griscom was referring to birds of the eastern slope of the Sierra Madres, and not to birds of the western slope, which at that time were apparently unknown to him. Since then our series has been collected by Chester C. Lamb and the author, constituting not only the first record of the species for Sinaloa, but more important, the first record for the more humid western slope of the northern Sierra Madre. These birds do not represent a "pale extreme," but a more olive race, distinctly darker below than *clarus*. This contrast is probably due to climatic differences of the two slopes, described above. The remarkable contrast between the luxuriant rain condition of the Arroyo

Hondo on the western slope and the burned, arid condition of the Barranca del Cobre, about twenty-five miles distant to the east on the eastern slope of the Sierra Madre, has already been described by the author (Proc. Bio. Soc. Wash., Vol. 48, pp. 112-113). A specimen from this barranca is intermediate between the new race and the pallid form of the east slope in Chihuahua.

One of the distinguishing characters in this group of thrushes has not been sufficiently emphasized, namely, the external, exposed coloration of the wings, particularly the wing coverts and edges of the primaries. In *melpomene* they are Ochraceous-Tawny, in *clarus* Clay color and in *aenopennis* they range from Saccardo's Umber to Tawny-Olive. In this character Guerrero birds are closer to true *melpomene*, but have the larger size of *clarus*. The specimen from Tepic reveals some tendency toward the Guerrero birds. Characters of five fresh specimens from Temascaltepec and three from Morelos in the Moore Collection place these birds with true *clarus*. Failure to use fresh specimens of the same sex and season will result in unreliable comparisons.

The only other race with which *aenopennis* can be confused, is with *aurantiistrostris aurantiistrostris* of Venezuela and eastern Colombia. This bird resembles the new race in the olive coloration of the wings and upper parts but differs decidedly in smaller size, particularly the tail.

The Type specimen from the Arroyo Hondo was close to breeding, having the testes considerably enlarged on May 29th.

***Atthis heloisa margarethae*,² subsp. nov.**

MARGARET HUMMINGBIRD.

Type.—Male adult in unworn fall plumage; number 12432, collection of Robert T. Moore; Rancho Batel, five miles north of Santa Lucia, southeastern Sinaloa, Mexico; November 14, 1934; collected by Chester C. Lamb.

Subspecific characters.—Male—nearest to *Atthis heloisa heloisa* (Lesson and Delattre) of Vera Cruz, Mexico, but lower throat and abdomen pure white instead of ranging from grayish white to Drab-Gray; buff of sides and flanks much more restricted and lighter color; metallic throat patch darker, Amethyst Violet instead of Pansy Violet, with feathers not so elongated laterally; size slightly smaller.

Female—Differs from the toptypical females of *heloisa heloisa* in having the spots on throat very much smaller; the sides, flanks, abdomen and under tail coverts light buff instead of cinnamon; the tips of outer rectrices pure white, instead of cinnamon or buff; size smaller. It differs from the female Type of *Atthis morcomi* Ridgway in having the spots on throat finer (mere points) and fewer in number; the buff on sides, flanks and abdomen much less restricted; tips to sub-median rectrices pure white instead of buff; upper parts strongly brassy instead of green; pileum overlaid with iridescent bronze instead of dull brown.

²Named for the author's wife, who was the first to observe the female of this new race at Rancho Batel April 15, 1936, feeding on a large flowering shrub in company with White-eared, Broad-tailed and Calliope Hummingbirds. This dedication commemorates a treasured association with her on expeditions in the Andes of South America and the Sierras of Mexico, where she cheerfully endured real hardships to give encouragement to the author in his ornithological studies.

Range.—Transition Zone of the mountains of Sinaloa, on the eastern slope of the main Sierra Madre from 5500 to 7500 feet in altitude.

The author has not seen the specimens reported by Salvin as taken in Jalisco and Guerrero and does not know which form they represent. It seems likely that the individual reported from "Tepic" by Salvin in the *Biologia Centrali-Americana*, Vol. II, p. 60, really came from Jalisco, as the note refers to a specimen, mentioned in the Catalogue of the British Museum as coming from "Tepic, Jalisco," and not from Tepic, Nayarit.

AVERAGE MEASUREMENTS OF *Atthis heloisa margarethae* AND *Atthis heloisa heloisa*.

	MALES.	WING	TAIL.	EXPOSED CULMEN.
9 adults (including Type) <i>margarethae</i>		32.7	19.4	11.8
6 adults (including topotypes) <i>heloisa</i>		34.7	20.3	12.0
	FEMALES.			
1 adult <i>margarethae</i>		34.9	18.6	
2 adults <i>heloisa</i> from Valley of Mexico.....		36.4	21.4	

Specimens examined.—*Margarethae*, S. E. Sinaloa, 5 ♂ (including Type) Rancho Batel; S. W. Chihuahua, 4 ♂, 1 ♀ S. San Feliz. *Heloisa*, Vera Cruz, 2 ♂, 3 ♀ Jalapa, 2 ♂, 2 ♀ Córdoba; "Oaxaca" 1 juv. ♂; Mexico, 2 ♂ Valle de Mejico, 3 ♂ "Mexico"; Arizona, 1 ♀ Huachuca Mountains (Type, *Atthis morcomi*). *Ellioti*, Guatemala, 1 ♂ Volcan de Fuego (Type *Atthis ellioti* Ridgway), 1 ♂ Guatemala City, 2 ♂ Vera Paz, 2 ♂ "Guatemala." *Selasphoroides*, Honduras, 6 ad. ♂, 2 im. ♂, 8 ♀ Cantoral, 1 ad. ♂ Montaña Vasquez, 1 ad. ♂ Monte Verde, 1 ad. ♀ "Honduras."

Remarks.—The topotypical material from the type locality of *heloisa heloisa*, six specimens from Jalapa, all show the wide area of cinnamon on sides and the Drab-Gray on breast and abdomen, distinctive characters separating them from *margarethae*. The upper parts of the latter average considerably greener above, as compared with the copper or golden bronze of *heloisa*. The immature male from Oaxaca has the uncontracted outermost primary of *ellioti* of Guatemala but is placed here provisionally, as no adult males from Oaxaca have been seen. A male and two females in my collection from the Valle de Mexico have somewhat whiter underparts, but are much closer to true *heloisa* of Jalapa, the male having the typical Pansy Violet throat and all three extensive cinnamon sides and flanks. One of the above-mentioned females is almost identical with the Type of *morcomi*.

This new material from the Valle de Mexico convinces me that the action of the A. O. U. Committee in relegating *Atthis morcomi* to the synonymy of *Atthis heloisa heloisa* is a logical one. Under this conception *heloisa heloisa* ranges from Vera Cruz through the states of central Mexico. It can be regarded only as a vagrant in Arizona, since, except for this record, it has never been found north of San Luis Potosi and Aguas Calientes.

Apparently a large gap exists between the range of *heloisa* and that of the new form, which seems to be restricted to the western slopes of the Sierra Madre. For example, *margarethae* was not found by the author on Mt. Mohinora, Chihuahua, less than twenty miles east of San Feliz, and the highest peak of the main range, yet two of its associates at Rancho Batel, the White-eared and Broad-tailed Hummingbirds, were common.

We would expect some difference in the coloration of specimens from the Valle de Mexico and those from Jalapa, since Mexico City has a precipitation of only twenty inches a year, whereas Jalapa records sixty and Córdoba almost eighty inches. True *heloisa* from the eastern slope of Mt. Orizaba is a Humid Temperate Zone bird, whereas *margarethae* is a Transition Zone form of an ordinarily dry area, where rain seldom falls during eight months of the year. The total for the four wet months (July to September at Panuco) is about twenty-four inches.

A female (Moore Coll. No. 15227), secured by the author at Rancho Batel on April 15, 1936, seems to be a hybrid between *Atthis heloisa margarethae* and *Stellula calliope*. It has the cinnamon basis to all the retrices (including the middle pair) like *margarethae*, but the large size and green pileum of *calliope*. As normal specimens of *Stellula calliope*, were present at Rancho Batel and two collected were immature, it is possible both species breed there.

***Ergaticus ruber melanauris*, subsp. nov.**

GRAY-EARED ERGATICUS.

Type.—Male adult in full breeding condition, nesting; number 18,437, collection of Robert T. Moore; Trogon Valley, eastern slope of Mt. Mohinora, southwest Chihuahua, Mexico; May 12, 1937; altitude 10,000 feet; collected by Robert T. Moore.

Subspecific characters.—Nearest to *Ergaticus ruber ruber* (Swainson), but the whole auricular region grayish black, instead of silvery white; eye-ring generally black instead of gray; upper parts much brighter red, the back Nopal Red instead of Garnet Brown, the forehead much brighter Scarlet-Red, contrasting with back instead of uniform.

Range.—Breeds in the Temperate Zone between 9,000 and 10,000 feet on Mt. Mohinora, the highest mountain of northern Mexico, in extreme southwestern Chihuahua. Migrates in winter to the tops of the lower ranges in southeastern Sinaloa (at least as low as 6,000 feet) and probably to the mountains of southern Durango.

Specimens examined.—*Melanauris*, S. W. Chihuahua, 3 ♂ (including Type), 1 ♀ Mt. Mohinora; S. E. Sinaloa, 2 ♂ (November) Rancho Batel near Santa Lucia. *Ruber*, Mexico, 1 ♂ Temascaltepec, 9 ♂, 5 ♀ Desierto de Los Leones, 2 ♂, 2 ♀ Contreras, 2 ♂, 2 ♀ San Bartolo, 3 ♀ La Venta; several specimens without data Valley of Mexico and Orizaba, Vera Cruz; Guerrero, 1 ♂ Chilpancingo.

Remarks.—Making an airplane landing on a natural meadow at 8,500 feet on the eastern slope, we found the top of Mt. Mohinora bulking high above all the other peaks of southwestern Mexico. The upper shoulders from 9,000 to 11,215 feet are in the Temperate Zone, consisting of an original conifer forest of large pines, firs and hemlocks with scattered stands of poplar. Due to its altitude, the upper areas have a heavy annual rainfall, partly caused by local thunder storms, sufficient to keep its verdure green and its many streams and torrents full of water, throughout the dry season of its lower levels. The Gray-eared *Ergaticus* was a fairly common breeder near the humid, heavily-timbered heads of the canyons, which sculpture the eastern slope of the mountain, just where the oaks peter out and conifers become dominant. Dr. Francis H. Tomlin and the author observed a

number of these sprightly red warblers and the three males and one female, collected, were all nesting birds. That it has not been found in other parts of Chihuahua, Sonora nor northeastern Sinaloa, is probably due to the lack of mountains over 10,000 feet in elevation. In spite of a considerable combing of these high altitudes by Chester C. Lamb during the past four years and by the author in annual visits, only two other specimens have been secured, both migrating birds taken in November at 6,000 feet in the mountains of southeastern Sinaloa. The only other specimens of the species, reported from northwestern Mexico, were secured by Forrer near Durango City, 200 miles southeast of Mt. Mohinora. Not having seen them, the author can not determine their status, but presumes they are intergrades between *ruber ruber* of southern Mexico and *melanauris*.

The comparative material from the State of Mexico consist of fresh specimens in the author's collection, secured by W. W. Brown and Pablo Roveglia, with exception of the few specimens without data. The individual, taken by Mr. Brown at Temascaltepec, comes from an area probably not far from the type locality. Ridgway may have been right in his suggestion that Swainson's Type probably hailed from the "Province of Morelia, state of Michoacan." Nevertheless, the authors of the *Biologia Centrali-Americana* (Vol. 1, p. 164) state that "this species was first described by Swainson in 1827, from a specimen sent from Mexico by Bullock." If it was secured at Temascaltepec, a not impossible assumption, then the Brown-collected specimen is a topotype. It is typical *ruber ruber*.

Aratinga canicularis clarae,³ subsp. nov.

SINALOA PAROQUET.

Type.—Female adult in fresh fall plumage; number 4343, collection of Robert T. Moore; El Molino, northeastern Sinaloa, Mexico; November 3, 1933; near sea level; collected by Chester C. Lamb.

Subspecific characters.—Nearest to *Aratinga canicularis eburnirostrum* (Lesson) from Acapulco, Guerrero, but Apricot Orange of forehead greatly restricted, so that the greenish blue of the crown continues anteriorly around the bare space in front of the eye and joins the blackish area between the base of the maxilla and the bare lores; crown patch of Light Terre Verte, much more extensive both posteriorly and anteriorly, extending in the former direction beyond the posterior margin of eye; lower throat and breast greener, less yellowish olive; dark spots on side of mandible blacker, less brownish; wing and tail larger.

Range.—Arid Lower Tropical Zone from Reforma on the coast of northeastern Sinaloa, fifty miles northwest of Culiacan, south along the coast at least to Mazatlan and the boundary of Tepic; west to Chacala in northwestern Durango ascending the lower mountains of Sinaloa to an altitude of 3500 feet, at least in the Sierra Palos Dulces.

The birds from San Blas, Nayarit, south to Manzanillo, Colima, have the restricted forehead patch of the new race, but the more yellowish olive lower throat and breast of *eburnirostrum*.

³Named in honor of Mrs. Chester C. Lamb, whose association with Mr. Lamb during his four years of collecting in Sinaloa have been a great support and encouragement to his zoological work.

AVERAGE MEASUREMENTS OF *Aratinga canicularis clarae* AND *Aratinga canicularis eburnirostrum*.

	MALES.	WING.	TAIL.
9 adults <i>clarae</i>		136.2	110.0
5 adults <i>eburnirostrum</i>		131.6	101.4
	FEMALES.		
5 adults <i>clarae</i>		135.8	113.6
6 adults <i>eburnirostrum</i>		127.6	108.1

Specimens examined.—*Clarae*, Sinaloa, 1 ♂, 2 ♀ Reforma, 1 ♂, 5 ♀ (including Type) El Molino, 1 ♂ Arroyo Guayabito, 1 ♂, 1 ♀ Sierra Palos Dulces, 1 ♂ Vado Hondo, 1 ♂, 1 ♀ San Ignacio, 1 ♀ Quelite, 2 ♂, 3 ♀ Mazatlan, 3 ♂, 2 ♀ Rosario, 1 ♂, 1 ♀ Rancho Santa Barbara, 2 ♂ near Esquinapa; Durango, 2 ♂ Chacala; Nayarit, 3 ♂, 1 ♀ Rio Las Neas. Intergrades from Nayarit, 2 ♂, 1 ♀ San Blas; Colima, 3 ♂ 2 ♀ Manzanillo. *Eburnirostrum*, Guerrero, 4 ♂, 6 ♀ Acapulco, 1 ♂ Coyuca. *Canicularis* Oaxaca, 3 ♂, 2 ♀ Chivela, 1 ♀ Tapanatepec, 1 ♀ Huilotepec, 2 (?) Tehuantepec; Guatemala, 2 ♂ Ocos; Salvador, 1 (?) La Union, 1 (?) Chocoyo, 1 (?) Querultepe; Honduras, 7 ♂, 2 ♀ San Lorenzo, 1 ♀ Monte El Conejo; Nicaragua, 1 (?) Chinandega, 1 (?) Boundary line; Costa Rica, 1 ♀ Alajuela, 2 ♂, 2 ♀ Bolson, 1 ♂ Escazu, 2 ♂, 1 ♀ Ballena, 3 ♂, 6 ♀ Pto. Humo.

Remarks.—Bangs and Peters recognized two races of *canicularis*, designating the type locality of true *canicularis* as northwestern Costa Rica and grouping all of the birds from Guerrero to Sinaloa under *eburnirostrum*. At that time, as our large series from northeastern Sinaloa had not been collected, only a few very old specimens, marked as from the general locality of "Mazatlan" were in existence and only a handful of specimens from Nayarit and Colima. Our series of twenty-eight specimens has thrown an entirely new light on the picture. Sixteen come from central and northern Sinaloa, whence recorded specimens were unknown previously and it is this area that represents the chief habitat of the new race. At a point somewhat south of Mazatlan, the lower throat and chest begins to change to a more yellowish olive, but the restricted forehead patch is maintained to Manzanillo in Colima. A large series of topotypes from Acapulco adequately represent the Type of *eburnirostrum*.

An interesting character of possibly minor importance differentiates true *canicularis* of Costa Rica from most of the forms to the north. Of the twenty individuals from Costa Rica (including thirteen fresh specimens in the Moore collection) not one has the brownish mark on the sides of the mandible, the entire mandible being ivory whitish like the maxilla. Of the fifty-seven specimens, ranging from Guerrero north to Sinaloa, every one has the sides dark in coloration, brownish in the case of *eburnirostrum* and bluish black in *clarae*. It is puzzling that all nine specimens from Oaxaca and two from Guatemala have ivory whitish mandibles like the Costa Rica birds, whereas all ten specimens from Honduras and all three from Salvador have at least some trace of a brown mark on the sides of the mandible. Two specimens from Nicaragua have practically none.

This race seems to breed in March as the oviduct in the female from San Ignacio on March 14th contained a full-sized, hard egg.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



TWO NEW OWLS FROM SINALOA, MEXICO.

BY ROBERT T. MOORE,
California Institute of Technology.

New forms of birds, which have appeared in the collections from Sinaloa, Mexico, are described in this paper.

For permission to examine specimens in their collections, my acknowledgments are gratefully offered to Dr. Alexander Wetmore and Dr. Herbert Friedmann of the Smithsonian Institution, Mr. John T. Zimmer of the American Museum of Natural History, Mr. James L. Peters of the Museum of Comparative Zoology, and Mr. S. C. Simms of the Field Museum of Natural History.

Asio stygius lambi,¹ subsp. nov.

LAMB'S STYGIAN OWL.

Type.—Male adult; number 15288, collection of Robert T. Moore; Babizos, northeastern Sinaloa, Mexico; December 3, 1935; altitude 6400 feet; collected by Chester C. Lamb.

Subspecific characters.—Differs from *Asio stygius robustus* Kelso of Vera Cruz, Mexico, in having the dark areas much darker throughout, dark blackish brown, instead of chocolate brown; chocolate brown and buffs of orbital region and facial rim replaced by black and white; chin whitish instead of buff; back almost immaculate blackish brown without mottling; lower back, rump and upper tail coverts darker with only inconspicuous whitish bars; flanks and sides of abdomen much darker; four outer primaries lacking the spots of deep buff or ochraceous on outer webs; spots on inner webs whiter; dark bars of longest under tail coverts four (sometimes five) instead of three; bars of middle rectrices five, very narrow, the posterior three almost obsolete; size larger. Resembles in its darker coloration *Asio stygius noctipetens* Riley of Santa Domingo, but is distinctly darker in the brown markings; black and white on the sides of the abdomen and lower

¹Chester C. Lamb is more than a collector, he has the indefatigable zest of a real student of bird behaviour, which has won him the friendship of every ornithologist. It is a pleasure to commemorate these sterling qualities by naming a well-marked race for its discoverer.

under parts, where *noctipetens* is largely bright ochraceous; size very much larger. Toes feathered almost to end of terminal joint—dark brown.

Range.—Probably the higher mountains throughout Sinaloa and western Durango.

AVERAGE MEASUREMENTS OF *Asio stygius lambi* AND RELATED RACES.

MALES	WING. ²	TAIL.	CULMEN. FROM BASE.
2 ads. (incl. Type)			
<i>lambi</i>	346.1	171.4	39.6
1 ad. Guatemala,			
<i>robustus</i>	325.1	157.1	39.1
1 ad. Cuba, <i>signapa</i>	311.0	155.3	35.8
1 ad. S. Domingo,			
<i>noctipetens</i> (Type)	291.0	159.4	34.5
1 ad. Argentine, <i>bar-</i>			
<i>beroi</i> (?).....	333.4	162.4
1 ad. Colombia,			
<i>stygius</i>	330.2	162.8
FEMALES.			
1 ad. Durango, <i>lambi</i>	347.8	181.3	41.2
1 ad. Nicaragua,			
<i>robustus</i>	330.	158.7	36.4
1 ad. S. Domingo,			
<i>signapa</i>	157.8
1 ad. Colombia,			
<i>stygius</i>	334.4	159.3

Specimens examined.—Lambi, Sinaloa 1 ♂ (Type) Babizos 1 ♂, 1 ♀ Muertocito, Durango. *Robustus*, Vera Cruz 1 ♀ (Type) Mirador; Guatemala 1 (?) Coban; Nicaragua 1 ♀ Matagalpa. *Signapa*, Cuba 1 ♂ Taco Taco, 2 (?) "Cuba." *Noctipetens*, Dominican Republic 1 ♂ (Type) Constanza, 1 ♀ Samarro Prov., 1 (?) "Santo Domingo." *Stygius stygius*, Brazil 1 (?); Colombia, 1 ♂ La Guneta, 1 ♀ Santa Elena, 1 ♂, 1 ♀, 1 (?) "Colombia"; Ecuador 1 ♂ Montes de Parambas. *Barberoi*, Argentine 1 ♂ Tucuman, 1 (?) "Argentine."

Remarks.—The series of *lambi* are the only specimens which have been secured on the west coast of Mexico. Apparently the only other from Mexico is the Type of *robustus* from Mirador, Vera Cruz, Ridgway's citation of "Mexico" on the authority of the Biologia Centrali-Americana being an error. When describing *robustus*, Kelso grouped all of the Central American birds under this name and laid particular stress on three characters as distinguishing them from South American birds. With more specimens before me, including six from Mexico and Central America and eight from South America, I find his characters valid. As he pointed out, the number of bars on the longer under tail coverts and the coloration, presence or absence of spotting on the webs of the primaries seem to have

²Wing measurement is the average of both wings.

important diagnostic value. The former increase from south to north, reaching their maximum both in number and prominence in *lambi*, whereas the latter decreases, becoming whiter and almost disappearing on the outer webs. The Coban bird, which is obviously *robustus*, has no spots on the outer webs of the two outer primaries, but shows traces on the others.

The three specimens of *lambi* are the largest of the nineteen specimens. Like the Type of *robustus*, *lambi*, the most northern representative of the species, has the toes rather heavily feathered almost to the end of the terminal joint.

***Glaucidium minutissimum oberholseri*,³ subsp. nov.**

OBERHOLSER'S PYGMY OWL.

Type.—Male adult in breeding plumage, number 17902, collection of Robert T. Moore; Vado Hondo, central Sinaloa, Mexico; April 3, 1937; altitude 1000 feet; collected by Chester C. Lamb.

Subspecific characters.—Nearest to *Glaucidium minutissimum palmarum* (Nelson), but darker above, pileum Olive Brown⁴ compared with Saccardo's Umber, tail Clove Brown compared with Bister, middle of back Olive Brown compared with Sepia, flanks more solid brown and much darker, Bister as compared with Snuff Brown; light streaks of under parts pure white instead of buffy white; large area of white on throat, whereas none in Type of *palmarum*; bristles on toes white instead of buff; wing and tail shorter, culmen longer.

Range.—Arid Upper Tropical Zone of the mountains of central and southern Sinaloa, from 1000 to 3500 feet in altitude.

AVERAGE MEASUREMENTS OF *Glaucidium minutissimum oberholseri* AND *Glaucidium minutissimum palmarum*.

	MALES.	WING. ⁵	TAIL.	CULMEN FROM CERE.
5 ads. (incl. Type)				
<i>oberholseri</i>	81.1	(80.5–82.0)	50.7 (48.6–53.1)	10.3 (9.8–10.6)
2 ads. <i>palmarum</i>	84.2	(83.2–84.9)	53.6 (53.1–54.1)	9.4 (9.2–9.5)
FEMALES.				
1 im. <i>oberholseri</i>	83.7		49.6	9.2
1 ad. (Type) <i>palmarum</i>	84.4		54.5	9.8

Specimens examined.—*Oberholseri*, Sinaloa 1 ♂ (Type) Vado Hondo, 3 ♂ Sierra Palos Dulces, 1 ♂ Rancho Santa Barbara, 1 ♀ Rancho Picacho. *Palmarum*, Nayarit 1 ♀ (Type) Arroyo de Juan Sanchez; Guerrero 1 ♂

³It would be superfluous to attempt to honor an ornithologist, whose name is spread over the list of North American birds. The receipt of numerous and unusual courtesies compels me to seek some way, however trite, to express my deep appreciation to one, whose name in Latin is so well known to every bird student, that its translation is unnecessary.

⁴Names of colors in this paper, when capitalized, are taken from Ridgway's "Color Standards and Color Nomenclature," 1912.

⁵Wing measured from anterior point of metacarpus.

Chilpancingo, 1 ♂ El Naranjo. *Gnoma*, several specimens from Jalisco, Michoacan, Morelos, Tamaulipa, Chihuahua, Nuevo Leon, and 1 ♀ (Moore collection) Temascaltepec, Mexico. *Gnoma* (?), 2 ♂, 1 ♀ San Feliz, Chi. near Sinaloa-Chihuahua State Line, 1 ♂ Babizos, Sinaloa. *Fisheri*, Puebla 1 ♀ (Type) Tochimilco.

Remarks.—*Oberholseri* is the Arid Upper Tropical Zone representative of the Humid Tropical *palmarum* of Nayarit to Guerrero. The northern limit of its range approximates the northern limit of the Tropical Zone, where it merges into the Lower Austral Zone of northern Sinaloa and Sonora. In these low mountains it is almost completely dry during nine months of the year but averages from fifteen to twenty inches during the three summer months (See Brooks, *Climates of North America*, pp. 55 and 58). The annual average of between twenty and thirty inches compares with approximately fifty or more inches at similar altitudes in Nayarit. Although Griscom, in his trenchant solution of the problems involved in the *gnoma-minutissimum* relationship, calls *minutissimum* a bird of the "humid rain-forests," the most northern representative of the *minutissimum* group occurs just where the humid Tropical Zone characteristics have vanished, so that the marked differentiation of this new race would be expected.

There is no tendency in the new race toward intergradation with *gnoma* to the north and east. The back is uniform without spots, the sides even more solid brown and the tail shorter than in *palmarum* to the south. Furthermore, *oberholseri* tends to have one bar less on the tail than *palmarum*, rather than one more as in *gnoma*! I have examined critically a large number of specimens of both the *gnoma* and *minutissimum* group. In freshly moulted individuals of all races a cross line of spots or bars appears at the extreme tip of the tail and a more or less obscure one at the extreme base of the feathers. Disregarding these extreme bars, *gnoma* and *californicum* generally have six bars, *palmarum* five, while *oberholseri* in several specimens shows only four. This tendency both in size and character away from *gnoma* is all the more surprising, because *gnoma* has at last been discovered on the west slope of the Sierra Madre, about one hundred miles north of the type locality of *oberholseri*. These four birds are in the typical gray phase of northern "*gnomas*," but have neither white nor black band often found on hindneck, and only a trace of the buff, whereas this triple character is the only one of *gnoma*, which all five adult specimens of *oberholseri* possess, just as do the males of *palmarum*.

The depth of color, increasing towards brown, rather than towards gray and the richer cinnamon on the upper back and even rump of some males indicates that all six specimens are in the intermediate phase, as are the *palmarums*.

PROCEEDINGS
OF THE
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A NEW BAT FALCON FROM SONORA.

BY A. J. VAN ROSSEM AND THE MARQUESS HACHISUKA.

One of the unexpected results of a recent survey of parts of southern Sonora was the collecting of a pair of bat falcons which were breeding, in an utterly inaccessible site, in the cliffs which overlook the village and valley of Guirocoba some twenty-five miles east of Alamos. Although only the two specimens were taken and no further trace of the species was detected at any of the several collecting stations, we do not hesitate to describe and name what is obviously a pale, northwestern race. We name this as

Falco albigularis petrophilus, subsp. nov.

Type.—Breeding male adult, No. 31882, Dickey Collection; Guirocoba, southeastern Sonora, Mexico, June 1, 1937; collected by A. J. Van Rossem and Robert Hannum.

Subspecific characters.—Differs from typical *Falco albigularis albigularis* Daudin of northern South America, Central America, and southern Mexico in the color of the upper parts which are plumbeous slate instead of plumbeous black or blackish plumbeous, this difference being particularly noticeable on the pileum, forehead; and cheeks; throat, upper breast, and partial collar around hindneck white, only faintly tinged with pale buff where adjoining dark portions instead of being strongly ochraceous; reddish brown of median underparts and thighs paler.

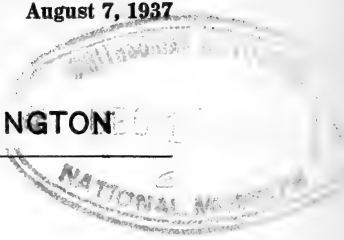
Range.—So far as known, the foothills of the Arid Tropical Zone in extreme southeastern Sonora.

Remarks.—According to the notes of the late Donald Dickey there is a specimen of this falcon from Mazatlan, Sinaloa, in the collection of the U. S. National Museum which seems to approximate the characters of *petrophilus*. We have no further data on the specimen.

While only 11 specimens of *albigularis* are immediately available in the present instance, we have examined at one time or another several times that number and have seen no individuals which bear the characters of *petrophilus*. In comparative depth of coloration, *petrophilus* has much the same relation to *albigularis* as has *Falco columbarius columbarius* to *Falco columbarius suckleyi*.

0673

PROCEEDINGS
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THE BLUE-GRAY GNATCATCHER OF SOUTHERN SONORA.

BY A. J. VAN ROSSEM AND THE MARQUESS HACHISUKA.

During a recent collecting trip conducted by van Rossem and Robert Hannum in the combined interests of the Dickey, Hachisuka, and Sheffler collections, one of the unexpected racial variations discovered in the Sierra Madre of extreme southeastern Sonora was a blue-gray gnatcatcher which was recognized even in the field as distinct from the well-known subspecies of the western United States. A description follows and the new race may be known as

Polioptila caerulea gracilis, subsp. nov.

Type.—Breeding male adult, number 31881 Dickey collection; collected by A. J. van Rossem and Robert Hannum at Rancho Santa Barbara, 20 miles northeast of Guirocoba in extreme southeastern Sonora, Mexico, June 8, 1937, altitude (approximately) 5000 feet.

Subspecific characters.—Differs from *Polioptila caerulea amoenissima* Grinnell in paler and more ashy blue dorsal coloration and whiter posterior underparts; black on forehead of adult summer males reduced to a mere trace and the black superciliary streaks reduced to slight indications which scarcely reach the eye. Tail, bill, and tarsus shorter than in *amoenissima*, and the tarsi and feet notably more slender.

Range.—Oak regions of the Sierra Madre foothills in extreme southeastern Sonora and probably in adjacent parts of Chihuahua and Sinaloa.

Remarks.—We know of no specimens of the blue-gray gnatcatcher taken in the breeding season in any part of southern Sonora save for the seven individuals collected in the present instance. The widely distributed western race, *amoenissima*, occurs commonly at that season in suitable localities along the northern boundary of the State and south in the north central ranges as far as Opodepe and La Chumata at least. Specimens from these localities (examined in the Museum of Comparative Zoölogy by van Rossem) appear to represent typical *amoenissima*.

A reexamination of fall, winter, and spring specimens (Dickey collection) from numerous localities in Sonora discloses only three which are unmistakably *gracilis*. Two of these are from San Esteban Island, collected on January 12, 1932, and one is from Tesia in the lower Mayo River Valley, collected on December 4, 1929. These records indicate that *gracilis* may simply descend to the coastal lowlands in winter instead of performing a southward migration.

MEASUREMENTS.

	<i>Wing.</i>	<i>Tail.</i>	<i>Exp. culmen.</i>	<i>Tarsus</i>
6 male <i>gracilis</i>	47-50	44-49	8.8-9.5	15.1-16.1
4 female <i>gracilis</i>	47-49	46-49	8.8-9.5	14.5-16.1
32 male <i>amoenissima</i>	48-52	48-55	9.0-10.6	16.0-18.4

0673

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A NEW ANT-LIKE THRIPS FROM FLORIDA.

BY J. DOUGLAS HOOD.

The members of the genus *Edaleothrips* look much like ants, and at least some of them occur in frequent association with species of ants to which they bear a close superficial resemblance, not only in size, form, and color, but also in behavior. Perhaps the thrips are actually mimics. Certainly the swollen head and abdomen, and the great reduction of the pterothorax, together with the elevation of the metanotum into a distinct hump—characters possible only in wingless forms—give them a strikingly ant-like appearance. The demarcation between thorax and abdomen, so accentuated in the ants, is secured in the species of *Edaleothrips* by the disposition of white markings in such a way as to reduce still further the apparent width of the pterothorax, and to make the abdomen appear pedicellate. At least two of the species—the only ones which the writer has seen alive—habitually curl the tip of the abdomen forward over the back when alarmed. This gives the abdomen a shorter and more rounded form, and hence more ant-like, when seen from above. The gait of these two thrips as they scuttle hurriedly to safety is far more like that of the ants with which they are frequently found than that of related thrips belonging to the same family. The interesting species described below is the only one in the genus which looks like a red ant; all of the others are dark colored.

Edaleothrips bradleyi, sp. nov.

Female (apterous).—Length about 2.8 mm. (nearly fully distended, 3.3 mm.). Color pale yellowish brown or testaceous, the head darker and more brownish anteriorly, the abdomen paler but with a partial transverse brown band behind the subbasal chitinous line on each of terga III-VIII, and the sides of segments VIII and IX and the tip of the tube darkened with gray-brown; stigmal areas of mesothorax chalky white, as is also the

extreme posterior portion of pterothorax, the first abdominal segment, and a spot on each side of the second segment; femora (especially the middle and hind pairs) lightly shaded with brown on their morphological dorsal surfaces, fore tibiæ similarly but more darkly shaded, their tarsi nearly yellow, middle and hind tibiæ and tarsi darker, brown in color, the tibiæ becoming somewhat blackish apically; antennæ with segments I and II nearly clear white, III and IV yellow, the distal five-sixths of III paler than the basal portion, the extreme tip of IV shaded with brown, V dark brown in about basal two-fifths, its distal portion and all of VI-VIII nearly black; prothoracic setæ brownish or yellowish, the other body setæ nearly or quite colorless.

Head a trifle broader across eyes than across cheeks, about 1.43 times as long as greatest width, not at all produced in front of eyes, so broadly rounded anteriorly that the part in front of posterior margins of eyes forms an almost perfect semicircle; cheeks full, narrowed to just in front of basal collar, where the width of head is only 0.6 that across eyes, the collar itself slightly wider; vertex not at all produced or overhanging, curved evenly downward to antennæ, its surface minutely rugose; frontal costa shallowly concave and very broad (78μ); dorsum of head decidedly elevated between and behind eyes and faintly reticulated, its extreme base polygonally subreticulate; all setæ nearly white, and all somewhat dilated at tip, the vertical pair longest (72μ), situated distinctly in advance of front margin of eyes and 145μ apart; interocellar pair about 50μ long, 137μ apart, and about opposite middle of eyes; postoculars about 43μ long, 245μ apart, arising about 50μ behind eyes, and about comparable with a pair arising laterad and cephalad to them; dorso-cephalic pair about equal to postoculars, 157μ apart, and 180μ behind eyes. *Eyes* not at all protruding, very slightly concave in front of the larger posterior facets, and very small in size, their dorsal length (113μ) about one-fifth that of head, their dorsal width and interval respectively 70 and 228μ ; ventrally they are about 0.38 as long as head (204μ) and much narrower, and the posterior prolongation contains facets whose diameter is fully twice that of the dorsal ones. *Ocelli* totally wanting. *Antennæ* thoroughly typical of the genus, formed almost exactly as in the genotype (see Hood, Bull. Brooklyn Ent. Soc., 11:64-65, Pl. II, fig. 3. 1916); segments V and VI with the usual lobe-like ventral prolongations; all major antennæ setæ pale and inconspicuous, nearly all of those on segments I-III knobbed, all on IV-VIII pointed; sense cones short and rather stout, situated as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1 (1), V 1 (1^{+}), VI 1 (0^{+}), VII 1 dorsal. *Mouth-cone* short and semicircularly rounded at tip, its length beyond dorsal margin of head about 164μ or 0.31 the length of head.

Prothorax along median line of pronotum about 0.56 as long as head and (inclusive of coxæ) about 1.4 times as wide as long; notum elevated and very convex, its anterior margin slightly thickened, its sides and anterior portion with distinct longitudinal sculpture, its posterior fourth curving abruptly downward and with distinct transverse anastomosing lines; midlateral setæ minute and pointed, all others slightly dilated apically and yellowish or brownish in color, the antero-marginals 30μ , antero-angulars 35μ , epimerals and coxals about 40μ , postero-marginals 46μ . *Legs*

normal to the genus, fore tarsi toothed as in the genotype (see Hood, *loc. cit.*, fig. 1). *Pterothorax* much narrower than prothorax and head, the greatest mesothoracic width only 0.88 that across eyes; metanotum much elevated above mesonotum, forming a rounded hump; mesonotum almost indistinguishably sculptured with transverse anastomosing lines, metanotum more closely striate with conspicuous concentric lines; metanotum with two pairs of blunt setæ about 26μ long forming a transverse row across middle, the inner pair only 45μ apart, the outer pair about 88μ laterad from them.

Abdomen broad and heavy, widened from base to segment V, where it is broadest, and then rounded to tube; wing-retaining setæ absent, terminal setæ pointed and about 137μ in length, all other major dorsal and lateral setæ distinctly dilated at apex, the single pair on tergum I about 28μ , the inner (and outer) pairs on succeeding terga measuring as follows in μ : II 59 (43), III 64 (50), IV 73 (52), V 80 (50), VI 89 (97), VII 130 (167), VIII 80 (150), IX 137 (174), the ventro-lateral pair on IX 125μ . *Tube* short and stout, about 0.41 as long as head, 1.84 times as long as greatest subbasal width, and 2.1 times as wide near base as at apex, with slight apical constriction, its sides nearly straight.

Measurements of female (holotype), in mm.: Length about 2.81 (nearly fully distended, 3.34); head, median dorsal length 0.528, width across eyes 0.368, greatest width across cheeks 0.363, least width near base 0.221, width across basal collar 0.227; prothorax, median length of pronotum 0.294, greatest width (inclusive of coxæ) 0.414; mesothorax, greatest width 0.322; abdomen, greatest width 0.578; tube (segment X, only) length 0.217, greatest subbasal width 0.118, least apical width 0.056.

Antennal segments:	1	2	3	4	5	6	7	8
Length (μ).....	83*	87	177	125	117†	103†	69	63
Width (μ).....	60‡	42	43	46	43	37	32	20
Total length of antenna 0.824 mm.								

* Ventral length.

† Dorsal length (exclusive of ventral process).

‡ Basal width.

FLORIDA: St. Petersburg, February 9, 1937, Dr. J. Chester Bradley, 1 ♀, "from low vegetation in open piney woods."

The pale testaceous color, relieved only by the somewhat darkened head, shaded legs, gray-tipped tube, and the chalky white markings on thorax and abdomen, give this species an appearance very different from that of the other members of its genus. Structurally it is thoroughly typical of the group which includes *hookeri* and *jacksoni*, all of whose species have the metanotum conspicuously elevated to form a hump which is concentrically striated. In this group only *hookeri* and *bradleyi* have the tube pale; that of all the others is black or dark brown. And the antennæ of *bradleyi*, with the first and second segments nearly white, the third and fourth largely yellow, and the others nearly black, are even more distinctive. The species is named after Dr. J. Chester Bradley, Professor of Entomology and Curator of Invertebrate Zoology at Cornell University, who collected it.



PROCEEDINGS
OF THE
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NOTES ON THE NOMENCLATURE OF THE
TROCHIDAE.

BY HARALD A. REHDER.



In the course of work on several faunal problems in progress I have come across a few necessary changes in the names of species and super-specific groups within the family Trochidae. As publication of the more comprehensive studies may be delayed for some time, I have deemed it expedient to put these items now on record.

Margarites johnsoni Dall 1921. The name for this New England shell (*Nautilus*, vol. 35, pp. 49-50) is preoccupied by *Margarita johnsoni* Arnold 1909 (U. S. Geol. Surv. Bull. 396, p. 69) from the Pliocene of the Coalinga District, California. For the recent East Coast form I propose the name

***Margarites mighelsi*.**

in honor of the one first to describe this species.

Margarites (Pupillaria) cinereus Couthouy 1839. Originally described as *Turbo cinereus* Couthouy (*Journal Boston Soc. Nat. Hist.*, vol. 2, p. 99), this name is preoccupied by *Turbo cinereus* Born (*Index Mus. Caes. Vind.*, p. 356), which, by the way, will have to be the name for the shell known as *Turbo porphyrites* Martyn 1786 or *Turbo versicolor* Gmelin 1792, as the description and rather poor figure show it to be the smooth form of this protean species (I have not seen Born's first work, but have used his *Testacea Mus. Caes. Vind.*, 1780, p. 349, pl. 12, figures 25, 26); Brauer, who examined Born's types, with the aid of von Martens, came to this same conclusion (*Sitzb. k. Akad. Wissensch. Wien, I Abth. Febr.-Heft*, 1878, p. 177). For Couthouy's species we may use the combination *Margarites costalis* "Loven" Gould 1841, since this name is quoted in the synonymy by Gould as a manuscript name (*Invertebrata of Massachusetts*, p. 252).

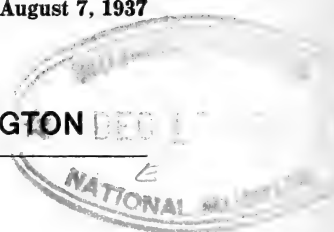
Zizyphinus Gray 1843. Since this name in the forty-fourth edition of the *Synopsis of the Contents of the British Museum*, 1842, must be con-

sidered a *nomen nudum*, its first valid use will date from 1843, when Gray used it in Dieffenbach, *Travels in New Zealand*, volume 2, page 237. Here he listed six species under this genus, all supposedly New Zealand forms, of which two, however, are now known to come from California. These species are: *canaliculatus* Martyn (= *decarinatus* Perry), *annulatus* Martyn (= *virgineus* Dillw.), *selectus* Dillw., *tigris* Martyn (= *tigris* Gmelin), and *punctulatus* Martyn (= *diaphanus* Gmelin). This genus has heretofore been dated from 1847, with the Mediterranean *Calliostoma zizyphinum* L. as type. I select *Zizyphinus canaliculatus* (Martyn) Gray as type, not merely because it is first on the list, but because the Neozelanic species cited have already received superspecific designations. Whether *Zizyphinus* will stand as a valid genus or subgenus will have to be determined by a critical study of the Californian species. It may be noted that I am discarding Martyn's names as I consider his nomenclature to be neither binominal nor Linnean.

Gibbium Gray 1843. This name first occurs as a *nomen nudum* in the forty-second edition of Gray's *Synopsis of the Contents of the British Museum*, 1840. In the forty-fourth edition of this work (1842, p. 57) there is a brief description, which is, however, too short to be of any diagnostic value. Its first valid introduction is in Dieffenbach's above-mentioned book (vol. 2, p. 238) where Gray proposes it as a subgenus of *Trochus* for a new species, *Trochus (gibbium) sanguineus*. That the name is not capitalized should not invalidate it, as in this article none of the subgenera are capitalized; on page 234 we find *Purpura (ricinula) rodostoma*, and on page 247 *Helix (carocolla) Zelandiae*. Finlay in 1926 (*Trans. New Zealand Inst.*, vol. 57, p. 355) made a genus *Micrelenchus* for this species, which will now be known as *Gibbium sanguineum* Gray, *Micrelenchus* Finlay 1926 becoming an absolute synonym of Gray's genus.

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DESCRIPTIONS OF TWO NEW PASSERINE BIRDS
FROM THE WESTERN UNITED STATES.

BY HARRY C. OBERHOLSER.

The two new subspecies of birds described below were incidentally discovered in the course of recent identifications of western birds. For the loan of comparative material the writer wishes to thank Dr. Vasco M. Tanner, A. M. Bailey, E. R. Warren, and C. Lynn Hayward.

The jays of the *Cyanocitta stelleri* group inhabiting central and southern Arizona appear to be indistinguishable from *Cyanocitta stelleri diademata* of Mexico. Birds of this species, however, from northern Arizona and apparently all of Utah, seem to differ sufficiently to make desirable their separation subspecifically, and they may accordingly be named:

Cyanocitta stelleri cottami,¹ subsp. nov.

UTAH JAY.

Subspecific characters.—Similar to *Cyanocitta stelleri diademata*, but larger; upper and lower parts decidedly darker, the blue less greenish; light blue streaks on the forehead darker, less whitish, smaller, and less numerous.

Measurements.—Adult male²: wing, 144-160 (average, 150.7) mm.; tail, 129-154 (137.6); exposed culmen, 27-30 (28.8); height of bill at base, 10.5-12 (11); tarsus, 42-45.5 (43.8); middle toe without claw, 20-23.5 (21.6). Adult female³: wing, 140-156 (average, 148.6) mm.; tail, 131-144 (137.8); exposed culmen, 25-31 (27.5); height of bill at base, 10-11.8 (10.6); tarsus, 42-46 (44.1); middle toe without claw, 20-22 (21.3).

Type.—Adult female, No. 139672, U. S. National Museum, Biological Survey collection; Provo, Utah; October 24, 1895; A. H. Howell, original number, 90.

¹ Named for Dr. Clarence Cottam of the U. S. Biological Survey.

² Ten specimens, from Utah, northern Arizona, and northwestern New Mexico.

³ Twelve specimens, from Utah and northwestern New Mexico.

Geographic distribution.—North to northern Utah; west to southwestern Utah (Pine Valley Mountains); south to northern Arizona (Williams); and east to central northern New Mexico (Tres Piedras and Twining), and northeastern Utah (Uinta Mountains).

Remarks.—This new race is similar to *Cyanocitta stelleri annectens*, but differs in somewhat smaller size and lighter coloration, the blue areas being of somewhat more greenish tone, the blue streaks on the forehead paler; and there is a conspicuous white spot or short broad streak above the eye, which is absent in *Cyanocitta stelleri annectens*. The difference in size separating this new form from *Cyanocitta stelleri diademata* may be appreciated by comparison with the following average measurements of adult males of the latter from Arizona and northern Mexico: wing, 143.7 mm.; tail, 132.1; exposed culmen, 27.1; height of bill at base, 11.3; tarsus, 43.7; middle toe without claw, 21.8.

Birds from northwestern New Mexico and central northern New Mexico (Cieneguilla, Tres Piedras, Twining, Chama, and Zuni Mountains) are more or less intermediate but are apparently nearer this new race from Utah. Specimens from Williams and Lukachukai Mountains, northern Arizona, are also somewhat intermediate between *Cyanocitta stelleri cottami* and *Cyanocitta stelleri diademata* of central Arizona, but are decidedly nearer the former.

This new jay is dedicated to Dr. Clarence Cottam, of the U. S. Biological Survey, who has done so much to advance our knowledge of Utah birds.

***Pipilo fuscus mesatus*, subsp. nov.**

COLORADO TOWHEE.

Subspecific characters.—Similar to *Pipilo fuscus mesoleucus*, of Arizona, but larger; above decidedly paler, more brownish (less grayish), the pileum particularly paler; sides and flanks also averaging somewhat lighter.

Measurements.—Adult male: wing, 95.5–104 (average, 98.3) mm.; tail, 101–110 (104.3); exposed culmen, 14.2–15.5 (14.9); height of bill at base, 9.8–10.5 (10.2); tarsus, 26–28.5 (27); middle toe without claw, 16.5–18 (17.1). Adult female: wing, 90–97 (average, 93) mm.; tail, 98–108.5 (102.3); exposed culmen, 13.5–15.5 (14.4); height of bill at base, 9.5–10.5 (9.9); tarsus, 25–27.5 (26.4); middle toe without claw, 16.5–18 (17.1).

Type.—Adult female, No. 204013, U. S. National Museum, Biological Survey collection; Gaume's Ranch, altitude 4,600 feet, northwestern corner of Baca County, Colorado; November 27, 1907; Merritt Cary, original number, 290.

Geographic distribution.—Middle and southeastern Colorado, north to south central Colorado (Otero and Pueblo counties), casually to central northern Colorado (Boulder); west to Fremont County; south to central southern Colorado (Westervale in southern Animas County) and southeastern Colorado (Baca County); and east to southeastern Colorado in Baca County and Bent County.

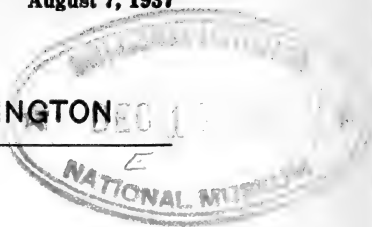
Remarks.—This surprisingly distinct towhee apparently has a rather limited distribution in the southeastern and south central portions of

Colorado, and no specimens have been seen from any other State. It is apparently another example of the differentiation to which certain species are subject in the general region of northwestern Texas, northeastern New Mexico, southeastern Colorado, and northwestern Oklahoma. Specimens of this species from northern New Mexico (Dorsey), Cieneguilla, Rinconada, Rio Puerco, and Hondo Canyon, are, however, all referable to *Pipilo fuscus mesoleucus*, as are also specimens from central New Mexico at localities such as the Manzano, San Andreas, and Capitan Mountains.

A good series of specimens of this new race has been examined, representing the following localities:

Colorado.—Regnier, Baca County (May 3, 4, 5, 6, 9, 12, 14, and 17, 1914; Feb. 1, 1915; Mar. 8, 1918); Jimmie Creek, Baca County (May 19, 29, and 31, 1914); Apishapa, Otero County (Nov. 11, 1876); Red Canon (Apr. 13, 1878); Fremont County (Apr. 16, 1872); Pueblo County (Mar. 9, 1875; Mar. 25, 1894; Nov. 20, 1892); Higbee (Apr. 14, 1910); Gaume's Ranch, northwestern Baca County (type, Nov. 27, 1907); Canon City (Sept. 30, 1892); Westervale (Aug. 7 and 8, 1906).

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



SOME NEW SPECIES AND VARIETIES OF
OREGON PLANTS.

BY MORTON E. PECK.

Recent collections have brought to light several apparently undescribed species and varieties of Oregon plants. There are still large areas of the State where little collecting has been done and where occasional discoveries of this kind may confidently be expected, especially in a region of such varied topography and climatic conditions. All of the following forms are probably very local.

***Arenaria tenella* Nutt. var. *puberulenta*, var. nov.**

Caule omnino densius glanduloso-puberulo.

Stem rather densely glandular-puberulent throughout; otherwise like the species.

Type *M. E. Peck* 18104, on a high moist cliff, Cape Perpetua, Lincoln Co., Sept. 13, 1933.

***Sedum Heckneri*, sp. nov.**

Planta tota glaucissima lividaque; rhizomatibus crassis copiose saepe radiate ramosis 3-10 cm. longis; foliis vergarum sterilium ad apicem congestis 1.5-3.5 cm. longis spatulatis vel obovato-spatulatis apicibus subtruncatis vel emarginatis; caulibus floriferis 1-2 dm. altis crassis foliosissimis, foliis late oblongis valde auriculati-complectentibus ad basin patentibus sursum curvatis; inflorescentia aliquid globosa ramis valde recurvatis, floribus multis bracteis superioribus parvis acutis; calyce 2-4 mm. alto fere ad basin partito segmentis anguste triangularibus acutis; petalis roseis erectis 8-10 mm. longis lanceolato-ovatis obtusis vel paulum acutis omnibus ad basin unitis vel etiam nonnullis in eodem flore distinctis; staminibus paulo brevioribus petalis 1.5 mm. longis; carpellis ad basin distinctis erectis petala aequantibus.

Whole plant very glaucous and livid; rootstocks stout, freely and often radiately branched; leaves of the sterile shoots crowded at the tips, 1.5-3.5

cm. long, spatulate or obovate-spatulate, nearly truncate to emarginate at apex; flowering stems 1-2 dm. high, stout, very leafy, the leaves broadly oblong, 1-2 cm. long, strongly auriculate-clasping, spreading at base and curved upward; inflorescence many-flowered, the strongly recurved branches forming a somewhat globose cluster, the upper bracts small and acute; calyx 2-4 mm. long, parted nearly to the base, the segments narrowly triangular and acute; petals rose-color, erect, 8-10 mm. long, lance-ovate, obtuse or acutish, united about one-fourth their length or some of them quite free even in the same flower; stamens a little shorter than the petals; carpels distinct to the base, erect, as long as the petals.

On a dry cliff along the Middle Fork of Applegate River four miles above the mouth of Carberry Creek, Jackson Co., Ore., June 26, 1931. Type *M. E. Peck* 16421.

This seems a very distinct species, striking in the peculiar color of its foliage and in the broad deeply clasping leaves of the flowering stems. It is named for Mr. J. H. Heckner, of Medford, Ore., who first brought it to my attention.

***Lomatium semisepultum*, sp. nov.**

Planta tota pilis densis brevibus patentibus canescens acaulescens a radice longa crassa; foliis ovatis 2-3.5 cm. longis quatuor-divisis -partitisque segmentis confertissimis ultimis plurimis semi-teretibus oblongis mucronatis vix 1 mm. longis; scapis 1-3 gracilibus super solum 3-6 cm. longis; umbellis sine involucri radiis 2-4 inaequalibus longissimo vix 1 cm. longo; bracteis involuclorum 4-6 lanceolatis vel ovatis ex parte foliaceis 2 mm. longis; petalis ut videtur albis vel purpurascens; pedicellis fructuariis 3-6 mm. longis; fructibus minute denseque puberulis ellipticis vel fere orbicularibus ad apicem basinque plus minusve incis 6-11 mm. longis, alis corpus fere aequantibus, vittis 1-3 in intervallis 6 in commissura.

Plant caescent throughout with a dense short spreading pubescence, very dwarf, acaulescent; leaves 2-3.5 cm. long, ovate in outline, very compactly 4-parted and -divided, the very numerous ultimate segments semi-terete, oblong, mucronate, scarcely 1 mm. long; scapes 1-3, slender, 3-6 cm. long above ground; involucre wanting, the rays of the umbel 2-4, very unequal, the longest not over 1 cm. long; involucl of 4-6 lanceolate or ovate partly herbaceous bractlets 2 mm. long; petals apparently white or purplish; fruiting pedicels 3-6 mm. long; fruit finely and densely puberulent, oval to nearly orbicular, 6-11 mm. long, more or less deeply indented at both ends, the wings nearly as wide as the body, the oil-tubes 1-3 in the intervals, 6 on the commissure.

Dry sandy ground 5 mi. southeast of Hampton, Des Chutes Co., June 19, 1936. Type *M. E. Peck* 18913.

A very inconspicuous little plant, not closely related to any species hitherto described. The very large fleshy root appears quite disproportionate to the few small leaves and scapes, while the fruit is remarkably large.

Campanula sacajaweana, sp. nov.

Herba pumila patens vel decumbens e rhizomate longo squamosissimo oriens; caule gracili 4-8 cm. alto glaberrimo vel basin versus minute puberulo; foliis glabris vel subter puberulis, basilaribus reniformibus vel orbiculatis integris vel paulum sinuosis 6-15 mm. latis in petiolis 2-5 cm. longis, caulinis inferioribus orbiculatis vel cordatis interdum paulum lobatis vel sparse denticulatis, foliis superioribus lanceolatis, nunquam anguste linearibus; floribus 1-2; tubo calycis hemisphaerico 2-3 mm. alto lobis triangulari-lanceolatis 3-3.5 mm. longis; corolla clare coerulesca late campanulata 8-10 mm. longa, lobis latioribus quam longis; filamentis infra late deltoideis.

Stems from elongated very scaly rootstocks, spreading or decumbent, slender, 3-8 dm. high, glabrous or minutely puberulent below; leaves glabrous or the under surface and petioles finely puberulent, the basal mainly reniform, entire or low-sinuate, 6-15 mm. wide, on petioles 3-8 times as long, sometimes shallowly lobed or with a few low teeth, the upper lanceolate, but none narrowly linear; flowers 1-2 to a stem; calyx-tube hemisphaeric, 2-3 mm. high, the triangular-lanceolate lobes 3-3.5 mm. long; corolla bright blue, broadly campanulate, 8-10 mm. long, the lobes broader than long; filaments broadly deltoid below.

Type *M. E. Peck* 16549, on a dry rocky slope near the summit of Matterhorn, Wallowa Mts., July 15, 1935. Other specimens are *Peck* 17876, high summit to the east of Lostine Canyon 20 mi. above Lostine, Wallowa Co., July 22, 1933, and *Peck* 18071, high rocky slope of Pete's Point, Wallowa Co., July 29, 1933.

A dwarf, high-mountain species, apparently very rare, differing consistently from alpine forms of *C. petiolata* A. DC., with which it often grows, in the reniform basal and lanceolate upper cauline leaves, and in the much broader and shorter calyx-lobes and broader corolla. *Sacajaweana*, for which the species is named, is a summit barely distinguishable from Matterhorn, and is the highest point in the Wallowa Mts. This plant was introduced into cultivation by Dr. I. N. Gabrielson, now chief of the U. S. Biological Survey, and was found to retain its distinctive characters perfectly.

Erigeron filifolius (Hook.) Nutt. var. **robustior**, var. nov.

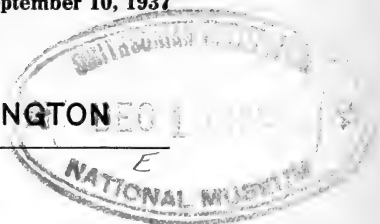
Caule humili robusto 2.5 dm. alto vel minus; capitulis magnis; involucre 12-15 mm. lato; floribus plurimis; radiis 8-10 mm. longis.

Stem low and stout, 2.5 dm. high or less; heads large and very many-flowered, the involucre 12-15 mm. broad; rays 8-10 mm. long, pinkish.

Type *M. E. Peck* 17417, sandy bluff along the Columbia R. near Rowena, Wasco Co., July 1, 1933.



PROCEEDINGS
OF THE
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A NEW SNAKE FROM SOUTHEASTERN CHINA.

BY J. LINSLEY GRESSITT,

Museum of Vertebrate Zoology, University of California, Berkeley.

The following new species was collected on a trip to southeastern China made by the writer during the summer of 1936. The localities visited on the trip were in eastern Kwantung, southeastern Kiangsi, and southwestern Fukien provinces, the material of the herein described species having been collected in the first two provinces named. The snake was probably collected near the eastern extremity of its range, as specimens undoubtedly belonging to the same species, though misidentified, have been recorded from farther west in southern China, and the regions to the east have been extensively collected. The specimens are all now in the collection of the Museum of Vertebrate Zoology, University of California, Berkeley. The writer is indebted to Dr. J. Grinnell and Dr. J. M. Linsdale for kindnesses in connection with this study.

Genus *NATRIX* Laurenti, 1768.

Natrix boulengeri, new species.

Tropidonotus modestus, Mell, 1922, Arch. Naturg., **88**, A, 10 : 116; Vogt., 1922, l. c., p. 137. (N. Kwantung; not of Guenther, 1875.)

Natrix khasiensis > *gilhodesi*, Mell, 1931, Lingnan Sci. Journ., **8** : 203. (N. Kwantung; not of Boulenger, 1890, or Wall, 1925.)

Natrix, Pope, 1935, Nat. Hist. Centr. Asia, **10** (Rept. China) : 90.

Type.—Adult female; No. 23623, Mus. Vert. Zool.; from Tai-yong, alt. 640 meters, E. Kwantung province, southeastern China (lat. 23° 34' N., long. 115° 55' E.), Aug. 5, 1936, J. L. Gressitt (Orig. no. 1487).

Paratype.—Adult female (somewhat dried); No. 23622, Mus. Vert. Zool.; from Hong San, alt. 850 meters, S. Kiangsi province, southeastern

China (lat. 24° 58' N., long. 115° 50' E.), June 30, 1936, J. L. Gressitt (Orig. no. 970).

Diagnosis.—A small, grayish black *Natrix* with pair of white stripes on side of head which continue on body as a pair of narrow pinkish brown dorsal stripes, and with labials and chin-shields that are largely black, or spotted with black. Ventrals 143–147, subcaudals 85–102; scale rows 19–19–17, all but outermost keeled, though weakly so. Closely allied with *N. craspedogaster* (Boul.), but with one pre- and two post-oculars, the nuchal white stripe arising from eye and the lateral black spots on sides of ventrals nearly as broad as long anteriorly, broader than long posteriorly, with external portions mottled.

Description of type.—Narrow; neck slender; head broad behind middle, attenuated anteriorly; snout narrowed, truncate.

Maxillary teeth 28 on right side.

Rostral nearly half again as broad as deep, barely visible from above; internasals as long as broad, narrowed apically and rounded externally; prefrontals one-fourth longer than internasals, their dorsal portions nearly square; frontal one-half again as long as broad, barely longer than interparietal suture, one-eighth longer than its distance from end of snout, two-thirds as broad at supraoculo-parietal suture as at anterior margin, which latter is nearly transverse, subacute behind; supraoculars one-half as broad as, and slightly shorter than, frontal; parietals seven-twelfths as broad as long. Nasal nearly twice as long as high, upper part of division behind nostril, which is in center; loreal subrectangular, two-thirds again as long as broad; preoculars single, nearly twice as broad above as below; eye very small, its length hardly more than one-half length of snout; post-oculars 2–2, superior ones four and three times as large as inferior, respectively; temporals 1–1–2 on each side, first at least twice as long as second, third set with outer considerably larger than inner on each side. Supralabials 9–9, fourth, fifth and sixth “entering” eye, first four small, consecutively larger, seventh, eighth and ninth very large, subequal in area; mental slightly broader than long, narrowed and acute apically; infra-labials 9–10, first five in contact with anterior chin-shields; anterior chin-shields two-thirds as long as, and equal in width to, posterior pair. Body scales in 19 rows from one and one-half head lengths behind head to two or three head lengths beyond middle of body, in 17 rows before vent; outermost row unkeeled, remainder finely keeled. Ventrals 144, anal divided; tail incomplete. Total length, 462 mm.; snout to vent, 399.

Color largely gray and black above, with a pair of pale longitudinal dorsal stripes. Head dark brownish black, dorsal surface finely vermiculated with gray, a pair of small gray-white spots before middle of parietals; lower portions of nasal, loreal and preocular partially mottled with gray; a striking, ivory-white stripe on each side, commencing on inferior postocular and upper hind corner of sixth supralabial, extending slightly obliquely, in a straight line, to side of top of nape, from where it continues as one of the dorsal stripes; first four supralabials black below, speckled above, fifth speckled anteriorly, black posteriorly, sixth largely black on upper half, speckled below; last three largely pure black except for the ivory-white

stripe, which crosses their upper portion; infralabials partly black, partly white and black-spotted; chin-shields partly black-spotted. Body gray-black, finely speckled with white on sides, crossed by irregular fasciae formed of indistinct black spots; stripes on sides of head continued along sides onto tail, anteriorly on seventh and eighth, and beyond middle of body on fifth and sixth, scale rows, as a pair of narrow, pinkish brown stripes, paler near vent, anteriorly formed of more or less joined, elongate-oblong spots. Ventrals creamy white, each with a squarish black spot on each side, separated from external margin by a finely black-mottled area which on anterior ventrals form a more or less distinct narrow light stripe.

Notes on paratype.—Agrees fairly well with the type in scutellation, pattern and color; preocular of each side with the suggestion of a rudimentary division in middle; fifth (?) supralabial missing on each side, leaving only two "entering" eye; pale vermiculations of top of head less distinct. Maxillary teeth 29 on right side, 28 on left. Ventrals, 145; subcaudals, 94. Total length, 658 mm.; tail, 219, or .302 of total length.

Comparisons.—This species is closely related to *N. inas* (Laidlaw) (Proc. Zool. Soc. London, 1901 : 576, pl. 35, fig. 2), of Perak, Malay Peninsula, and to *N. craspedogaster* (Boulenger) (t. c., 1899 : 163, pl. 17), of S. China. It differs from the former in having the frontal slightly longer than its distance from the end of the snout, in having three, instead of two, labials reaching the eye, the labials more extensively marked with black, and the nuchal stripe arising from the eye instead of the mouth, and from the latter in having the eye smaller, two instead of three, postoculars, the white stripe commencing at lower hind corner of eye instead of the mouth, the labials largely, instead of merely edged with, black, and the lateral dark spots of ventrals broader. *Boulengeri* is distinguished from *N. modestus* (Guenther) (Proc. Zool. Soc. London, 1875 : 232) by being more grayish black than olive brown, by the presence of the white stripe from the eye to the top of the neck, and the oblong loreal, and there being two, instead of three, postoculars, and from *khasiensis* (Boul.) (Faun. Brit. India, Rept. & Batr., 1890 : 344) by its weakly keeled scales, smaller eyes, two, instead of three, postoculars, and irregularly black-spotted labials.

Remarks.—This novelty is doubtless the same species as the two specimens from N. Kwantung identified by Mell as *Tropidonotus modestus* and *Natrix khasiensis* > *gilhodesi*, and described, though not named, by Pope (see refs. in synonymy, above). Pope stated that quite likely the specimens recorded as *Tropidonotus johannis* Boul. from the Langbian Plateau, S. Annam, by Smith (Proc. Zool. Soc. London, 1921 : 426) were identical with Mell's N. Kwantung material, but Smith's had the white stripe arising from near the mouth. Anderson (1879, Anat. zool. res. . . . two exped. to W. Yunnan, London : 817) described two specimens of *Natrix* from Yunnan as *Tropidonotus modestus* Guenther, but these apparently belong neither to *modestus* nor *boulengeri*. His specimens had 152 and 154 ventrals, 110 and 122 subcaudals, respectively, and the nuchal stripes arose from the mouth.

Habits.—The type contained three large elongate-oblong eggs, 22 to 29 mm. long and 7 to 11 mm. in diameter, with no evident embryos, so the

species is doubtless oviparous. Both of the writer's specimens came from rice-fields or paths in the vicinity of small streams in mountain valleys between two and three thousand feet in altitude. Mell (1922, Arch. Naturg., 88, A, 10 : 116) described the habitat of his specimens as being 600 to 900 meters above the sea, at the edge of shady, rocky streams and in partly shaded, damp and rocky-floored groves. He lists four localities, though Pope (1935, Rept. China: 90) only mentioned seeing two specimens in the Berlin Museum collected by Mell. Including Mell's specimens, the known range of the species is 23° 30' to 26° N. lat. and 114° to 116° E. long.

Dedication.—This species is named in honor of Dr. George Albert Boulenger, veteran herpetologist and describer of *Natrix craspedogaster* as well as of very many other Chinese reptiles and amphibians, not to mention those of other countries.

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PROCEEDINGS
OF THE
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NEW N. A. LEAFHOPPERS BELONGING TO *PARABOLOCRATUS* AND RELATED GENERA.

BY E. D. BALL,
University of Arizona, Tucson.

One ordinarily thinks of leafhoppers as found on leaves or stems well above the ground line and depending upon their excellent leaping ability for protection. The writer described the genus *Memnonia* in 1900, including two species that were found, both larvae and adults, hiding in the dirt beneath the overhanging leaves of clump grasses. Recently two more species in this genus and one in *Parabolocratus* were found to have similar habits. These captures called to mind the fact that the only known females of *Neoslossonia putnami* Osb. were dug out from under the margins of wire grass clumps in Florida by W. E. Stone and the writer. In all of these species the males are small, dark and active, and are occasionally swept, while the females are much larger, usually paler and rarely found unless the dirt and debris under the margins of the clumps is disturbed, when they will be seen to crawl about and attempt to hide. It is probable that a much larger number of species with similar adaptations will be found when more attention is paid to these habitats.

***Parabolocratus nimbosus* Ball, n. sp.**

Resembling *grandis* Shaw in form, with a broader head than in *viridis*; female dark brown, male almost black. Length ♂ 5 mm., ♀ 7.5 mm. Vertex in the single (ternal) female much longer than its basal width; the lateral margins narrowing but little for nearly half the length, then forming a paraboloid apex. Both the disc of the vertex and the face inflated. Male with a broad paraboloid thin-margined vertex about as in the female of *viridis*, much broader and more foliaceous than in the male of *viridis*.

Elytra in the (ternal) female exposing the last segment of the tergum, their apices rounding. In the male they equal the apex of abdomen and in the normal flaring position appear almost truncate. Female segment short and only slightly rounding behind; ovipositor exceeding the pygofer by about its width. Male plates slightly narrower posteriorly than in *viridis*, their acute apices separated by the keel of the pygofer. Pygofer with the anal opening much smaller and more vertical than in *viridis* so that the plates do not reach it. In *viridis* the pygofer has an incision on the ventral margin with a semicircular flap before the oblique opening; in this species the ventral keel is entire.

Color.—The males black or dark brown above and below, paler examples may have lighter areas inside the margins of the vertex and elytra; light arcs on face and the tips of plates light; the slightly ternal female is brown above and paler below.

Holotype ♂, ten paratype ♂, the allotype female and many nymphs taken by the writer, June 18, 1936, at 9000 ft. elevation about 5 miles east of "Old Baldy" in the White Mountains, Arizona.

***Parabolocratus spadix* Ball, n. sp.**

Resembling *brunneus* Ball, but with a more definitely angled head with thinner margins. Green, the male with the elytra a uniform rich brown. Length ♀ 5.5 mm., ♂ 4 mm.

Vertex in female broader than in *brunneus* with the disc concave and the margin raised and definite anteriorly instead of convex and rounding into the thick margin throughout. Face broader and less inflated. Male vertex over one-third longer and more acute; the disc concave anteriorly, forming a sharp margin instead of a rounding one.

Elytra longer in both sexes covering all but the pygofer in the female and equalling the pygofer spines in the male. Male plates similar in form to those in *brunneus*, but shorter, covering little more than half of the pygofer.

Color.—Females green in both species, males bright green with the elytra a deep rich red-brown with the nervures concolorous in *spadix* while in *brunneus* the male elytra are striped with pale brown with the nervures darker in sharp contrast.

Holotype ♂ Santa Rita Mountains, July 18, 1931; allotype ♀ July 13, 1930, and two female and six male paratypes Baboquivari Mts. August 29, 1931. All taken by the writer in southern Arizona. Two male paratypes from Dr. Beamer and returned to him one, Silver City, N. Mex., July 22, 1936 (Lindsey), the other Baboquivari Mts. July 19, '32 (Beamer).

***Parabolocratus fenestrellus* Ball, n. sp.**

Resembling *spadix*, except the female has a much longer ovipositor, the male with a shorter, thicker head and about six ivory spots in the elytra. Length ♀ 7 mm., ♂ 4 mm.

Vertex in the female, slightly narrower and more angulate than in *spadix*, the disc concave forming a blunt but angled margin with the face. Face strongly inflated, convex, the convexity extending to the blunt margin

instead of fading out to a definite marginal line as in *spadix*. Male with the vertex slightly acutely angled, the apex bluntly rounded, the margin thick and less angled than in the female. Elytra short, rounding in the female, exposing the pygofer and a triangle of the preceding segment. In the male parallel margined and equalling the abdomen, but exposing the pygofer spines. Female ovipositor extremely long, exceeding the pygofer by their dorsal length.

Color.—Females green, fading to cream, with the nervures darker green; males green with the elytra sooty-brown, the costal margin narrowly light, about six ivory spots in the apices of the anteapical cells, the bases of the apical and a few obscure ivory markings along the sutural margin. The color of the elytra may vary to a pale sandy brown, but in all cases the ivory spots exist and the nervures in these areas are margined with dark. There are three and sometimes four nervures at right angles to costa that are dark marked.

Holotype ♀, allotype ♂, three female, and two male paratypes and nymphs. Calexico, California, June 10, 1931, and two male paratypes, Yuma, Arizona, June 7, 1931 and June 12, 1934, all collected by the writer. One female paratype labelled "West of Califa, California, July 22, 1935, Oman" returned to him.

***Memnonia albolinea* Ball, n. sp.**

Much larger and with a shorter head than in *consobrina*, male dark with an ivory line under the vertex margin and five light stripes on pronotum; female creamy white with a dark line above vertex margin. Length ♂ 3.5 mm., ♀ 5.5 mm.

Vertex shorter and broader than in *consobrina*, roundly right angled, the disc sloping two-thirds its length then nearly flat with the margin sharp and angled with the face. Face less inflated than in *consobrina*. Elytra in the brachypterous female exposing three abdominal segments, the venation simplified, the apical cells minute or wanting. In the male they are as long as the abdomen and more flaring than in *consobrina*.

Color.—Females creamy white above and below, the vertex margin white with a dark line above and traces of one or two below. Elytra white with the longitudinal nervures on corium pale brown. Male with the vertex brown back of the ivory margin, the disc becoming smoky. Pronotum dark smoky with few light stripes sometimes interrupted. Elytra with the basal half subhyaline. The nervures broadly dark, apical half smoky or black, iridescent, sometimes with traces of ivory points in the apical and anteapical cells. Face brown, the clypeus black, below dark brown.

Holotype ♂ and eight paratype males five miles east of Old Baldy (9,000 ft.) in the White Mts., Ariz., June 18, 1936. Allotype ♀ and one female paratype all taken by the writer in a similar location on the Santa Catalina Mts., July 2, 1933. Five pairs of paratypes taken on the top of the Chiricahua Mts. June 9, 1933, by P. W. Oman and R. H. Beamer and returned to them.

Memnonia fossitia Ball, n. sp.

Resembling *consobrina* but larger, the vertex longer and more pointed; the males nearly twice the size and often pale cinnamon in color; females green or greenish cream with the elytra smoky olive subhyaline with brown nervures and black points. Length ♀ 5 mm., ♂ 3 mm.

Vertex in the female with the disc flatter than in *consobrina* with the margin definitely angled instead of rounding, disc not as depressed as in *albolinea*. Elytra in brachypterous forms exposing the last two or three segments of the abdomen, about as in *consobrina*, longer than in *albolinea* with apicals short but definite instead of almost wanting. Male vertex much longer than in *consobrina*, nearer *albolinea*, more acutely angled than in either with the marginal line within the line of the clypeus below. Elytra decidedly more flaring than in *consobrina*.

Color.—Females pale creamy green, the elytra subhyaline heavily powdered, with brown nervures and black points. The exposed part of abdomen brown with white stripes. Below black, the upper third of the face pale green. Males tan above and below with dark vertices and a smoky cloud around the fenestrate areas, shading to all smoky and occasionally shining black with a band of small fenestrate spots across the anteapicals.

Holotype ♀, allotype ♂, and 10 paratypes from southeast of Douglas, June 10, 1936, and four paratypes Ash Fork. All taken in Arizona by the writer and a pair of paratypes taken at Cloudercroft, New Mex., July 24, 1936, by R. H. Beamer and returned to him.

Dicyphonia nigrita Ball, n. sp.

Female green, resembling *plura* Beamer, but with a shorter and broader vertex; male green with a broad median stripe and the posterior half of the elytra black. Length of ♀ 5 mm., ♂ 4 mm. Vertex paraboloid, scarcely as long as its basal width, about right angled in the female, acutely angled in the male, the tips rounding in both cases. Elytra as long as abdomen in both sexes, venation similar to *plura* but the outer anteapical cell usually almost round and petiolate.

Color.—Females green, paler on vertex and below. A triangular black spot either side the apex and a faint dark line along the margin of vertex. A dark dot at apex of clavus and another at the end of the inner apical nervure. Males, green, a broad black stripe occupying one-third of the vertex and widening on the pronotum, extends to the middle of the elytra where it widens to cover the whole posterior half. This stripe omits an ivory wedge on the apex of vertex and a number of ivory spots in the apical and antiapical cells, the outer ones sometimes forming a light triangle running in from the costal margin. The nervures in this area are broadly tan colored. Below green, the abdomen black with a green band across the last segment and base of plates.

Holotype ♂, allotype ♀, and eight paratypes taken at the 399 kilometer post (out of Mexico City) on the Acapulco Road, Aug. 24, 1936, and six paratypes at the 382 post, Aug. 29, 1936, all taken by Ball and Stone.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



TWO NEW POCKET GOPHERS OF THE *THOMOMYS*
BOTTAE GROUP.

BY E. A. GOLDMAN.

Further studies of pocket gophers of the *Thomomys bottae* group have resulted in the discrimination of two new geographic races. One of these is from Arizona and the other from Utah.

***Thomomys bottae virgineus*, subsp. nov.**

VIRGIN VALLEY POCKET GOPHER.

Type.—From Beaverdam Creek, near confluence with Virgin River, at Littlefield, northwestern Arizona (altitude 1,500 feet). No. 262016, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection), collected by Luther C. Goldman, October 16, 1936. Original number 67.

Distribution.—Virgin River Valley in northwestern Arizona and probably southeastern Nevada.

General characters.—A rather light-colored subspecies of medium size. Most closely resembling *Thomomys bottae centralis* of eastern Nevada, but somewhat deeper cinnamon buff; skull narrower, more elongated. Similar to *Thomomys bottae planirostris* of Zion National Park, Utah, but much smaller, color cinnamon buff instead of ochraceous tawny, skull less massive. Differing from *Thomomys bottae trumbullensis*, of the Mount Trumbull region, Arizona, in much paler coloration and cranial details.

Color.—*Type* (acquiring fresh pelage): Upper parts near "cinnamon-buff" (Ridgway, 1912) finely and rather inconspicuously mixed with black on head and over back, paling to "pinkish buff" on cheeks, shoulders, forearms, flanks, and thighs; under parts overlaid with "pale pinkish buff"; muzzle blackish; feet white; tail light buffy above, whitish below, becoming purer white all around near tip.

Skull.—Very similar to that of *centralis*, but relatively narrower, more elongated; zygomata less widely spreading, more distinctly bowed inward near middle of jugals; premaxillae extending farther posteriorly beyond nasals; molariform teeth heavier. Compared with *planirostris*: Much smaller, less massive; naso-frontal region convex, instead of flattened or

depressed along the median line; premaxillae relatively narrower; dentition lighter. Compared with *trumbullensis*: Size about the same; zygomata less widely spreading, the sides more strongly bowed inward near middle of jugals; palato-pterygoids usually narrower; molariform teeth larger.

Measurements.—*Type*: Total length, 231 mm.; tail vertebrae, 68; hind foot, 28.5. Average of three adult male topotypes: 232 (232–232); 74 (72–75); 31.5 (31–31.5). Two adult female topotypes, respectively: 207, 210; 62, 58; 28, 29.5. *Skull* (type and an adult female topotype): Occipito-nasal length, 38.6, 35; zygomatic breadth, 23.8, 21; width across squamosals (over mastoids), 19.6, 19.3; interorbital constriction, 6.2, 6.6; length of nasals, 13.4, 11.6; maxillary tooththrow (alveoli), 7.9, 8.1.

Remarks.—*T. b. virgineus* probably has an extensive range along the lower part of the Virgin River Valley. Close resemblance to *T. b. planirostris*, which inhabits the upper reaches of the Virgin River Valley, might be expected, but the two contrast rather strongly and their ranges may be separated near the point where the river breaks across the fault line marked by the Beaverdam Mountains on one side and the Grand Wash Cliffs on the other.

Specimens examined.—Ten, all from the type locality.

***Thomomys bottae birdseyei*, subsp. nov.**

PINE VALLEY MOUNTAINS POCKET GOPHER.

Type.—From Pine Valley Mountains, five miles east of Pine Valley, Washington County, Utah (altitude 8,300 feet). No. 161654, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection), collected by Clarence Birdseye, October 10, 1909. Original number 861.

Distribution.—High mountains and adjacent plateau region in southwestern Utah.

General characters.—A dark-colored high mountain subspecies. Similar in general size and color to *Thomomys bottae trumbullensis* of the Mount Trumbull region, Arizona, but cranial features, especially the median depression of the frontals, distinctive. Allied to *Thomomys bottae planirostris* of Zion National Park, Utah, but much smaller and darker; skull less massive. Also similar to *Thomomys bottae absonus* of Houserock Valley, Arizona, but color darker and cranial details different.

Color.—*Type*: Upper parts near "cinnamon" (Ridgway, 1912), moderately mixed with black over top of head and back, becoming lighter and near "cinnamon-buff" on forearms, flanks, and thighs; under parts overlaid with "pinkish buff"; muzzle blackish; feet white; tail light brownish above, near base, becoming whitish below and whitish all around toward tip. General color varying in some specimens to light tawny above and below.

Skull.—Similar in general to that of *trumbullensis*, but more depressed along median line of frontals and posterior ends of nasals, tending toward concavity in transverse section at naso-frontal suture; zygomata more widely spreading anteriorly; auditory bullae less inflated, less bulging below level of basioccipital; dentition about the same. Much smaller,

less massive than in *planirostris*, but similar in the median depression of frontals and nasals; maxillary arm of zygoma much more slender; auditory bullae flatter, less bulging below level of basioccipital; dentition relatively lighter. Compared with that of *absonus* the nasals and frontals are more depressed along the median line, the zygomata are more widely spreading, and the dentition is lighter.

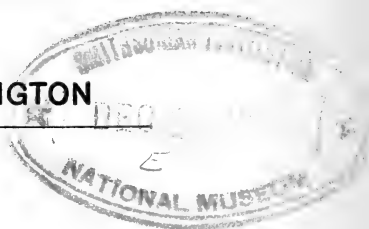
Measurements.—*Type*: Total length, 232 mm.; tail vertebrae, 76; hind foot, 30. An adult female topotype: 223, 75; 30.5. *Skull* (type and an adult female topotype): Greatest length, 40.7, 36.8; occipitonasal length, 40.3, 36.4; zygomatic breadth, 25.9, 22.4; width across squamosals (over mastoids), 21, 18.3; interorbital constriction, 6.4, 6.3; length of nasals, 13.2, 11.6; maxillary toothrow (alveoli), 7.9, 7.3.

Remarks.—*T. b. birdseyei* closely approaches *trumbullensis* in external appearance, but in the tendency toward depression or concavity of the cranium along the median line anteriorly alliance to the otherwise differing form *planirostris* is suggested. In the high mountains of southwestern Utah it invades the type of habitat usually occupied by *Thomomys fossor* in the general region.

Specimens examined.—Total number, 13, all from Utah, as follows: Hebron, 1; Mountain Meadows (Hamblin Ranch), 2; Pine Valley, 4; Pine Valley Mountains, 6.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



NATURAL HISTORY OF PLUMMERS ISLAND,
MARYLAND.

VI. REPTILES AND AMPHIBIANS.¹

BY M. K. BRADY.

The present list of 39 species is based on the records of the Washington Biologists' Field Club up to June, 1936, and on the writer's field notes made during nearly a decade of study of these forms on the Club property. The list includes 9 salamanders, 9 frogs, 1 lizard, 11 snakes and 9 turtles. Except in the case of forms recorded on the basis of only one or two specimens, mention of the general habitat on the property and relative abundance is given for each species listed. The common names used are those which seem to enjoy the most widespread acceptance among naturalists. A list of six forms found in the immediate vicinity of the property and likely to be encountered on it is appended. Species definitely known only from the mainland property of the Club are marked with an asterisk.

CAUDATA. SALAMANDERS.

- **Triturus viridescens viridescens* (Rafinesque). Newt.
Ponds and canal. Common, breeds late spring through early summer.
- **Ambystoma jeffersonianum* (Green). Jefferson's Salamander.
Breeds in the ponds in February. Known from eggs only on the property.
- **Ambystoma maculatum* (Shaw). Spotted Salamander.
Breeds in the ponds in March.
- **Ambystoma opacum* (Gravenhorst). Marbled Salamander.
Breeds in the ponds in the early fall.
- Hemidactylum scutatum* (Schlegel). Four-toed Salamander.
One record for the Island (Nov. 9, 1910). Breeds in ponds in March.

¹ The following numbers of this series have been published previously; I (Introduction) Proc. Biol. Soc. Wash. 48 : 115-117. 1935; II (Flowering plants and ferns), l. c. 118-134; III (Mosses), l. c. 135-137; IV (Birds), l. c. 159-167; V (Fungi), *op. cit.*: 49 : 123-131. 1936.

Plethodon cinereus (Green). Gray Salamander, Red-backed Salamander.

Only salamander breeding on the Island, in late spring. Common form.

**Eurycea bistineata bistineata* (Green). Two-lined Salamander.

Occurs in Rock Run.

Eurycea longicauda (Green). Long-tailed Salamander.

One example taken on the Island (H. W. Henshaw, July 30, 1905).

**Desmognathus fuscus fuscus* (Rafinesque). Dusky Salamander.

Common in Rock Run.

SALIENTIA. FROGS AND TOADS.

Rana clamitans Latreille. Green Frog.

An abundant form.

Rana palustris Le Conte. Pickerel Frog.

Occasional on upper end of Island. Common in the canal.

Rana sylvatica Le Conte. Wood Frog.

Occasional on Island. Common on mainland.

Bufo fowleri Hinckley. Fowler's Toad.

The most abundant toad, calling from late April to August.

Bufo americanus americanus Holbrook. American Toad.

Less abundant. Calls from late February through March.

Acris gryllus (Le Conte). Cricket Frog.

Common. Canal and shores of channel. Chorus begins in May.

Pseudacris nigrita feriarum (Baird). Swamp Tree Frog.

Abundant. Chorus starts in February.

Hyla crucifer Wied. Spring Peeper.

Abundant. Chorus follows soon after that of above form.

Hyla versicolor versicolor (Le Conte). Tree Frog.

Breeds in ponds and canal in May. Calls continue through mid-summer. Island and mainland.

SAURIA. LIZARDS.

Eumeces fasciatus (Linné). Skink.

Apparently the only lizard on the Island. Abundant.

SERPENTES. SNAKES.

Carphophis amoena amoena (Say). Worm Snake.

Fairly common, Island and mainland.

Diadophis punctatus edwardsii (Merrem). Ring-necked Snake.

Relatively abundant, Island and mainland.

Heterodon contortrix (Linné). Hog-nosed Snake.

Recorded on the Island May 20, 1906 (W. Palmer) and May 4, 1913 (W. O. Emery).

Ophedryx aestivus (Linné). Rough-scaled Green Snake.

Not uncommon on Island and mainland. The record for *Liopeltis vernalis* probably indicates this species.

Coluber constrictor constrictor (Linné). Black Snake, Racer.

Fairly frequent on the property.

Elaphe obsoleta obsoleta (Say). Pilot Black Snake.

This black snake is seen more often than the preceding species.

- **Lampropeltis triangulum triangulum* (Lacepède). Milk Snake.
Two records for mainland, field near garden, May 30, 1918, May 18, 1924.
- Natrix sipedon sipedon* (Linné). Banded Water Snake.
Common, canal and river.
- **Natrix septemvittata* (Say). Queen Snake.
Occasional, along the canal.
- Thamnophis sirtalis sirtalis* (Linné). Garter Snake.
Frequent occurrence, Island and mainland.
- Agkistrodon mokasen* Beauvois. Copperhead.
Infrequent on the Island. The species is clearly on the decline in this area.

TESTUDINATA. TURTLES.

- Sternotherus odoratus* (Latreille). Musk Turtle.
Canal, channel and river, especially along southeast end of Island.
Apparently not uncommon.
- **Kinosternon subrubrum subrubrum* (Lacepède). Mud Turtle.
Occasional, in the canal at low water.
- Chelydra serpentina* (Linné). Snapping Turtle.
Common in the river about the Island.
- **Clemmys guttata* (Schneider). Spotted Turtle.
Canal and ponds. Abundant.
- Clemmys insculpta* (Le Conte). Wood Turtle.
Occasional, mainland and Island.
- Pseudemys rubriventris* (Le Conte). Red-bellied Terrapin.
Not uncommon in the river around the Island.
- Pseudemys floridana concinna* (Le Conte). Yellow-bellied Terrapin.
This slider is probably not as abundant as the preceding species in our area.
- Chrysemys picta picta* (Schneider). Painted Turtle.
Plentiful in the canal, river and ponds.
- Terrapene carolina* (Linné). Box Turtle.
Very abundant, Island and mainland.

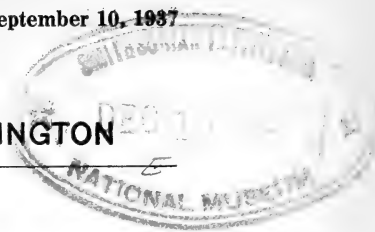
LIST OF SPECIES FOUND IN IMMEDIATE VICINITY OF THE CLUB PROPERTY.

- Pseudotriton ruber ruber* (Sonnini). Red Salamander.
Found between river and canal both above and below Island property.
- Plethodon glutinosus* (Green). Slimy Salamander.
Found at Carderrock and on the Maryland shore across the canal from the property.
- Sceloporus undulatus* (Latreille). Fence Lizard.
Found on Herzog's and other high islands and in the Carderrock area.
- Storeria dekayi* (Holbrook). De Kay's Snake.
Maryland shore near the property.
- Virginia valeriae valeriae* (Baird & Girard). Virginia Snake.
Wooded region between canal and river half mile above Island.
- Clemmys muhlenbergii* (Schoepff). Muhlenberg's Turtle.
One specimen taken at Stubblefield, 1924. Species reported between canal and river in vicinity of the Island.



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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



A NEW NEOTENIC SALAMANDER FROM TEXAS.¹

BY S. C. BISHOP AND MARGARET R. WRIGHT.

On April 1, 1936, we collected in a small stream five miles north of Helotes, Texas, and took nine larval salamanders from among dead leaves in the deeper pools. These salamanders obviously belong in the genus *Eurycea* and in body form, color and pattern resemble *E. b. bislineata*. From *bislineata* they differ in having 16 costal grooves, and poorly developed dorsal light bands and dorso-lateral light areas. Although the gills are well developed in all individuals, and the tail, tongue, dentition and cranial characters are larval in character, the larger individuals of both sexes are sexually mature.

The structural features of generic significance which, in adults, easily separate *Eurycea* and *Typhlotriton*, are not sufficiently developed in the larvae to serve as criteria. However, the larvae from Texas may be distinguished from those of *Typhlotriton* by their color, pattern, smaller size, different costal groove count and shape of the tail fins. *Typhlotriton* larvae are more uniformly colored and attain a length of at least 97 mm. while the largest sexually mature male of the Texas salamander is only 72 mm., and the largest female, 69 mm. The costal grooves of *Typhlotriton* are 17 in the majority of specimens, counting one each in the axilla and groin, while in the Texas material the count is usually 16, but varies from 15 to 17. The tail fins of *Typhlotriton* are broad and the tip of the tail bluntly pointed; in the *Eurycea* here described, the fins are narrow and the tail tapers to a sharp point.

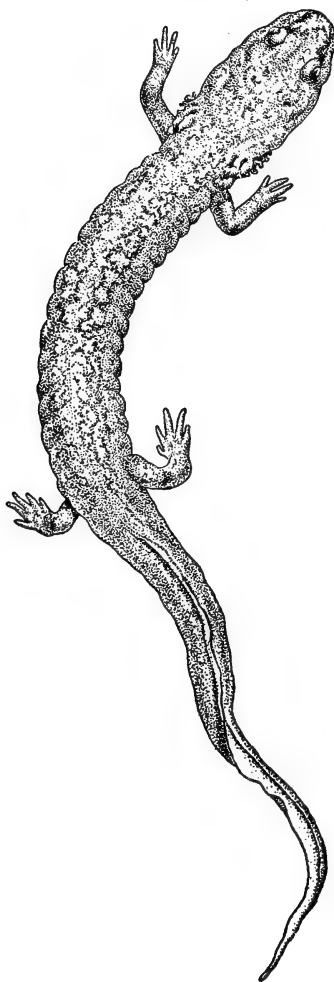
The genus *Eurycea* in Texas has heretofore been represented by *Eurycea (Manculus) q. quadridigitata* in the eastern part of the State and *Eurycea melanopleura* from an unknown

¹ Contribution from the Department of Zoology, University of Rochester.

locality. The former has only four toes and the latter 13 costal grooves. The characteristics given below will distinguish the new Texas species from other members of the genus *Eurycea*.

***Eurycea neotenes*, sp. nov.**

This is a small, slender species attaining a maximum length, in this series of specimens, of 72 mm. Head moderately broad, widest immediately anterior to the gills; snout bluntly rounded; gills with long rami; costal



Eurycea neotemes, n. sp. Male, actual length 72 mm.
Drawn by Miss M. L. Leffler.

grooves 15-17; tail oval in section near base, somewhat flattened below, compressed distally; dorsal tail fin very narrow and extending from a point dorsal to the posterior end of vent to a sharp point at the tip of the tail; ventral tail fin equally narrow and extending less than half the length of the tail, continued a short distance further as a low ridge; toes 4-5, free; toes of fore feet in order of length, from the shortest, 1, 4, 2, 3; hind, 1, 5, 2, 4, 3. Vent of female a simple slit with a few low tubercles along the margins; that of the male with the margins thrown into folds.

In life the ground color is yellowish with the brown chromatophores aggregated on the back and sides to give a mottled appearance. There is only a slight indication of a light dorsal band, and the light dorso-lateral spots are only faintly developed. The secondary row of light larval areas is developed only on the smaller specimens. The sides of head and chin are lightly pigmented, and the dark line from eye to nostril is more prominently developed than in *E. b. bislineata*. The lower sides and belly are without pigment.

Holotype, male, 68 mm. long; allotype, female, 62 mm. long. Types deposited in the U. S. National Museum.

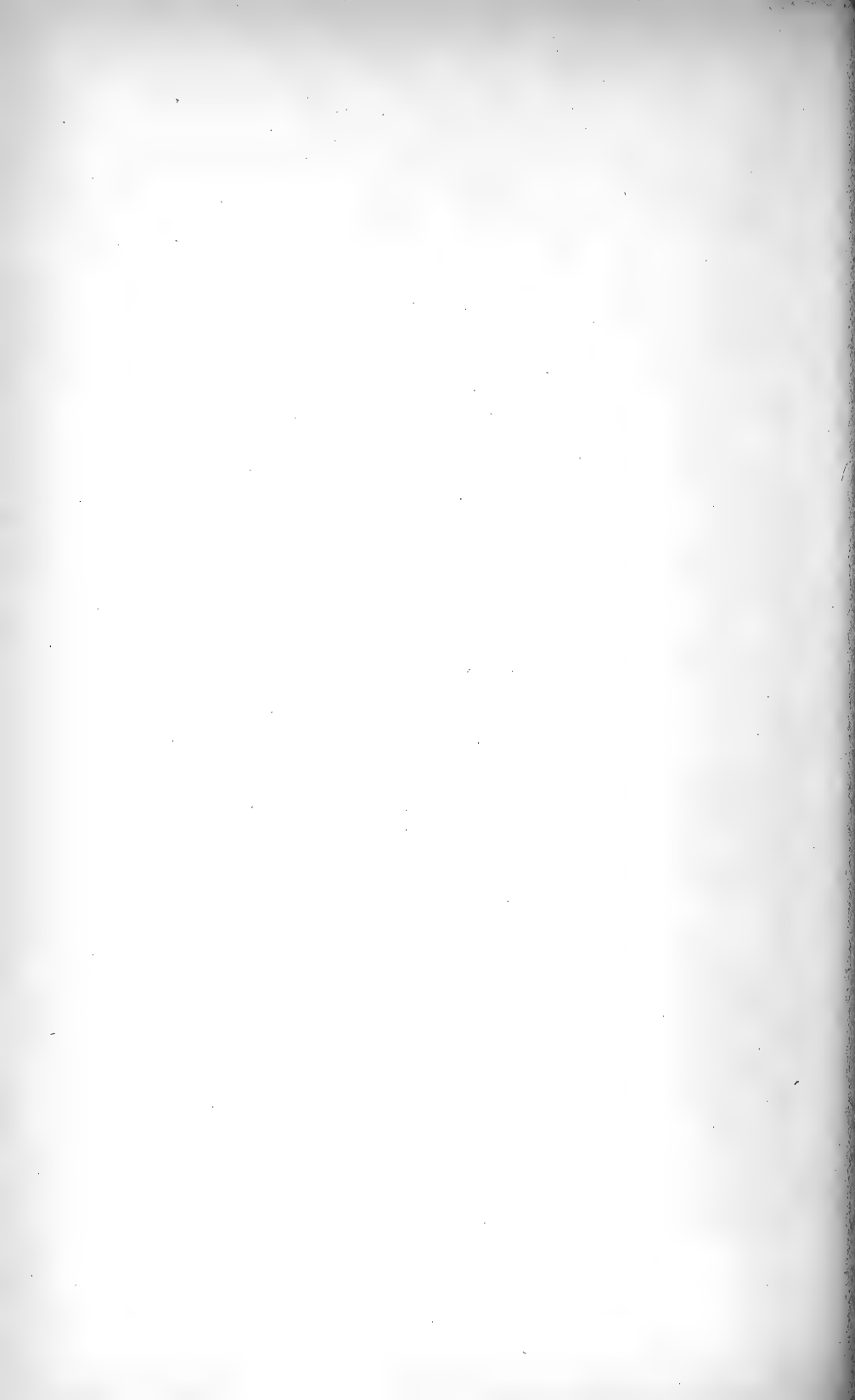
Type locality.—Culebra Creek, 5 miles north of Helotes, Bexar County, Texas. April 1, 1936. Nine specimens of both sexes.

Field notes.—The stream where the larvae were taken flows over bed rock at the foot of a wooded ridge. At the time of our visit, the water was shallow except in small pools which had a depth of 12-18 inches. The surrounding territory was exceedingly dry, and search along the borders of the stream and beneath logs and stones on the adjacent hillside failed to discover transformed individuals of this or any other salamander. It remains to be discovered if this salamander ever transforms.

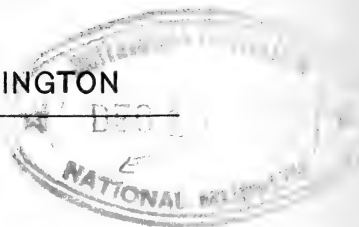
Measurements and costal grooves are indicated below for the nine specimens.

SEX	LENGTH IN MM.		COSTAL GROOVES	
	TOTAL	TAIL	LEFT	RIGHT
male.....	68	32	16	16
male.....	72	33	16	16
male.....	66	31	16	15
male.....	53	24	16	16
female.....	62	29	15	16
female.....	69	32	17	16
female.....	68	31	16	16
female.....	61	27	16	15
young.....	39	16	15	15

The specimens upon which the above account is based were collected during a field trip made possible by a grant from the National Research Council.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



ON THE FLIGHTLESS HERON OF RODRIGUEZ.

BY THE MARQUESS HACHISUKA, PH. D., SC. D.

In 1708 Leguat published an account of the Rodriguez Flightless Heron which is translated into English as follows: "We had abundance of Bittern, as big and as good as Capons; they are tamer, and more easily to be caught than Woodhens." He writes further, a few pages later, about an interesting account of lizards where he again mentions the herons. "The Palmtrees and Plantanes are always loaden with Lizards about a foot long, the Beauty of which is very Extraordinary; some of them are blue, some black, some green, some red, some grey, and the colour of each the most lively and bright of any of its kind. Their common Food is the Fruit of the Palm-Trees. They are not mischievous, and so Tame, that they often come and eat the Melons on our Tables, and in our Presence, and even in our Hands; they serve for Prey to some Birds, especially the Bitterns. When we beat 'em down from the Trees with a Pole, these Birds wou'd come and devour them before us, tho' we did our utmost to hinder them; and when we offer'd to oppose them, they came on still after their Prey, and still follow'd us when we endeavour'd to defend them."

The anonymous author of the manuscript "Relation du l'île Rodrigue" (cf. *Ann. Sci. Nat.*, (6) 11, p. 133 et seq., 1875) about the year 1830 mentions this bird as follows: "There are plenty of Bitterns which are birds which only fly a little and run perfectly well when they are chased. They are of the size of an Egret (*aigrette*) and something like them." This unknown author seems to be not very careful in his observation. He writes that the bird was able to rise from the ground even for a short moment. This appears an unlikely occurrence after we examine the remains of the sternum and wing which clearly indicate that the bird did not have the power of flight. If the anonymous author's experience was correct it must have happened on a sloping ground.

In 1873, on the basis of a few osteological remains found on that island Milne-Edwards described, a heron believed to be identical to the bird of which Leguat speaks; and called it *Ardea megacephala*, considering it to be a true *Ardea*; finding the fore-part of its frontal region flat as in a heron, whilst this part being concave in *Nycticorax*, he dismissed the question of the affinity to the latter.

H. H. Slater brought home, as commissioned naturalist on board the Transit of Venus, 2,000 Solitaire remains. Along with them were additional material of the present heron. In 1879 Gunther and Newton, with the aid of this richer material published the conclusion that *A. megacephala* ought to be close to the European Night Heron, so united them under the genus *Nycticorax*. Rothschild, however, placed it into *Ardea* in his "Extinct Birds," (1907).

Here I quote from Günther and Newton and repeat in full: "The distinctive features of the skull common to the European and Rodriguez Night-Herons are:—first the great width of the occipital region; then the mastoid processes, which are as distant from each other as the temporal; the relative distances between the mastoids, temporal, and postorbital processes are the same in both birds. The temporal fossa is nearly of the same width; the foramen occipital is broader than deep, more as in the Rodriguez species than in *N. nycticorax*, the arch of the supraorbital margin is in both much more open than in the Heron; the prenasal groove is equally deep, and extending equally far forwards; the bill of the Rodriguez species is not less curved downwards than in *N. nycticorax*, though the bill is equally slight in either. The bill of *N. megacephalus* is much stronger than in the European bird, but not more so than in other species of this genus. The principal difference between these skulls is that that of the Rodriguez species is much more depressed, with scarcely any transverse and longitudinal depression near the base of the bill; it is also a little longer.

The evidence gathered from a comparison of the pelvis leads to the same conclusion. The praecetabular portion is nearly equally narrow and constricted; the anterior iliac blades coalesce for a short distance only, leaving a great part of the sacral crest uncovered. The width of the postacetabular half, and the arrangement of the foramina, pleurapophyses, etc., are nearly the same.

	<i>N. megacephalus</i>	<i>N. nycticorax</i>
Length of pelvis.....	63 mm.	61 mm.
Width in its narrowest part.....	15 mm.	14 mm.
Greatest width above acetabulum.....	35 mm.	33 mm.

The pelvis of *Ardea cinerea* has length of 82 mm., and a greatest width of 39 mm., and is therefore in general shape (as well as in other details of configuration) widely different from that of *Nycticorax*.

Taking the pelvis as guide, the body of the Rodriguez Night-Heron was of nearly the same size as that of *N. nycticorax*; the cranium also was nearly of the same size; while the bill and mandible were much stronger,

and in accordance with this powerful development of the maxillary apparatus, the cervical portion of the vertebral column was proportionally stouter than in *N. nycticorax*.

The reduction of the power of flight has been already demonstrated by M. Milne-Edwards, and we are able to corroborate his opinion by completing the measurements of the sternum and wing in comparison with the European Night-Heron:

	<i>N. megacephala</i>	<i>N. nycticorax</i>
Length of sternum.....	64 mm.	69 mm.
Breadth of sternum.....	34 mm.	37 mm.
Greatest depth of keel.....	14 mm.	20 mm.
Length of scapula.....	72 mm.	72 mm.
coracoid.....	55 mm.	60 mm.
humerus.....	114 mm.	126 mm.
ulna.....	121 mm.	139 mm.
radius.....	117 mm.	133 mm.
metacarpus.....	62 mm.	70 mm.

It will be observed from this table that while all the bones of the wing have been reduced in length "and strength," the scapula has not been affected. As regards form, it is exactly the same as in other Herons, viz., tapering behind, without dilation.

With regard to the leg, M. Milne-Edwards, guided in his estimate of the general size of the bird by the length of the skull and femur, inferred that this part of the osseous frame was much reduced in length. Having shown from the pelvis, with which M. Milne-Edwards was not acquainted, that the body of this bird was considerably less in size than he supposed, in fact equal to that of the European Night-Heron, we arrive at the opposite conclusion, viz., that the leg is proportionally much more developed in length and strength. And this will be readily perceived from the following table:

	<i>N. megacephala</i>	<i>N. nycticorax</i>	<i>Ardea cinerea</i>
Length of femur.....	86 mm.	82 mm.	89 mm.
tibia.....	136 mm.	136 mm.	185 mm.
metatarsus.....	93 mm.	89 mm.	139 mm.
Width of metatarsus.....	6½ mm.	4 mm.
Length of 2d phalanx of inner toe.....	20 mm.	19 mm.	26 mm.
Length of 1st phalanx of hind toe.....	30 mm.	28 mm.	35 mm.

In this table we have added also the corresponding measurements of the Heron, in order to show that the Rodriguez bird agrees with *Nycticorax*, and differs from *Ardea* in the length of the femur as compared with that of tibia and metatarsus. The metatarsus and phalanges are the parts in which the greatest development has taken place, the thickness of these bones being nearly twice as great as in *N. nycticorax*, the bird having been

clearly of much more cursorial habits than its congeners, chasing rather terrestrial animals (lizards) than aquatic.

Thus the effect of the prolonged isolation on the two vertebrate-hunting birds of Rodriguez, the Owl and the Night-Heron, was precisely the same. Without losing the power of flight, they became brevipennate; but the increased development of the legs compensated for the reduction of this power, and enabled the one to destroy animals of larger size when the smaller kinds became scarcer, and the other to chase its swift-running prey. In the Night-Heron the increase of development was confined to the legs in conformity with its acquired habit; and it was principally the metatarsus which became enlarged to receive and form a base for the tendons of the foot. But the Owl required additional strength for the purpose of mastering and tearing its prey, not only in the muscles of the lower leg, but also in those attached to the trunk, and hence we find in this bird the greatest development in the femur and pelvis.

We have before us sufficient osteological specimens to prove that the Rodriguez Flightless Heron is but little related to any Herons known to us, both existing and extinct; therefore I propose a new Genus and call it:

MEGAPHOYX, gen. nov.

Type, *Ardea megacephala* Milne-Edwards.

"Butors" Leguat, *Voyages et Avantures*, 1708.

Ardea megacephala, Milne-Edwards, *Ann. Sci. Nat.* (5) XIX. p. 10, 1874.

Ardea megacephala of Milne-Edwards; Newton, *Proc. Zool. Soc.*, p. 41, 1875.

Nycticorax megacephala, Günther and Newton, *Philos. Trans.* Vol. 168, p. 43, 1879.

"Bittern" Leguat, "Voyage of Francois Leguat, etc." Vol. I, pp. 81 and 86, 1891.

"Butors," Anonymous, "Relation de l'île Rodrigue" Prior to 1730.

Ardea megacephala Rothschild, "Extinct Birds," p. 111, 1907.

Ardea megacephala, Lambrecht, "Handbuch der Palaeornith." p. 313, 1933.

Head very large; legs proportionately to the head are very short. The sternum is puny and small in comparison to the size of the bird, proving clearly it had no power of flight. The genus is quite remarkable among the herons and not closely related to *Ardea* or *Nycticorax* as formerly believed.

I am puzzled as to why Leguat called it a "Bittern." The only probable meaning I can find is that Leguat pointed out the general coloration of the plumage which reminded him of bitterns of his native France, which have buffish feathers mottled with black.

The anonymous author says "They are of the size of an Egret and something like them." Egret is a pure white bird and if "something like them" meant to point out the significance in color it does not support Leguat's statement. It is best for the time not to place importance to this as we already have proofs of its inaccuracy for flight.

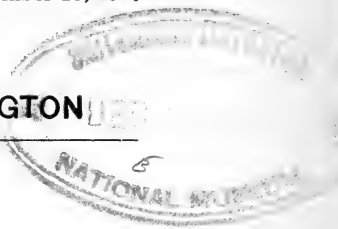
It is worth noting here a few examples of birds that, due to sedentary

habitat, have lost their power of flying, although their close allies are distributed over a large portion of the world. Those are:

<i>Porphyrio</i>	<i>Notornis</i> and <i>Cyanornis</i>
<i>Alca</i>	<i>Pinguinus</i>
<i>Phalacrocorax</i>	<i>Nannopterum</i>
<i>Porzana</i>	<i>Atlantisia</i>
(especially <i>bicolor</i> and <i>tabuensis</i>)	

Among the species we may note *Scolopax rusticolus* and *S. mira*. Mr. Peters is wrong in his "Birds of the World," vol. II, p. 276, in considering *Mira* as a race because it is well known to the Japanese ornithologists that both birds breed on the same island. The present article is a continuation of my study on the extinct avifauna of the Mascarene Islands, the first of which is "Revisional Note on the Didine Birds of Reunion," *supra*, vol. 50, pp. 69-72, May 6, 1937. The second is "A proposed new genus, *Kuina*, and a description of a new Rail, *Kuina mundyi*, from Mauritius." *Bull. Brit. Orn. Club*, cccvi, p. 154-157, 1937.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTONNEW RACE OF *CHUBBIA JAMESONI* FROM
COLOMBIA.BY ROBERT T. MOORE,
California Institute of Technology.

In his "Distribution of Bird Life in Ecuador," p. 200, Dr. Chapman called attention to differences in length of bills of specimens of *Gallinago jamesoni* (Bonaparte) from Ecuador and Colombia. A series of twelve specimens, taken in various parts of Ecuador on the author's expeditions of 1927 and 1929, not only confirms Dr. Chapman's analysis, but also indicates a much greater and unusual disparity, which makes it desirable to separate the two forms. The Colombian race is described below and dedicated to Dr. Chapman, which gives the author opportunity to express his profound respect for the exhaustive and comprehensive work, accomplished in the Colombian-Ecuadorian region by America's distinguished ornithologist.

My acknowledgments are made to the American Museum of Natural History for the loan of their specimens from Colombia and Ecuador.

Chubbia jamesoni chapmani, subsp. nov.

CHAPMAN'S SNIPE.

Type.—Female adult in worn plumage; number 111338, collection of American Museum of Natural History; Santa Isabel, Quindio Andes, Colombia; September 14, 1911; altitude 12,700 feet; collected by Allen and Miller.

Subspecific characters.—Nearest to *Xylocota jamesoni* Bonaparte, but size, particularly bill, decidedly larger; coloration of anterior parts, including forehead, sides of face, throat and jugulum slightly grayer, when specimens of the same month are compared; legs and toes heavier and larger.

Range.—Paramo Zone of the Central Andes of Colombia.

AVERAGE MEASUREMENTS OF *Chubbia jamesoni chapmani* AND
Chubbia jamesoni jamesoni.

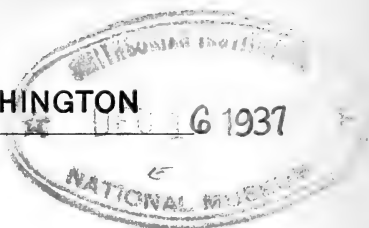
FEMALES	WING.	EXPOSED CULMEN.	MIDDLETOE MINUS CLAW. ¹
3 ads. Santa Isabel, Colombia,			
<i>Chapmani</i>	155.7	93.3 (90.8-95.3)	37.2
10 ads. Ecuador, <i>jamesoni</i>	149.4	80.7 (78.5-84.0)	35.5

Remarks.—The type locality of *Xylocota jamesoni* Bonaparte is given as the "High Andes of Quito, Ecuador." Like many of the early high mountain species, it probably came from the Paramo on Mt. Pichincha above Quito, since this species, as well as *Capella nobilis*, has been a favored table-bird of the connoisseurs of Quito for many decades. Of the ten females and nine males from Ecuador, which the author has examined, four are from Mt. Pichincha and the rest from the high mountains of central and southern Ecuador. They vary very little in measurements or coloration. The measurements of both sexes confirm those given by Dr. Chapman, revealing a still greater variation in length of bill between the Colombian and Ecuadorian forms of the females, and somewhat less for the males. The longest bill of the Ecuadorian birds measures only 84.0 mm., whereas the shortest bill of the Colombian females measures 90.8 mm.! Dr. Chapman's measurements were based on a larger number of Colombian specimens, but on a much smaller total of Ecuadorian ones.

The disparity in the bills is not only an absolute difference but a relative one, for whereas wings and middle toes of Colombian birds are only about five per cent larger, bills of Colombian females are fifteen per cent longer. But a greater difference would be revealed in the measurement of the wings, were it not for the fact that the Colombian birds, all taken in September, have the tips of the remiges badly worn, whereas the great majority of Ecuadorian birds are in fresh unworn plumage.

1. Measured from the anterior end of the metatarsal bone.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



FOUR NEW RODENTS FROM MONTEREY COUNTY,
CALIFORNIA.

BY JACK C. VON BLOEKER, JR.

Museum of Vertebrate Zoology, University of California.

Field work in Monterey County, California, in the summer of 1936, has revealed the existence there of four hitherto apparently unknown subspecies of rodents. Discussion of the ecological relationships of these forms is reserved for a later account of all the mammals of this region, sponsored by Mr. O. P. Silliman, of Salinas, California, who has deposited the type specimens in the Museum of Vertebrate Zoology. The new races may be described as follows:

***Perognathus longimembris psammophilus*, subsp. nov.**

SOLEDAD POCKET MOUSE.

Type.—♀ subadult, skin and skull, no. 74681, Museum of Vertebrate Zoology, from the west side of Arroyo Seco Wash, 150 feet altitude, four miles south of Soledad, Monterey County, California, June 5, 1936, collected by Jack C. von Bloeker, Jr., orig. no. 6209.

Distribution.—In so far as known, occurs in fine-textured sandy areas in the Salinas Valley and Carrizo Plains region of south-central California, from Soledad, Monterey County, southeast at least to Santiago Springs, San Luis Obispo County, California.

Diagnosis.—A small (see measurements), short-tailed, dark-colored pocket mouse of the *longimembris* group, with the belly hairs entirely white; upper surface of feet whitish; lower surface of tail light ochraceous buff; skull short and narrow, with slender rostrum and medium-sized mastoid bullae.

Comparisons.—Compared with *Perognathus longimembris longimembris*, body larger; tail actually and relatively shorter; hind foot larger; color averages darker dorsally, pinkish cinnamon colored lateral stripe averages broader. Skull relatively broader; rostrum broader, mastoids larger. Compared with *Perognathus longimembris brevinasus*, body of similar size;

tail actually and relatively shorter; color averages darker dorsally, with lateral stripe darker. Skull longer and relatively narrower, with mastoids and rostrum similar in size. Compared with *Perognathus longimembris cantwelli*, body averages longer; tail actually and relatively shorter; color averages lighter dorsally, with less prominent and lighter lateral stripe. Skull actually and relatively longer and narrower, with larger mastoids and broader rostrum.

Color (using color terms from Ridgway's *Color Standards and Color Nomenclature*, 1912).—Type (near mean of June-taken series of adults and subadults): Dorsal hairs with terminal portions black, subterminal bands chamois, brightening to cinnamon buff on the lateral stripe; basal portions of dorsal hairs slate gray. Ventral body hairs and hairs of upper surface of feet entirely white. Tail bicolor, with a faint dorsal stripe terminating in a distinct black tip, sides and ventral surface of tail light ochraceous buff. Hairs at base of vibrissae black.

Pronounced seasonal variation in color occurs; specimens taken in late summer are paler, presumably due to wearing-off of the terminal portions of the dorsal hairs.

Measurements (in millimeters).—Averages and extremes of eight subadults, four males and four females, paratypes: Total length, 130 (127–136); tail, 63 (58–69); hind foot, 18 (17–19); ear, from notch, 6.4 (5–7). Skull: Occipito-nasal length, 20.7 (20.5–21.0); fronto-nasal length, 13.6 (13.2–13.9); greatest mastoid breadth, 10.8 (10.5–11.0); length of mastoid, 8.0 (7.7–8.3); distance between stylo-mastoid foramina, 9.9 (9.8–10.1); least interorbital breadth, 4.9 (4.8–5.0).

Specimens examined.—Unless otherwise indicated, specimens are in the collection of O. P. Silliman, on loan at the Museum of Vertebrate Zoology. Eleven, from the following localities in California: MONTEREY COUNTY: Arroyo Seco Wash, 150 feet, four miles south of Soledad, 8;¹ Metz, 200 feet, Salinas Valley, 1; SAN LUIS OBISPO COUNTY: Salinas Valley, two miles south of San Miguel, 1;² Sandiego Joe's (= Santiago Springs), 2600 feet, 1.²

***Perognathus inornatus sillimani*, subsp. nov.**

SILLIMAN POCKET MOUSE.

Type.—♀ adult, skin and skull, no. 74682, Mus. Vert. Zool., from the west side of Arroyo Seco Wash, 150 feet altitude, four miles south of Soledad, Monterey County, California, August 3, 1936, collected by Jack C. von Bloeker, Jr., orig. no. 6997.

Distribution.—In so far as known, confined to dry sandy washes in the Salinas Valley, California, from Soledad, Monterey County, south at least to San Miguel, San Luis Obispo County.

Diagnosis.—A moderately large (see measurements), short-tailed, dark-colored pocket mouse of the *inornatus* group, with the belly hairs entirely white; upper surface of feet whitish; lower surface of tail warm buff; skull, short and broad, with tapering rostrum and large mastoid bullae.

¹ One in Museum of Vertebrate Zoology.

² Museum of Vertebrate Zoology.

Comparisons.—Compared with *Perognathus inornatus inornatus*, body larger; tail actually and relatively shorter; hind foot larger; ear larger; color averages darker dorsally, including even the ears; pinkish cinnamon colored lateral stripe averages broader and contrasts sharply with the darker dorsal region. Skull actually and relatively broader, mastoids larger, interorbital breadth greater. Compared with *Perognathus inornatus neglectus*, body relatively longer; tail actually and relatively shorter; hind foot smaller; ear larger; color averages darker and lateral stripe is broader and more prominent. Skull shorter and relatively broader, rostrum shorter and narrower, mastoids smaller, interorbital breadth greater.

Color.—Type (near mean of August-taken adults): Dorsal hairs with terminal portions black, subterminal bands ochraceous buff, brightening to pinkish cinnamon on the lateral stripe; basal portions of dorsal hairs light violet-gray. Hairs of ventral surface of body and upper surface of feet entirely white. Tail indistinctly bicolor, with grayish dorsal stripe terminating in a blackish tip, sides and ventral surface of tail pinkish cinnamon.

Measurements.—Averages and extremes of eight adults, two males and six females, paratypes: Total length, 142 (138–147); tail, 67 (63–70); hind foot, 19 (19); ear, from notch, 7 (6–8). Skull: Occipito-nasal length, 22.4 (22.1–22.8); fronto-nasal length, 15.1 (14.9–15.2); greatest mastoid breadth, 13.3 (13.0–13.9); length of mastoid, 8.3 (8.0–8.5); distance between stylo-mastoid foramina, 10.7 (10.5–10.9); least interorbital breadth, 5.2 (5.0–5.5).

Specimens examined.—Eleven, from the following localities in California: MONTEREY COUNTY: Arroyo Seco Wash, 150 feet, four miles south of Soledad, 5;³ mouth of Wild Horse Canyon, 500 feet, 1; Hog Canyon, 1;⁴ SAN LUIS OBISPO COUNTY: Salinas Valley, two miles south of San Miguel, 4,⁵

***Reithrodontomys megalotis distichlis*, subsp. nov.**

MONTEREY BAY HARVEST MOUSE.

Type.—♂ adult, skin and skull, no. 74683, Mus. Vert. Zool., from the salt-marsh at the mouth of the Salinas River, Monterey County, California, June 10, 1936, collected by Jack C. von Bloeker, Jr., orig. no. 6271.

Distribution.—Coastal salt-marshes and sandhill region in the vicinity of the sea-coast in Monterey County, California, from the mouth of Elkhorn Slough, Moss Landing, south to Seaside Lagoon. Found particularly in association with salt-grass (*Distichlis*) and pickle-weed (*Salicornia*).

Diagnosis.—A medium-sized (see measurements), dark-colored harvest mouse of the *megalotis* group; belly hairs with basal third slate color and terminal portion cartridge buff; tail bicolor, deep slaty brown above and white below; skull small, with comparatively weak zygomatic arches.

Comparisons.—Compared with *Reithrodontomys megalotis longicaudus*,

³ One in Museum of Vertebrate Zoology.

⁴ Los Angeles Museum.

⁵ Museum of Vertebrate Zoology.

body, tail, and hind foot shorter; ear smaller; color averages darker dorsally, being almost black over broad mid-dorsal area. Skull smaller throughout, zygomatic arch less sharply decurved and more delicate. Compared with *Reithrodontomys megalotis limicola*, body larger; tail actually and relatively shorter; ear smaller, color averages slightly darker dorsally and ventrally. Skull smaller throughout, zygomatic arch relatively weaker.

This race is distinguishable from *Reithrodontomys raviventris raviventris* and *Reithrodontomys raviventris halicoetes* by the specific characters which separate the two groups, *megalotis* and *raviventris*. The races of *raviventris* are externally larger in size throughout and have a greater concentration of reddish pigment in the subterminal bands of the dorsal hairs. Also the skull is larger, with a relatively shorter rostrum, shorter nasals and palatal foramina, and the zygomas are more widely expanded anteriorly.

Color.—Type (near mean of June-taken series of adults): Dorsal hairs with terminal portions black, narrow subterminal bands cinnamon buff, basal portions slate black. Hairs of ventral region slate color in basal third and tipped with cartridge buff. Hairs of upper surface of feet and ventral surface of tail entirely white; hairs of dorsal surface of tail deep slaty brown. Hairs at base of vibrissae black.

Measurements.—Series selected for comparable age on basis of molar development, only those with fully developed, yet unworn, molars are represented. Averages and extremes of eight adults, three males and five females, paratypes: Total length, 143 (134–148); tail, 75 (70–78); hind foot, 16.7 (16–17); ear, from notch, 13.3 (13–14). Skull: Condyllo-basal length, 17.8 (17.0–18.5); occipito-nasal length, 19.8 (19.3–20.1); width of cranium, 9.9 (9.7–10.2); height of cranium at bullae, 7.6 (7.4–7.9); mastoid width, 9.3 (9.1–9.6); zygomatic width, 9.6 (9.3–10.0); least interorbital breadth, 3.1 (3.0–3.3); upper molar series, 3.0 (2.9–3.1).

Specimens examined.—Twenty-nine, all from California, as follows: MONTEREY COUNTY: Mouth of Elkhorn Slough (salt-marsh), 2; Moss Landing (salt-marshes and sandhills), 7; mouth of Salinas River (salt-marsh and sandhills), 4;⁶ west side of Salinas River, 50 feet, five miles west of Salinas (sandhills), 1; Marina (salt-marsh), 1; Camp Ord, 100 feet, three and one-half miles east of Marina (sandhills), 1; Indian Harbor, one and one-half miles south of Marina (sandhills), 3; Seaside (salt-marsh), 10.⁷

***Microtus californicus halophilus*, subsp. nov.**

MONTEREY BAY MEADOW MOUSE.

Type.—♀ adult, skin and skull, no. 74684, Mus. Vert. Zool., from Moss Landing, Monterey County, California, August 11, 1936, collected by Jack C. von Bloeker, Jr., orig. no. 7079.

Distribution.—A medium-sized (see measurements), dark-colored meadow mouse of the *californicus* group, with the ventral hairs dark plumbeous basally and tipped with pale violet gray; tail distinctly bicolor,

⁶ One in Museum of Vertebrate Zoology.

⁷ Seven in Museum of Vertebrate Zoology.

mummy brown above and whitish below; skull short and narrow, with short, stocky rostrum.

Comparisons.—Compared with *Microtus californicus californicus*, total length averages less; body length actually and relatively less; tail shorter; hind foot smaller; color averages darker throughout. Skull shorter and relatively broader throughout. Compared with *Microtus californicus sanctidiegi*, actually and relatively smaller throughout; color averages darker. Skull smaller. Compared with *Microtus californicus paludicola*, total length, tail, and body length averages less; color averages darker. Skull smaller throughout. Compared with *Microtus californicus stephensi*, smaller throughout; color averages lighter.

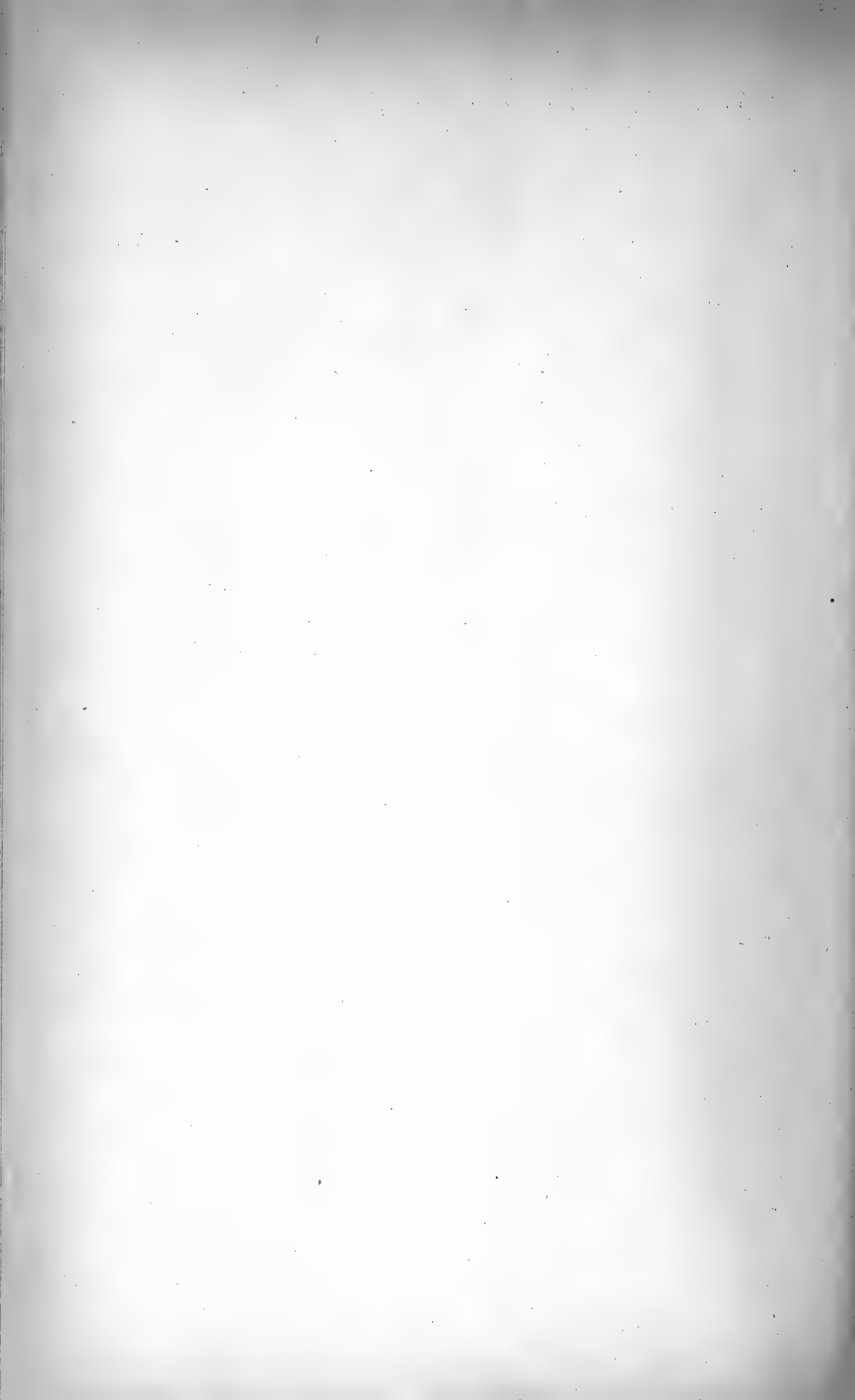
Color.—Type (near mean of August-taken series of adults): Dorsal hairs with terminal portions black, narrow subterminal bands cream buff, basal portions blackish plumbeous. Ventral hairs dark plumbeous basally and tipped with pale violet gray. Hairs of upper surface of tail mummy brown, hairs of ventral surface of tail and upper surface of feet whitish.

Measurements.—Specimens selected for comparable age on basis of development of the supraorbital ridges, those with prominently well-developed, yet separate, ridges being used. Older specimens show these ridges fused together into a single median knife-like crest, while younger specimens have the ridges weakly developed and widely separated. Averages and extremes of ten adults, six males and four females, paratypes: Total length, 163 (153–173); tail, 46 (43–52); hind foot, 21 (20–22); ear, from notch, 14.7 (14–15). Skull: Condylar-basal length, 26.2 (25.2–26.8); occipito-nasal length, 25.5 (25.0–26.1); height of cranium at bullae, 10.1 (9.8–10.5); mastoid width, 12.7 (12.0–13.3); zygomatic width, 15.2 (14.3–16.2); least interorbital breadth, 3.5 (3.2–3.7); upper molar series, 6.3 (6.0–6.7).

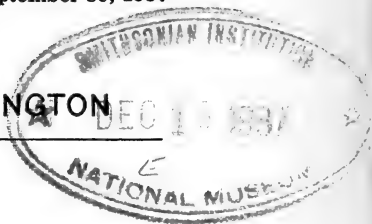
Specimens examined.—One hundred and twenty, all from California, as follows: MONTEREY COUNTY: Mouth of Elkhorn Slough (salt-marsh), 5; Moss Landing (salt-marshes and sandhills), 32;⁸ mouth of Tembladero Slough (salt-marsh), 23; mouth of Salinas River (salt-marsh and sandhills), 18;⁸ Marina (salt-marsh), 2; Camp Ord, 100 feet, three and one-half miles east of Marina (sandhills), 4; Indian Harbor, 50 feet, one and one-half miles south of Marina (sandhills), 5; Seaside (salt-marsh and sandhills), 31.⁹

⁸ One in Museum of Vertebrate Zoology.

⁹ Four in Museum of Vertebrate Zoology.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



THE YELLOW-GREEN VIREO OF NORTHWESTERN
MEXICO.

BY A. J. VAN ROSSEM AND THE MARQUESS HACHISUKA.

Several years ago one of the writers (van Rossem) had occasion to make a more than casual study of the geographic behavior of the yellow-green vireo, the object at that time being the determination of sundry nondescript specimens taken in El Salvador during fall and spring migrations. During the course of this work it was found that the available material from northwestern Mexico in the U. S. National Museum and Biological Survey (9 specimens from Sinaloa and Nayarit) and also a specimen from Oposura, Sonora, in the British Museum, indicated strongly that a distinct race existed in that region. A small series recently taken by van Rossem and Hannum in southern Sonora confirms the fact that the characters formerly observed were not due to any post mortem color changes and we do not hesitate, therefore, in giving a name to the yellow-green vireos of northwestern Mexico.¹ The race will be known as

Vireo olivaceus hypoleucus, subs. nov.

Type.—♂ adult in breeding condition, no. 31884, Dickey collection; collected at San Francisco Cañon on the extreme eastern boundary of Sonora at Lat. 27° N., on May 29, 1937, by A. J. van Rossem and Robert Hannum; altitude (approximately), 1200 feet; life zone, Arid Lower Tropical.

Subspecific characters.—Similar in size to *Vireo olivaceus flavoviridis* (Cassin) of southern Mexico and Central America, but in color duller above and paler below; median area from chin to anal region more purely (less grayish) white and more extensive; sides, under wing coverts, and under tail coverts paler and yellower (less greenish). Upper parts, including

¹ For recent opinions on the relationships of the red-eyed vireos see Zimmer, Field Mus. Nat. Hist., Zool. Ser., 17, No. 7, Dec., 1930, pp. 413-414; Peters, Auk, 48 July, 1931, pp. 575-587, and Hellmayr, Field Mus. Nat. Hist., Zool. Ser., 13, Pt. 8, 1935, p. 132.

edgings of wing feathers, duller and more olive (less yellowish) green; pileum paler and more purely (less olive) gray.

Range.—In summer, the Lower Arid Tropical Zone west of the Sierra Madre from central eastern Sonora south to southern Sinaloa and Nayarit. Winter range unknown, but the race occurs in migration in El Salvador.

Remarks.—The new race shows a definite approach to *Vireo olivaceus olivaceus* of the eastern United States in all color characters save that of the blackish line on each side of the pileum, in which respect it is very close to *flavoviridis*, though possibly averaging less distinct.

In this connection certain Tamaulipas (Victoria) specimens in the collection of the Biological Survey suggest an even closer approach to *olivaceus*, although others from the same State (Alta Mira) seem to be typical of *flavoviridis*.

Like all North and Middle American races of this species the present one is migratory and does not reach its breeding grounds until about June 1. Although the collectors were continuously in the field in suitable territory from May 11, it was not until the 29th of that month that the first individuals (singing males) appeared. The first female was detected on June 13, and the first nest building was observed on June 16.

Twenty specimens of *hypoleucus* have been examined from Sonora (Oposura; Rancho Santa Barbara; Guirocoba; San Francisco Cañon; Tesia), Sinaloa (Rosario; Mazatlan), Nayarit (Santiago), and El Salvador (Lake Olomega). In the comparative description above we have used 32 breeding specimens from El Salvador as representing *flavoviridis*. This locality is so close to one of those named by Cassin in his original description as to make them virtual topotypes. We believe that a designation of "western Nicaragua" is in order as a restricted type locality for *flavoviridis*. Such a designation eliminates the ever present possibility that some one might apply Cassin's name to the Panama race *insulanus*.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



THE TIGER-BITTERN OF NORTHWESTERN
MEXICO.

BY A. J. VAN ROSSEM AND THE MARQUESS HACHISUKA.

Only a few months ago the authors (Trans. San Diego Soc. Nat. Hist., 8, No. 23, June 15, 1937, p. 327) stated that a specimen of Cabanis' Tiger-Bittern taken at Tesia, southern Sonora, was seemingly identical with certain Central American specimens of similar age. Since that time, additional material collected by van Rossem and Hannum indicates that not only was the initial assumption correct but that, paradoxically, an undescribed race of *Heterocnus cabanisi* (Heine) exists in the region in question. Briefly, in the juvenile and post-juvenile plumage stages the tiger-bitterns of Sonora are not to be distinguished from *cabanisi* in color and are but slightly larger in size. Adults, however, are quite distinct. We name the northwestern race as

***Heterocnus cabanisi fremitus*, subs. nov.**

Type.—31883, Dickey collection, a breeding adult male collected at Guirocoba, extreme southern Sonora, Mexico, on June 2, 1937, by A. J. van Rossem and Robert Hannum.

Subspecific characters.—Resembles *Heterocnus cabanisi cabanisi* (Heine) of southern Mexico and Central America in the juvenile and post-juvenile stages; but in adults the barring on the neck, upper back, and upper chest is notably wider; blackish streaks on fore-neck paler and tending to be broken by the intrusion of barring. Size slightly larger than *cabanisi*.

Range.—Fresh-water streams in the Arid Lower Tropical Zone in southern Sonora and probably in Sinaloa.

Remarks.—Heine's description of *Tigrisoma cabanisi* (J. f. O., 7, 1859, 407) was based on a male from "Mexico,"—obviously an adult but not determinable as to subspecies by the color characters given. The measurements, however, are relatively small and fall well within those of typical *cabanisi* as above restricted. It is possible that examination of Heine's type will provide evidence of specific locality so that we do not care to designate one at this time.

MEASUREMENTS.

	WING	TAIL
<i>cabanisi</i>		
2 ad. ♂ from El Salvador.....	342 - 345	137 - 142
2 im. ♂ " "	310 - 335	126 -
2 ad. ♀ " "	335 - 345	131 - 144
3 im. ♀ " "	325 - 340	125 - 141
<i>fremitus</i>		
1 ad. ♂ from Sonora	365	156
1 ad. ♀ " "	375	157
2 im. ♀ " "	340 - 345	135 - 153

4.0623

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



CONCERNING THE GENUS LEPTOBYRSA STÅL
(HEMIPTERA).

BY C. J. DRAKE AND M. E. POOR.

One of the problems confronting the writers for some time has been the status of the genus *Leptobyrsa* Stål as well as certain other genera of the family Tingitidae of the Western Hemisphere.

The genus *Leptobyrsa* was erected by Stål, ENUM. HEMIP. III, 1873, pp. 119 and 123, for a single species, *Tingis steini* Stål from Rio Janeiro. Champion, BIOL. CENTR.-AMER., RHYNCH., II, 1897, p. 25, greatly amplified the generic conception of *Leptobyrsa* so as to include five species which he was describing from Central America. Since then, several species have been described from South America and two from Australia. In all, a total of 17 species has been assigned to the genus *Leptobyrsa*.

The two Australian tingidids described by Hacker as *Leptobyrsa* Stål do not belong to this genus nor to the new genera described below and will be discussed in a subsequent paper. *Leptobyrsa bradleyi* Drake is transferred to the genus *Leptopharsa* Stål. The rest of the American species included in *Leptobyrsa* are treated below.

Genus LEPTOBYRSA Stål.
Haplotype, *Tingis steini* Stål.

Pronotum convex, pitted, narrowed anteriorly, abbreviated behind, tricarinate, each carina strongly foliaceous and with large areolae; hood moderately large, subglobose to globose, inflated, projecting forward over base of head, sometimes as far as apex of head; paranota subrectangular in outline, reflexed, widely reticulate, produced forward in front; lateral carinae terminating in front at calli, opposite basal margin of hood; greatest width of pronotum, including paranota, at humeral angles. Antennae

slender, moderately long, widely separated at base, clothed with long stiff hairs. Rostral channel wide, open behind, the laminae foliaceous; rostrum long, bucculae closed in front. Wings abbreviated. Elytra rectangular in outline, widely reticulate, abruptly widened a little behind the base, there usually widest; discoidal area raised in a large tumid elevation strongly impressed within, nearly reaching middle of elytra and with inner row of areolae very large; subcostal area narrow, mostly biseriata, the inner row of areolae much larger than outer areolae. Margins of paranota and elytra armed with spines or hairs, or both hairs and spines. Legs slender, clothed with long stiff hairs.

As here delimited, *Leptobyrsa* Stål contains: *Steini* Stål, *ardua* Drake and *tersa* Drake and Hambleton from Brazil; *bruchii* Drake and *mendocina* Pennington from Argentina; and *decora* Drake from Colombia and Ecuador. These forms represent a very distinct but closely related generic group of six species which are readily separated specifically from each other.

The rest of the American species of *Leptobyrsa* are being referred to the new genera detailed below:

ARISTOBYRSA, gen. nov.

Differs from *Leptobyrsa* Stål in having the antennae densely clothed with extremely long hairs, bucculae open in front, elytra extremely broad and paranota clothed with long hairs. Hood small, formed by raised median portion of collar, roof-shaped; legs slender, hairy. Pronotum tricarinate, triangularly produced behind. Hypocostal ridge uniseriate.

Genotype, *Leptobyrsa latipennis* Champion.

Champion, BIOL. CENTR.-AMER., RHYNCH., II, 1897, p. 25, pl. II, figs. 13 and 13a, gives an excellent description and figure of *latipennis*. The size, extremely long antennal hairs and very large bulbous elevation of elytra, not impressed and projecting over the narrow, finely seriate subcostal area, separate this species at once from allies. Described from Panama; specimens are at hand from Brazil and Peru.

PLANIBYRSA, gen. nov.

Pronotum without hood, but with truncate collar; unicarinate, the lateral carinae obsolete and the median carina ridge-like, sometimes almost lacking. Paranota expanded anterolaterally, exceeding apex of head, and terminating posteriorly in a narrow strip at humeral angles; widest point of paranota and pronotum together opposite or anterior to collar. Posterior triangular process of pronotum reticulate and either abbreviated or extended. Elytra wide at base and produced forward beyond humeral angles. Discoidal area not exceeding half the length of elytra, flattened, moderately tumid, or slightly raised at subcostal vein. Subcostal area with areolae of same size as those on the other elytral areas. Costal area wide, widest at base. Margins of elytra and paranota set with spines. Hypocostal ridge uniseriate at base, merely ridgelike posteriorly.

Genotype, *Leptobyrsa splendida* Drake (MEM. CARN. MUS. IX, 1922, p. 374, fig. 2a.)

In addition to *splendida* (Drake) from Brazil, the genus *Planobyrsa* contains *elegantula* (Drake) and *sodalis* (Drake and Bondar) also from Brazil.

PLESEOBYRSA, gen. nov.

Separated from *Leptobyrsa* Stål and the other two genera described above by the differently formed elytra and collar. Collar distinct, truncate or slightly produced forward in front, in the latter case usually with the median portion raised so as to form an inverted V-shaped, hoodlike structure. Pronotum uni- or tri-carinate, the posterior process triangular or abbreviated. Paranota expanded, slightly reflexed, variable in form in different species. Elytra with distinct areas, without tumid elevation; discoidal area short, raised so that the subcostal area is subvertical; margins of elytra and paranota clothed with hairs or armed with short spines. Bucculae closed in front.

Genotype, *Pleseobyrsa boliviana*, n. sp.

P. chiriquensis (Champion) and *plicata* (Champion) from Panama, *mollinediae* (Drake and Hambleton) from Brazil and *nigriceps* (Champion) from Guatemala and Panama are here transferred to this genus.

From the original description and figure it would appear that *Leptobyrsa translucida* Champion may belong to the genus *Stephanitis* Stål. The foliaceous median carina, hood and discoidal area appear to be typical of the latter genus.

***Pleseobyrsa boliviana*, sp. nov.**

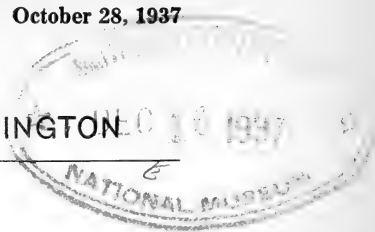
Very similar in appearance and form to *P. chiriquensis* (Champ.) but larger, with median carina more elevated behind and differently shaped discoidal area. Antennae brown, rather densely clothed with hairs, the first and last segments black; segment I stouter and nearly two and one half times as long as II, the latter short, III very long, slightly curved, a little more than two and one-half times as long as IV. Head black, the spines brownish and much reduced. Pronotum convex, blackish, sharply tricarinate, carinae testaceous; lateral carinae parallel, obsolete behind on triangular process; median carina slightly more elevated; collar distinct, slightly raised along median line; paranota moderately wide, slightly reflexed, rounded in front, nearly straight along the lateral margin, triseriate in front, uniseriate behind, the outer margin armed with short spines.

Elytra similar in form to *P. chiriquensis*, the outer margin armed with short, slender spines; costal area irregularly tri-quadriseriate, the cells varying considerably in size; subcostal area mostly triseriate or quadriseriate, the cells slightly irregular; discoidal area distinctly impressed, five or six cells wide at widest point.

Legs fuscous, set with rather short, slender spines; bucculae open in front. Rostral channel open behind, rostrum extending almost to mesosternum. Hypocostal ridge very narrow, indistinctly uniseriate.

Length, 4.25 mm.; width, 2.50 mm.

Holotype, male, and allotype, female, Cochabamba, Bolivia in Drake collection.

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NEW SPECIES OF MITES OF THE SUBFAMILY TROMBICULINAE, WITH A KEY TO THE NEW WORLD LARVAE OF THE AKAMUSHI GROUP OF THE GENUS TROMBICULA.

BY H. E. EWING,

Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

This paper deals with chigger mites (Trombiculinae) of the New World. One of the seven new species here described was taken from a hibernating blue-tailed skink in Maryland. Two are part of a collection from Colombia sent in for identification by Professor J. C. Bequaert of Harvard University. Four new species, all based on larvae, belong to the *akamushi* group and come from various New World hosts and localities.

Most of the material studied was prepared and mounted by Miss Grace E. Glance. Alcoholic specimens were treated with a solution of potassium hydroxide before they were mounted in a modified Berlese mixture. The clearing done by the different modified Berlese mixtures is not in itself sufficient in the case of chiggers, although satisfactory for certain other mites.

It will be noted that the character that is most used in separating the larvae of species of the Trombiculinae is the number of dorsal abdominal setae. Frequently one is inclined to believe that the number of such setae varies within a single species. However, this probably is not true. As the abdomen of a chigger swells following engorgement, its dorsal wall distends more rapidly than the ventral. This may cause certain dorsal setae that are very near to the lateral margin to be carried beyond this margin and have a slightly ventral position. When the dorsal setae are counted in such an engorged individual the number will be less than in an unengorged specimen. For these reasons it is best to confine the counts of dorsal setae to speci-

mens that are only slightly engorged. In unengorged specimens the dorsal abdominal setae are often so close together that there is confusion in counting them.

Since there is a tendency in most species for the dorsal abdominal setae to be grouped in transverse rows, some authors have given formulas to indicate not only the number of dorsal abdominal setae but also the number of such rows and the number of setae in each row. This practice can not be followed with safety in all species. In some of them the rows formed by the dorsal setae are too irregular for ready detection, and in all of them the setae shift their position somewhat during engorgement.

A NEW SPECIES OF *Neoschöngastia* EWING.

Species of *Neoschöngastia*, all of which are known only in the larval stage, are characterized by having five setae (exclusive of pseudostigmatic organs) on the dorsal plate, the pseudostigmatic organs strongly clavate or capitate, the palpal claws trifurcate and the chelicerae each with only one dorsal tooth. About a dozen species are known from the New World.

Neoschöngastia dasyproctae, new species.

Palpus stout; second segment broadly rounded laterally; first palpal seta with several minute, short barbs; second and third simple. Palpal claw with middle prong stoutest; outer prong stouter, shorter, and nearer base of claw than inner. Dorsal plate much broader than long, anteriorly rounded on front margin near insertion of each of three anterior setae and very broadly rounded on posterior margin. Pseudostigmata situated slightly posterior to middle of dorsal plate and each slightly more than its diameter from median line. A curved transverse slit is contiguous with anterior, and another with posterior, margin of each pseudostigma. Pseudostigmatic organ strongly clavate, barbed, with a slender pedicel and extending backward beyond posterior margin of dorsal plate. Eyes of a side equal, contiguous, not situated on a sclerotized plate. Dorsal abdominal setae as follows: Humerals much in front of first row and not included in formula, which is 6-6-6-6 (including first laterals) -4 (including second laterals) -4 (including third laterals). Legs rather large; tarsus I with dorsal spine rather weak and situated about its length from base of segment.

Length of partly engorged specimen, 0.40 mm.; width, 0.22 mm.

Type host.—An agouti, *Dasyprocta variegata*.

Type locality.—Muzo, Boyacá Department, Colombia.

Type slide.—U. S. N. M. No. 1260.

Described from six specimens taken from type host at type locality January 1, 1937, by M. Roca Garcia. This species is nearest *N. scelopori* Ewing, from which it differs in having a slit behind each pseudostigma and no tubercle on tarsus I.

AN ADULT OF A NEW SPECIES OF TROMBICULA.

Adults of the subfamily Trombiculinae are rarely found and have been reared only in the case of three or four species. It has been the writer's practice to put all new adults in the genus *Trombicula*. This practice should avoid creating many generic synonyms.

***Trombicula manriquei*, new species.**

Palpus slender, extending about one-half its length beyond the chelicerae. Palpal thumb slender, well clothed with setae, and slightly surpassing tip of palpal claw; palpal claw rather slender, without tooth, moderately curved; accessory spines three, subequal, arranged in a comb. Crista extending forward as a pointed rod between bases of chelicerae and expanded posteriorly into a laterally rounded pseudostigmatic area, the latter without posterior lobes. Pseudostigmata small, situated on extreme lateral margins of pseudostigmatic area; pseudostigmatic organs simple, flagelliform, longer than crista. Eyes absent. Abdomen densely beset with tapering, barbed setae which increase progressively in length from anterior to posterior border. Anterior legs longest; posterior next in length; legs of second and third pairs subequal. Claws on tarsus I unequal, also those on tarsus IV unequal; those on tarsus II subequal, and on tarsus III subequal.

Length of body, 0.96 mm.; greatest width, 0.53 mm.

Type locality.—Villavicencio (Quenane), Meta Department, Colombia.

Type slide.—U. S. N. M. No. 1261.

Description based upon one specimen taken from humus in a tree hole at the type locality October 26, 1936, by J. R. Manrique, for whom the species is named. Although this specimen is small for an adult of the genus *Trombicula*, the presence of three accessory spines near the base of the palpal claw and of three pairs of genital suckers surrounding the genital opening indicates that it is an adult. This species is nearest *T. coarctata* Berlese and *T. splendens* Ewing, from both of which it differs in having no posterior lobes to the pseudostigmatic area.

THE *irritans* GROUP OF THE GENUS TROMBICULA.

This group of the genus *Trombicula* includes those species in the larvae of which the palpal claw is typically divided into two prongs and the pseudostigmatic organ is barbed or plumose. About two dozen species have been described from the New World, fully one-fourth of which are synonyms. The new species here described is based on larvae.

***Trombicula gurneyi*, new species.**

Palpus short, stout; second segment broadly rounded laterally; first palpal seta short, with 0 to 2 barbs (usually without barbs); second short, simple; third simple. Inner prong of palpal claw stouter than outer, the latter being less curved and in a somewhat ventral position. Dorsal plate broader than long, not porose, almost straight along anterior margin and outwardly rounded along posterior margin. Pseudostigmata situated

almost between posterolateral setae and each a little more than its diameter from median line. A slight chitinous fold may be present at either the anterior or posterior border of the pseudostigmata. Pseudostigmatic organs each with rather long barbs on distal half. Eyes of a side equal, contiguous, not situated on a sclerotized plate. Dorsal abdominal setae as follows, counting the humerals as belonging to first row, 8-6-4-4 (including first laterals) -2 (not including second laterals). Legs moderate in length; tarsus I with dorsal spine situated slightly more than its length from base of segment; subapical seta straight, on apex of a tubercle.

Length of slightly engorged specimen, 0.27 mm.; width, 0.21 mm.

Type host.—Blue-tailed skink, *Eumeces fasciatus*.

Type locality.—Priest Bridge, Patuxent River, Maryland.

Type slide.—U. S. N. M. No. 1262.

Described from six specimens taken from type host collected at type locality April 24, 1937, by A. B. Gurney. When the type host was found it was in a state of hibernation, deep in a large pile of sawdust. The chiggers probably attached to the host when the latter was active before going into hibernation. This species is nearest *T. panamensis* Ewing, from which it differs in sometimes having the first palpal seta with one or two barbs and in having the palpal setae very short.

THE *akamushi* GROUP OF THE GENUS TROMBICULA.

Chiggers of this group of the genus *Trombicula* are here defined as those which have the palpal claw divided into three or four prongs and which possess barbed pseudostigmatic organs. Members of the group are well clothed with abdominal setae, and are distributed over most of the known geographical range of the subfamily Trombiculinae. The species which gives the group its name is *T. akamushi* (Brumpt), the well known Asiatic chigger that transmits to man a serious disease known as Kedani fever, or Tsutsugamushi disease.

KEY TO THE NEW WORLD SPECIES OF THE *akamushi* GROUP OF THE GENUS TROMBICULA.

- A. First palpal seta barbed.
 - B. Dorsal abdominal setae more than 54; palpal claw pronged.....*T. setosa*, new species.
 - BB. Dorsal abdominal setae less than 50.
 - C. Dorsal abdominal setae more than 30.
 - D. Dorsal abdominal setae more than 44.
 - T. shannoni* Ewing.
 - DD. Dorsal abdominal setae not more than 40.
 - E. Dorsal plate almost twice as broad as long and with a slit behind each pseudostigma.....*T. bisignata* Ewing.
 - EE. Dorsal plate less than one and a half times as broad as long and without a slit behind each pseudostigma..... *T. cynos*, new species.

CC. Dorsal abdominal setae less than 26; dorsal plate indistinct.....*T. dasyproctae*, new species.

AA. First palpal seta simple.

B. Dorsal abdominal setae more than 34; dorsal plate with a slit *in front* of each pseudostigma. On bats....
T. mexicana, new species.

BB. Dorsal abdominal setae less than 30; dorsal plate with a slit *behind* each pseudostigma. Not on bats.....
T. microti Ewing.

FOUR NEW SPECIES OF THE *akamushi* GROUP FROM THE NEW WORLD.

Larvae of the New World species of the *akamushi* group differ from those of *Trombicula akamushi* Brumpt in having the anterior eye equal to or larger than the posterior. Of our species *T. bisignata* Ewing appears to be nearest to the Asiatic species. *T. bisignata* differs from *T. akamushi* not only in the character just mentioned but also in possessing a pair of slit-like openings on the dorsal plate near the pseudostigmata, as well as in certain other respects.

Trombicula setosa, new species.

Palpus rather short; second segment angulate laterally; first palpal seta with many barbs; second with 3 to 4 barbs; third simple. Palpal claw three or four pronged with inner one or two prongs longer than outer prongs. Dorsal plate more than twice as broad as long; front margin nearly straight; posterior margin outwardly rounded; without pair of slits near pseudostigmata. Pseudostigmata situated posterior to a line drawn between posterolateral setae, each being a little more than its diameter from median line; pseudostigmatic organs each with a few minute barbs. Eyes immediately lateral to dorsal plate, not situated on sclerotized plate; posterior eye equal to anterior and with cornea. Dorsal abdominal setae 56 to 60; first three transverse rows of setae with formula 14-14-10; other rows irregular in arrangement. Legs short; tarsus I with dorsal spine situated slightly more than its length from base of segment.

Length of engorged specimen, 0.48 mm.; width, 0.33 mm.

Type host.—White-footed mouse, *Peromyscus gossypinus gossypinus*.

Type locality.—Okefinokee Swamp, Georgia.

Type slide.—U. S. N. M. No. 1256.

Described from three specimens taken from type host at type locality, December 2, 1934, by E. V. Komarek (Bish. no. 22740) and one specimen taken from straw, Los Angeles, California, February 10, 1937, by E. R. Miller (Bish. no. 26926). This species differs from all others of the *akamushi* group occurring in the New World in having the palpal claw sometimes divided into four prongs and in having more than fifty dorsal abdominal setae.

Trombicula cynos, new species.

Palpus stout; second segment broadly rounded laterally; first palpal seta with a few barbs; second also with a few barbs; third with 3 to 4

barbs. Palpal claw with a large central prong surpassing the much smaller subequal, lateral ones. Dorsal plate minutely porose, slightly broader than long; anterior margin forming three subequal festoons; posterior margin forming a median angle; no slits near pseudostigmata. Pseudostigmata situated in front of a line drawn between the posterolateral setae and each about its diameter from median line. Pseudostigmatic organs very long, straight, subplumose, with many delicate barbs. Eyes large; anterior and posterior equal, contiguous, each with cornea. Dorsal abdominal setae about 32; first three transverse rows of setae with following formula: 8-6-6; other rows irregular in formation. Legs large; tarsus I with its rather short dorsal spine situated about twice its length from base of segment.

Length of unengorged specimen, 0.25 mm.; width, 0.16 mm.

Type host.—A raccoon, *Procyon lotor*.

Type locality.—Ithaca, New York.

Type slide (holotype).—U. S. N. M. No. 1257.

Described from a single specimen taken from type host at type locality by Dr. D. W. Baker. This very characteristic species is easily separated from all others of the *akamushi* group occurring in the New World by the peculiar shape of the dorsal plate. The single specimen at hand was taken from the ear of its host.

***Trombicula dasyproctae*, new species.**

Palpus with second segment subangulate laterally; first palpal seta with 1 to 3 barbs; second with 0 to 3 barbs; third with a few barbs. Palpal claw with a large, stout central prong and two slender, shorter, inconspicuous lateral prongs. Dorsal plate broader than long, poorly sclerotized, with anterior margin almost straight and posterior margin rounded. Pseudostigmata situated between postero-lateral setae and each about its diameter from median line. Anterior and posterior eyes equal, contiguous, not situated on a sclerotized plate. Dorsal abdominal setae 20 to 24; first row irregular, with 8 setae; second row with 6 setae; other setae not in rows. Legs of moderate length; tarsus I longer than tibia I and with dorsal spine situated about its length from base of segment.

Length of partly engorged specimen, 0.44 mm.; width, 0.24 mm.

Type host.—Agouti, *Dasyprocta punctata*.

Type locality.—Capira, Panama.

Type slide.—U. S. N. M. No. 1258.

Described from eight specimens taken from type host at type locality August 28, 1931, by L. H. Dunn. Except for the trifurcate palpal claw and equal anterior and posterior eyes this species is very similar to *Trombicula irritans* (Riley).

***Trombicula mexicana*, new species.**

Palpus short, stout; large second segment subangulate laterally; first palpal seta simple; second and third simple. Palpal claw stout; middle prong stouter than the smaller, subequal lateral prongs, and surpassing the

latter. Dorsal plate minutely porose, broader than long, with anterior margin almost straight and posterior margin very broadly rounded. Pseudostigmata situated slightly anterior to a line drawn between postero-lateral setae and each slightly less than its diameter from the median line and with a slit at its anterior border. Pseudostigmatic organ long, flagelliform, with a few very minute barbs on distal half. Anterior and posterior eyes equal, contiguous, not situated on a sclerotized plate. Dorsal abdominal setae 38 to 40; first row with 12 setae; second with 8 setae; third with 8 to 10 setae. Legs rather slender; tarsus I with dorsal spine situated about one and a half times its length from base of segment.

Length of engorged specimen, 0.55 mm.; width, 0.33 mm.

Type host.—A bat.

Type locality.—San Luis Potosi, Mexico.

Type slide.—U. S. N. M. No. 1259.

Described from four specimens taken from type host at type locality April 7, 1931, by R. A. Roberts (Bish. no. 12771) and five specimens taken from ear of *Eptesicus* sp. collected at Columbia, Missouri, March 23, 1936. This species is nearest *T. piercei* Ewing, described from the Philippines, from which it differs in having a more strongly sclerotized dorsal plate and fewer barbs on the pseudostigmatic organs.

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CRITICAL REMARKS ON CRYPTURELLUS VARIEGATUS AND ITS ALLIES.

BY W. E. CLYDE TODD.

The Tinamou *Crypturellus variegatus* is one of the oldest known species of this family, having been described by Buffon and figured by D'Aubenton in 1778, under the vernacular name "Tinamou varie de Cayenne." This is the basis of the scientific name *Tetrao variegatus* under which it was formally presented by Gmelin in 1789. Shortly thereafter it was placed by Latham in his new genus *Tinamus*, and later on referred to the distinct generic group recognized by authors generally as *Crypturus* Illiger, but which must be called *Crypturellus*.¹ The species has figured in the literature of South American birds more or less prominently, but material for study has not been ample, so that I am prompted to offer a few observations based mainly on the examination of the fair series of specimens in the collection of the Carnegie Museum. My acknowledgments are due Mr. John T. Zimmer for the loan of certain specimens from the collection of the American Museum of Natural History.

Crypturellus variegatus variegatus (Gmelin).

Topotypical adult birds from French Guiana have the upper parts, wing- and tail-coverts black, regularly barred with rich buffy (between cinnamon buff and clay-color); the pileum dusky black; the hindneck amber brown, and the neck below and breast similar but paler (more buffy). The posterior under parts are whitish in some specimens, more uniformly buffy in others. The dark barring on the sides also varies considerably in extent and intensity, but is well marked in the majority of specimens.

¹ *Crypturellus* Brabourne and Chubb was later replaced by *Microcrypturus* Chubb because of a prior *Crypturella* Silvestri. But there can be no risk of confusion here, since these two names, although differing only in gender-endings, refer to animals in very different Classes. Were both names those of birds I should not hesitate to reject the later one and follow the A. O. U. Code.

The youngest bird (No. 61,591, May 21) has the back almost "solid" brown (near Prout's brown); the pileum shows some deep rufous feathers remaining from an earlier stage; the characteristic white spots denoting immaturity appear on the breast, neck, and upper wing-coverts. Other specimens are in various stages of transition from this dress to that of the adult.

If the larger individuals are females, as is generally the case in this group, then the sexing of the specimens is not entirely dependable. In any case I can not specify what the sexual differences in color (if any) may be.

Two specimens from the Caura River, Venezuela, and one from Obidos on the lower Amazon, however, are markedly different from the "general run" and raise a question as to their identity. Instead of being black above, narrowly barred with buffy, they are decidedly rufescent (near Brussels brown), barred and mottled with black; the buffy bars are scarcely obvious, except on the wing-coverts; the upper tail-coverts have black bars separated by olive brown interspaces each having a median transverse rufescent buffy line. The general effect is thus unlike that of the adult plumage above described. Since we have also a perfectly typical adult from Obidos these three odd birds must represent either a color-phase, a stage of plumage not fully mature, or another species altogether. They certainly look different enough to justify the latter alternative, hard as it is to accept. But there are certain suggestions of immaturity—in fact, one of these birds shows remains of white spotting on the wing-coverts. It is odd, however, that the French Guiana series does not include any examples in this dress.

An adult specimen from Tonantins, on the upper Amazon, is very buffy below, with the barring on the sides obsolete; the buffy bars above are wider than in the average Guiana specimen. It may represent an intermediate towards

Crypturellus variegatus salvini (Salvadori).

This form was originally described as a distinct species, but it is merely a darker race of *variegatus*, and not a very strongly marked one at that! The characters to which Salvadori calls attention do not hold good at all, tested by the series at hand—every one of them occurs in Guiana specimens as individual variations. The neck and breast are somewhat deeper rufescent in adults, and the bars above are also darker (near Sudan brown). The form appears to be confined to eastern Ecuador; the type-locality "Sarayacu" is perhaps open to question, as are all of those to which Buckley's name is attached.

***Crypturellus variegatus transamazonicus*, subsp. nov.**

Type.—No. 72,997, Collection Carnegie Museum, adult female; Santarem, Brazil, May 22, 1919; Samuel M. Klages.

Subspecific characters.—Similar to *Crypturellus variegatus variegatus* of Guiana, etc., but averaging lighter-colored, especially below; all the colors paler, the abdomen with more white.

Range.—Brazil, south of the Amazon River for an indefinite distance, and west to the borders of Ecuador.

Remarks.—This new race varies away from true *variegatus* in a direction precisely opposite to that of *salvini*, being lighter- instead of darker-colored, as seen in series; individual specimens would not invariably be distinguishable. It is the form which occurs on the south bank of the Amazon and on the Rio Tapajoz. A small series from the Rio Purús and one specimen from São Paulo de Olivença, on the upper Amazon (Rio Solimões), however, verge toward *salvini*, but are better referred to the present form.

There is one name which must be considered at this point: *Tinamus bimaculatus* Gray (List Birds British Museum, Gallinæ, 1867, 101), described from "South America." The description indicates a young bird, which can not be identified subspecifically. Salvadori lists the type-specimen under *variegatus*, but Brabourne and Chubb, in their synopsis of the forms of this genus (Annals and Magazine Natural History, (8), XIV, 1914, 320), have resurrected the name, but without indication of range or locality. On the principle that a certainty is better than an uncertainty, it would be desirable to drop the name as unidentifiable, even although the type-specimen is extant.

Crypturellus brevirostris (von Pelzeln).

This form is related to *C. variegatus*, which it closely resembles in general coloration, but from which it is specifically distinct, as shown by the occurrence of both together in French Guiana and along the Rio Purús. Compared with *variegatus* it is a rare species, known heretofore only from the types and a skin from Tefé, Rio Solimões, in the Rothschild Collection, discussed by Dr. C. E. Hellmayr in *Novitates Zoologicae*, XIV, 1907, 90. Mr. J. L. Peters gives it from Cayenne (Check-List of Birds of the World, I, 1931, 20)—I do not know on what authority. Dr. Hellmayr says that the Tefé skin (a female) "agrees perfectly with von Pelzeln's description," and goes on to point out how it differs from *variegatus*. Our adult Hyutanahan specimen (a female) differs from a French Guiana bird (a subadult male) very conspicuously in the color of the posterior under parts, which in the former are rich buffy, but in the latter pure white, in strong contrast with the color of the breast; moreover, there is practically no barring on the flanks and tibias, although this is well marked in the Rio Purús skin. These differences may be sexual, individual, or subspecific—it is impossible to say which without more material. A young male from the Rio Purús agrees with the adult female in the color of the under parts; above it is plain brown (between Brussels brown and raw umber), with but little black mottling. The original description "pectore et abdomine ferrugineo rufis, abdomine medio albescente" applies better to the French Guiana specimen than to those from the Rio Purús. The observable differences are comparable with those in *variegatus*, and in my judgment it would not be well to attempt any racial separation on the basis of present material. The color of the pileum is the same in our three specimens: at first glance it looks to be deep brown, but on closer examination it is seen to be mainly blackish, the brown appearance being due to the deep chestnut brown tips

and bars on the feathers; these, however, are certainly not conspicuous. The ear-coverts are raw umber, in contrast with the rusty sides of the head. The young has some black spots on the breast and white ones on the scapulars. Male (61,590): wing, 126; tail, 39; bill (exposed culmen), 20; tarsus, 38. Female (87,529): wing, 144; tail, 40; bill, 23; tarsus, 40. It is thus a decidedly smaller species than *variegatus*.

Crypturellus bartletti (Sclater and Salvin).

Dr. Hellmayr (Novitates Zoologicae, XIV, 1907, 410) says that the Rio Madeira specimens he examined are exactly like the types from eastern Peru (in the collection of the British Museum), so that our series from the Rio Purús must also be the same. Brabourne and Chubb's *caroli* (Annals and Magazine Natural History, (8), XIV, 1914, 320-1) is a synonym. I can not exactly follow Dr. Hellmayr, however, in his description of the sexual differences in this species. As it happens, all our specimens are labelled as females, but I think No. 93,752 is a male, since it is more olivaceous above and duller below, lacking almost entirely the rich rusty buff color of the breast which is so conspicuous a feature in the others. It is also smaller.

C. bartletti is quite distinct from *C. variegatus*. Seen from below they are similar, but the upper parts in the two species are different. As Dr. Hellmayr suggests, its nearest ally is probably *C. parvirostris* of southern and eastern Brazil. *C. variegatus*, *C. brevisrostris*, and *C. bartletti* all occur together on the Rio Purús (Hyutanahan).

LIST OF SPECIMENS EXAMINED.

Crypturellus variegatus variegatus.—El Llagual, Rio Caura, Venezuela, 2; Pied Saut, Oyapock River, French Guiana, 8; Cayari Island, Uassa Swamp, northern Pará, Brazil, 1; Upper Araucaua, northern Pará, Brazil, 3; Obidos, Amazon River, Brazil, 5; Tonantins, Rio Solimoës, Brazil, 1; Manacapurú, Rio Solimoës, Brazil, 1.

Crypturellus variegatus salvini.—Rio Suno, eastern Ecuador, 4 (coll. Am. Mus. Nat. Hist.).

Crypturellus variegatus transamazonicus.—Santarem, Brazil, 4; Colonia do Mojuy, Santarem, Brazil, 5; Villa Braga, Rio Tapajóz, Brazil, 2; Hyutanahan, Rio Purús, Brazil, 2; Arimã, Rio Purús, Brazil, 5; São Paulo de Olivença, Brazil, 1.

Crypturellus brevisrostris.—Tamanoir, French Guiana, 1; Hyutanahan, Rio Purús, Brazil, 2.

Crypturellus bartletti.—Hyutanahan, Rio Purús, Brazil, 2; Nova Olinda, Rio Purús, Brazil, 1; Arimã, Rio Purús, Brazil, 6.

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PROCEEDINGS
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A NEW SPECIES OF DRYOPTERIS, SUBGENUS
EUDRYOPTERIS, FROM GUATEMALA.¹

BY WILLIAM R. MAXON AND C. V. MORTON.

There is described herewith a new fern of the genus *Dryopteris* from the high mountains of western Guatemala, the specimens belonging to a large collection made several years ago by Dr. Alexander F. Skutch and kindly presented by him to the U. S. National Museum. It is not sufficiently close to any of the American species of the subgenus *Eudryopteris* previously known to require detailed comparison.

Dryopteris nubigena Maxon & Morton, sp. nov.

Subg. *Eudryopteris*. Rhizoma adscendens lignosum paleaceum, paleis lanceolatis brunneis vel castaneis onustum; folia longe stipitata; lamina deltoidea tripinnata-pinnatifida vix paleacea, rhachibus stramineis vel flavescens nudis parce stipitato-glandulosis; pinnae suboppositae ca. 9-jugae patentes, infimae deltoideae petiolulatae basicopicae anadromae, ceterae catadromae ambitu sublanceolatae; pinnae secundariae alternae lanceolatae, infimae liberae, superiores decurrentes et ala angustissima conjunctae; pinnulae suboppositae ca. 9-jugae oblongae decurrentes profunde pinnatifidae, segmentis ultimis ca. 5-jugis latis apice acutiuscule dentatis; venae plerumque furcatae; lamina tenero-membranacea fere glabra parce stipitato-glandulosa; sori mediocres solitarii, sporangiis glabris; indusium orbiculari-reniforme parvum tenerum subpersistens glanduloso-ciliolatum.

Rhizome stout, ascending, woody, 10-15 cm. long, about 2 cm. thick, densely paleaceous, the scales narrowly ovate to lanceolate, 8-15 mm. long, 1-3 mm. broad, acuminate, castaneous, lustrous, minutely glandular-denticulate. Fronds several, close, erect-spreading, 50-85 cm. long, the stipes stoutish, sulcate, equaling or mostly slightly longer than the blades, castaneous in basal portion, here freely paleaceous, the scales ovate-lanceolate, acuminate, up to 17 mm. long and 5 mm. broad, mostly dark brown, minutely glandular-denticulate; blades deltoid, up to 42 cm. long and 44

¹ Published by permission of the Secretary of the Smithsonian Institution.

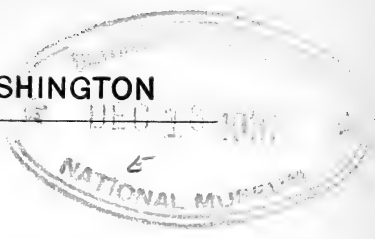
cm. broad, tripinnate-pinnatifid, the rachis stramineous, terete, naked, very sparsely capitate-glandular, the secondary rachises similar; main pinnae about 9 pairs, subopposite, at right angles to the rachis, the lowest inequilateral, basiscopically developed, elongate-deltoid, up to 22 cm. long and 13 cm. broad, anadromous, stalked (up to 1.5 cm.), the upper pinnae narrower, nearly equilateral, catadromous; secondary pinnae of the middle pinnae about 15 pairs, the basal ones free, broadly lanceolate, about 4.5 cm. long and 2 cm. broad, the upper ones simpler, decurrent, and joined by a very narrow wing; tertiary pinnules subopposite, about 9 main pairs, oblong, decurrent and joined by a narrow wing, the larger ones about 1 cm. long and 5 mm. broad, deeply pinnatifid, the segments (about 5 pairs) broad, with 2-4 acutish teeth; costae and costules bearing pale stalked capitate glands and a few appressed reddish firm 5- or 6-celled hairlike scales less than 0.3 mm. long and 25-30 μ thick; leaf tissue membranous, bearing scattered pale stalked capitate glands; sori solitary in the segments, supramedial, terminal or not; indusia roundish-reniform, small, delicate, pale, glandular and sparingly glandular-ciliate, early-shriveling but subsistent; sporangia glabrous; spores yellowish-brown, about $45\mu \times 25\mu$

Type in the U. S. National Herbarium, no. 1,587,763, collected at Buena Vista, in cloud forest above Tecpam, Department of Chimaltenango, Guatemala, at an altitude of about 3000 meters, December 25, 1933, by Alexander F. Skutch (no. 771). Other plants were collected in January, 1933 (*Skutch* 179), and there is at hand also a depauperate specimen from the same region collected in March, 1936, by Morris E. Leeds.

In the general architecture of its deltoid blades *Dryopteris nubigena* most resembles *D. Karwinskyana* (Mett.) Kuntze, of which specimens are at hand from Mexico, Guatemala, Nicaragua, and Costa Rica; but that, which is perhaps its nearest relative, differs widely in many essential characters, notably in its paleaceous blades, covered with peculiar hairlike glands, and its very large, firm, vaulted, and persistent indusia.

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DESCRIPTION OF A RACE OF PEROGNATHUS
PARVUS FROM ARIZONA.

BY SETH B. BENSON,

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

The pocket mouse *Perognathus parvus* is most characteristically a Great Basin species generally living on more or less sandy ground where the sagebrush (*Artemisia tridentata*) is the dominant plant. In 1932 Miss Annie M. Alexander and Miss Louise Kellogg collected two specimens of this species near Mt. Trumbull in the high plateau country of northwestern Arizona. These specimens indicated that an undescribed race of *parvus* inhabited the region. Accordingly the area was revisited in 1933 in order to obtain a series large enough to show with certainty whether or not the two specimens were actually characteristic of the population living there. A study of the larger series obtained has led to the conclusion that the population merits recognition as a geographic race.

***Perognathus parvus trumbullensis*, new subspecies.**

Type.—Young adult male, skin and skull, no. 60929, Mus. Vert. Zool., from Nixon Spring, 6250 ft., Mount Trumbull, Mohave County, Arizona. Collected May 26, 1933, by Annie M. Alexander. Original number 2182.

Distribution.—Probably ranging throughout the high plateau region in Arizona north of the Colorado River wherever the habitat is suitable.

Diagnosis and comparisons.—A race of *Perognathus parvus* characterized by dark color, slender rostrum, weakly-flaring zygomatic arches, relatively large mastoid bullae. Compared with near topotypes of *Perognathus parvus olivaceus* (Merriam), the only recognized race of *parvus* whose area of distribution approaches that of *trumbullensis*: Averaging smaller in size, skull with more slender rostrum and weaker zygomatic arches, relatively broader through mastoids; mastoids relatively larger; color darker dorsally, belly hairs in most specimens plumbeous basally and tipped with ochraceous-buff instead of pure white to roots.

The race *olivaceus* is widely distributed in Nevada and some of the adjoining States and it exhibits a considerable degree of local variation. Merriam (North Amer. Fauna, no. 1, 1889, p. 16) named a race *amoenus* from Nephi, Juab County, Utah. One of the characters cited as diagnostic of this race was the presence of pigmented hairs on the belly. Osgood (North Amer. Fauna, no. 18, 1900, pp. 37-38) placed this name in the synonymy of *olivaceus*. According to Osgood, specimens additional to those studied by Merriam showed that the character of pigmented ventral hairs was not constant. In the Museum of Vertebrate Zoology are seven topotypes of "*amoenus*" and in only one of these is there a suggestion of pigment in the belly hairs. The type of *amoenus*, which I had opportunity to examine in May, 1935, is not as richly pigmented as the series from Mt. Trumbull. Furthermore, the specimens from Nephi differ from those from Mt. Trumbull in the same way as do the near topotypes of *olivaceus*.

Color (capitalized terms after Ridgway, Color Standards and Color Nomenclature, 1912).—Dorsal hairs with tips black, subterminal bands Ochraceous-Buff, basal portions Neutral Gray. Hairs of throat, breast, and inguinal region white. Belly with hairs Pale Neutral Gray at bases, Pinkish Cinnamon on tips. Hairs of distal part of feet white, of proximal part, Light Pinkish Cinnamon.

The specimens show some variation in color, some being more and some less intensely pigmented than the type specimen. The series from Mt. Trumbull is much more uniform than the series from 6 miles north of Wolf Hole. Only a few specimens, all from the latter locality, lack pigment on the hairs of the belly, yet one from the Wolf Hole locality is as intensely pigmented as the darkest of the Mt. Trumbull series.

Measurements.—Average, minimum, and maximum measurements in millimeters of adult males (the single number in parentheses indicates the number of specimens averaged): Total length (20), 171 (153-182); tail (20) 87 (77-96); hind foot (20), 23 (21-24); ear from notch (12), 9 (8-10); weight in grams (20), 19.1 (15.0-23.8). Skull: occipitonasal length (18), 26.8 (25.3-27.8); frontonasal length (20), 17.9 (16.8-18.7); mastoid breadth (18), 14.1 (13.9-14.4), length of mastoid (18), 9.2 (8.9-9.4); distance between stylomastoid foramina (18), 11.4 (10.9-12.0); interorbital space (20), 6.0 (5.5-6.4).

Specimens examined.—Total number 48, all from Mohave County, Arizona, as follows: 6 miles north of Wolf Hole, 4900 feet, 9; Nixon Spring, 6250 feet, Mt. Trumbull, 39.

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TWO NEW SWIFTS OF THE GENUS CHÆTURA.

BY W. E. CLYDE TODD.

A recent study of the Swifts in the collection of the Carnegie Museum has resulted in the discovery of two subspecific forms of *Chætura* which apparently are undescribed. The first may be called

Chætura spinicauda æthalea, subsp. nov.

Type.—No. 69,378, Collection Carnegie Museum, adult male; Benevides, Pará, Brazil, September 18, 1918; Samuel M. Klages. Wing, 109 mm.; tail, 40 mm.

Subspecific characters.—Similar to *Chætura spinicauda spinicauda* (Temminck) of northern South America, but general coloration darker, the under parts dull sooty (near *Chætura* black of Ridgway) instead of dark hair brown. Similar also to *C. spinicauda fumosa* Salvin of Central America, but still darker, and the gloss of the upper parts greenish rather than bluish.

Range.—The Lower Amazon Valley (south bank only).

Remarks.—Eight specimens of this new race show that its characters are sufficiently constant to justify its recognition when compared with a good series of true *spinicauda* from French Guiana. Curiously enough, it approaches more closely the northern race, *fumosa*, but is still darker, and the gloss of the back is different. The new form seems to be confined to the south bank of the Amazon (as far west at least as the Rio Tapajóz), since a specimen from Obidos, on the north bank, is clearly referable to *spinicauda*. Ridgway long ago (Bulletin U. S. National Museum No. 50, V, 1911, 726) called attention to the alleged occurrence of *fumosa* in this region, as said by Hartert (Catalogue Birds British Museum, XVI, 1892, 483), and suggested that this would bear closer investigation.

Specimens examined.—Benevides, Pará, Brazil, 7; Colonia do Mojuy, Santarem, Brazil, 1.

The second new race is named

Chætura cinereiventris schistacea, subsp. nov.

Type.—No. 60,667, Collection Carnegie Museum, adult male; La Colorada, Boyaca, Colombia, April 27, 1917; M. A. Carriker, Jr.

Subspecific characters.—Similar to *Chætura cinereiventris lawrencei* Ridgway of Trinidad, Grenada, and the north coast of Venezuela, but general coloration darker, the under parts deep neutral gray, passing into slate-color on the under tail-coverts, and the upper parts with a more decided steel blue gloss.

Range.—Western Venezuela and eastern Colombia (except towards the south?), west to the Eastern Andes.

Remarks.—Dr. Frank M. Chapman (Bulletin American Museum of Natural History, XXXVI, 1917, 277) refers a single specimen of *Chætura cinereiventris* from Buena Vista, Colombia, to *sclateri*. By analogy our two birds from a locality farther north in eastern Colombia ought to be the same, but I can not make them fit the diagnosis and description of that form as given by Dr. C. E. Hellmayr (Verhandlungen Ornithologischen Gesellschaft in Bayern, VIII, 1908, 146, 157), nor are they referable to *guianensis*. These two skins, together with a third from Santa Elena, Merida, Venezuela, apparently represent an undescribed race which differs from *lawrencei* in the saturated coloration of the plumage generally. The size is the same: wing (type), 113 mm.; tail, 36 mm.

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PROCEEDINGS
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THE PIGEONS OF THE COLUMBA PLUMBEA GROUP.

BY W. E. CLYDE TODD.

The Pigeons of this group are medium-sized and plainly colored birds, characterized by a small, blackish bill and reddish feet. Their systematic arrangement has always given trouble to ornithologists, and indeed remains to be fully worked out. The present brief paper is offered as a contribution towards this end, and not as a final solution of the problem. It is based wholly on a study of the material in the Carnegie Museum, fifty-six specimens in all, representing eleven different forms.

Salvadori¹ was probably not the first author to discover the puzzling character of this particular group, but his arrangement may be taken as a point of departure. He segregated the three species which he recognized under *Ænaenas*—a name used here in a subgeneric sense and later raised to generic rank by Ridgway.² But I have come to agree with Dr. C. E. Hellmayr³ and others that there is no practical advantage in splitting the old genus *Columba* into several more or less poorly defined groups. Salvadori admits his inability to discriminate more than three forms of the *plumbea* group on the basis of the material before him—for which he is certainly not to be blamed. Clean, well and uniformly made skins are a virtual necessity in studying Pigeons, if valid conclusions are to be reached. This author was the first to point out the pertinence of the (preoccupied) name *Columba vinacea* Temminck for the bird of Guiana, but he was clearly mistaken in referring *Columba purpureotincta* Ridgway to the same form, and in “lumping” several other names under *C. plumbea*. Ridgway’s tentative arrangement of 1916 covered the entire group as then understood, and was certainly a decided improvement. The latest author to deal with this group is Mr. James L. Peters,⁴ who lists six species and nine additional subspecies, one of which is considered doubtful. In the present paper one new subspecies is described, one form is reduced to subspecific rank, and one name is revived.

¹ Catalogue Birds British Museum, XXI, 1893, 248, 322.
² Bulletin U. S. National Museum, No. 50, VII, 1916, 323.
³ Field Museum Zoological Series, XII, 1929, 462, note.
⁴ Check-List of Birds of the World, III, 1937, 71-73.

Columba plumbea and *C. subvinacea*, the two principal forms of the group, both have an extensive range in tropical America. Their occurrence together in various parts of this area shows that they must represent two distinct specific types. Generally speaking, *C. plumbea* is larger than *C. subvinacea*, its coloration is more bluish, less purplish, and its wings are darker, lacking any trace of the cinnamon color on the inner webs of the remiges that characterizes, in greater or less degree, the latter species. In addition to these two main forms there are two others, *C. goodsoni* and *C. chiriquensis*, possessing a combination of characters which, taken in connection with the facts of their known ranges, necessitate their recognition as species. A third outlying form of wider range, *C. nigrirostris* of Central America, must be placed in the same category. The origin and development of the group as a whole thus constitute a problem in genetics which is worthy of study.

Columba plumbea plumbea and *C. plumbea baeri* have not been examined in the present connection, but judging from descriptions alone seem to be distinct from each other and from the more northern races. Dr. Hellmayr⁵ insists that the *C. locutrix* of Wied is a synonym of the former, but Mr. Peters appears not so sure of this. The lower Amazon Valley, north to Guiana, is occupied by a different race, which must be called

Columba plumbea wallacei Chubb.

This form first appeared in ornithological literature in 1811, when it was described by Temminck and figured by Madame Knip⁶ as *Columba vinacea*, a name unfortunately preoccupied by Gmelin (1788) for an African dove. French Guiana was given as its home, but one looks in vain for further records from that country. Mr. Samuel M. Klages' field-work there in 1917-18, however, resulted in the taking of five specimens, which prove to belong to the same dull-colored race as the birds he collected later on the lower Amazon and the Rio Tapajóz. There is as yet nothing whatever to show that any other form of this group occurs in French Guiana. It is true that von Berlepsch, in his paper on the birds of Cayenne,⁷ lists *C. purpureotincta* from that place, but solely on the authority of Temminck.⁸ Temminck's description, however, obviously refers to the larger species which he called "*vinacea*," and not to the smaller form later characterized as *C. purpureotincta* by Ridgway. It is fair to presume that birds from the three Guianas are the same.

⁵ Novitates Zoologicae, XV, 1908, 91.

⁶ Les Pigeons, I, p. 87, pl. 41.

⁷ Novitates Zoologicae, XV, 1908, 295.

⁸ Von Berlepsch, probably following Salvadori, quotes *Columba cayennensis* Bonaterre (Tableau Encyclopédique et Méthodique, I, 1790, 234, ex Hollande, Abrégé d'Histoire Naturelle, II, 1790, 214) as a doubtful earlier name in this connection. Even Ridgway, in his review of the forms of this group, was thus misled. At the place indicated there is a perfectly accurate and unmistakable description of the Pigeon we have been calling *Columba rufina*, a name first applied by Temminck in 1810, but long antedated by the other. Such a change is indeed regrettable, but this well-known species will have to stand as

Columba cayennensis Bonaterre.

Giebel (Thesaurus Ornithologie, I, 1872, 741) made this discovery long ago.

In discussing Pará specimens of this Pigeon Dr. Hellmayr⁹ suggested that they might prove to belong to an undescribed form, which Chubb¹⁰ later ventured to separate under the name *wallacei*. Mr. John T. Zimmer,¹¹ however, calls a British Guiana specimen *pallescens*—an allocation inferentially not justified from a study of French Guiana specimens. Mr. Peters relegates *wallacei* to the synonymy of *pallescens* without apparent misgivings. Our series from French Guiana and the lower Amazon (collectively) differs decidedly from four undoubted specimens of *pallescens* from the Rio Purús in the duller, more brownish tone of the upper parts, wings, and tail, and the more vinaceous, less plumbeous cast of the head, neck, upper back, and under parts generally. From *delicata*, which *wallacei* resembles in the color of the upper parts, wings, and tail, the latter differs in its paler underparts, particularly the under tail-coverts. How *wallacei* differs from *baeri* I do not know, not having seen the latter, but it is fair to presume that Dr. Hellmayr would not have overlooked this point. I think, therefore, that we shall have to recognize *wallacei* for the form under discussion.

Twelve specimens: Tamanoir, French Guiana, 2; Pied Saut, Oyapock River, French Guiana, 3; Villa Braga, Rio Tapajóz, Brazil, 4; Obidos, Brazil, 1; Manacapurú, Amazon River, Brazil, 1; Rio Manacapurú, Brazil, 1.

Columba plumbea pallescens Sneathlidge.

The describer of this form had but one male bird, which she compared with *C. p. plumbea* and with *C. "p." bogotensis*. From the description alone I judge it is sufficiently different from the former (from southeastern Brazil). It is of course very different from the latter, which is a race of *C. subvinacea*, but is close to *C. p. delicata*, differing, however, in having the back, wings, and tail more olivaceous, less brownish in tone, while the head and neck have more plumbeous shading; the under parts average slightly paler.

Four specimens: Hyutanahan, Rio Purús, Brazil, 1; Arimã, Rio Purús, Brazil, 3.

Columba plumbea delicata von Berlepsch and Stolzmann.

I can not find any differences between specimens from Colombia, Bolivia, and Venezuela. As above remarked, this race appears most closely allied to *pallescens*.

Five specimens: El Cauca, Colombia, 2; Cerro Hosane, Bolivia, 2; La Azulita, Venezuela, 1.

Columba plumbea chapmani (Ridgway) is another form which is autotypically unknown to me.

Columba subvinacea recondita, subsp. nov.

Type.—No. 74,472, Collection Carnegie Museum, adult male; Colonia do Mojuy, Santarem, Brazil, October 25, 1919; Samuel M. Klages. Wing, 156; tail, 117; bill, 11.5; tarsus, 20.

⁹ Novitates Zoologicae, XIII, 1906, 383.

¹⁰ Bulletin British Ornithologists' Club, XXXVIII, 1917, 32.

¹¹ Field Museum Zoological Series, XVII, 1930, 256.

Subspecific characters.—Similar in general to *Columba subvinacea bogotensis* (von Berlepsch and Leverkühn) of the Andean region (Colombia to Bolivia), but upper parts, wings (above), and tail darker, more olivaceous, less brownish rufescent, and wings underneath less cinnamomeous.

Range.—The Amazon Valley, west (at least on the south) to the Rio Purús.

Remarks.—This is the *Columba purpureotincta* of Sneath, ¹² but not of Ridgway, 1888. Of the latter we have a perfectly typical specimen from eastern Venezuela, identified by Ridgway himself. From this form *recondita* differs in its somewhat larger size, darker-colored back, wings, and tail, and in having the wings underneath less decidedly cinnamomeous. In *recondita* the wings externally are mummy brown; in *bogotensis* they are raw umber to Brussels brown, while the upper parts in general correspond. The under parts are colored about the same in *purpureotincta*, *recondita*, and *bogotensis*. So far as color characters are concerned, there is a perfect gradation from *peninsularis* of northern Venezuela through *purpureotincta* to *recondita*. I believe all three should be regarded as conspecific. The present race has nothing to do with *C. plumbea*, with races of which it occurs together on the lower Amazon as well as on the Rio Purús. Specimens of *recondita* from the latter locality are a little larger and darker than those from the lower Amazon, but are not different enough to deserve a special name.

Thirteen specimens: Colonia do Mojuy, Santarem, Brazil, 1; Villa Braga, Rio Tapajóz, Brazil, 2; Obidos, Brazil, 3; Hyutanahan, Rio Purús, Brazil, 1; Nova Olinda, Rio Purús, Brazil, 3; Arimã, Rio Purús, Brazil, 3.

Columba subvinacea purpureotincta Ridgway.

Our single specimen (handled and identified by Ridgway himself) comes from a locality in Venezuela close to the Guiana frontier, and may be considered as typical. The form proves to be so exactly intermediate in its color characters between *peninsularis* on the one hand and the new form *recondita* on the other that the only course open is to consider all three conspecific. In size the present race is the smallest of the three.

Mr. Klages did not obtain this form in French Guiana, nor did Mr. George K. Cherrie. As already explained, its ascription to that country rests solely on an erroneous identification of Temminck's *Columba vinacea*. But in British Guiana it appears to be not uncommon.

One specimen: Rio Yuruan, Venezuela.

Columba subvinacea peninsularis Chapman.

This seems to be a small, pale race of *subvinacea*, as compared with *zuliae*. Our specimens may possibly be not entirely typical, and require comparison.

Three specimens: San Rafael (near Cumanacoa), Venezuela.

Columba subvinacea zuliae Cory.

Cory compared his new form with *berlepschi* instead of with *bogotensis*, to which it is more closely allied genetically and geographically. Since his

¹² Boletim Museu Goeldi, VIII, 1914, 62.

paper appeared earlier, he was not aware of Dr. Chapman's results at the time. I refer our specimens to *zulia* on geographical grounds, but the only characters I can find to separate them from *bogotensis* are their slightly darker general coloration and in particular their deeper cinnamon under wing-coverts and underside of the wings. They come from a locality in the Upper Tropical Zone.

Two specimens: Santa Lucia, Miranda, Venezuela.

Columba subvinacea bogotensis (von Berlepsch and Leverkühn).

Dr. Frank M. Champan¹³ has very clearly shown that this form is a race of *subvinacea* instead of *plumbea*, as originally described. I fully agree with his conclusions after a study of our series, although unfortunately I have no specimens of *berlepschi* for comparison, and only one of true *subvinacea*. Our Colombian specimens are all from the Subtropical Zone, while those from Bolivia are from the Tropical; notwithstanding which circumstance no racial differences are obvious.

Twelve specimens: Rio Surutu, Bolivia, 3; Rio Yapacani, Bolivia, 1; Buenavista, Bolivia, 3; Las Ventanas, Colombia, 5.

Columba subvinacea subvinacea (Lawrence).

This form closely resembles *C. nigrirostris*, from which it differs in its more purplish (instead of olive brown) upper parts and relatively longer tail. The underside of the wing is more decidedly and extensively cinnamon. In its range this is more a bird of the Subtropical Zone. The two forms are clearly different species.

One specimen: Ujuras de Terraba, Costa Rica.

I am unable to discuss *Columba subvinacea berlepschi* Hartert for lack of material.

Columba goodsoni Hartert.

Our specimens correspond closely to the original description, and illustrate as well Dr. Hellmayr's later comments.¹⁴ So far as I can see there is no ground for associating this form with any of its neighbors in a conspecific sense; the combination of characters it possesses entitles it to stand alone. It has the plumbeous head and breast of *C. plumbea* together with the rufescent wings of *C. subvinacea*, but is in no sense a connectant between these two.

Three specimens: Malagita, Chocó, Colombia.

Columba nigrirostris Sclater.

Costa Rican and British Honduras birds are the same in my opinion. Some of the latter, indeed, show a decided rusty brown tinge to the recrices below, which feature, however, seems to be purely individual and is carried to an extreme in the type of *C. nigrirostris brunneicauda* Carriker. The exact shade and intensity of coloration varies in birds from both countries.

¹³ Bulletin American Museum Natural History, XXXVI, 1917, 204.

¹⁴ Proceedings Zoological Society of London, 1911, 205.

Since this form is properly one of the Tropical Zone, its range impinges upon that of *C. subvinacea subvinacea* in Costa Rica only to a limited extent—despite Mr. Carriker's intimation. It is clearly a species distinct from *subvinacea*. It is also isolated geographically and by color characters from any of the South American forms of this group—valid reasons why it should continue to stand as a full species.

Ten specimens: Pozo Azul de Pirris, Costa Rica, 1; Guapiles, Costa Rica, 1; Boruca, Costa Rica, 1; El Hogar, Costa Rica, 1; Manatee Lagoon, British Honduras, 6.

Columba chiriquensis (Ridgway), the only remaining form of this group, I have not seen.

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A NEW RACE OF TINAMUS MAJOR FROM BRAZIL.

BY H. B. CONOVER.

During a recent investigation of the South American races of *Tinamus major* inhabiting the country east of the Andes, it has been discovered that specimens from eastern Brazil, south of the Amazon River, differ from all the other known races. This new race may be known as

Tinamus major olivascens, new subspecies.

Type.—From Tome-assu, Rio Acara, Para, Brazil; no. 11,410, adult male in the Conover Collection, Field Museum of Natural History, Chicago; collected December 6, 1933, by A. M. Olalla.

Characters.—Differs from all the other known races by the extreme olive green color of the upper parts, which are barred with rather coarse black cross-marks. The foreneck and chest decidedly grayish, rest of under parts strongly vermiculated, but many specimens have the vent white. The remiges are olivaceous, much less rufescent than in *serratus* or *ruficeps*, but not as much so when compared to *peruvianus*.

Description of type.—Top of the head bright rufous; throat white, sides of face rufescent; upper neck all around dirty buff, barred indistinctly with dusky; lower neck and mantle grayish olive green; rest of upper parts grayish olive green with practically no rufescent tinge and strongly barred with rather coarse black markings; upper tail coverts with a narrow rather obsolete bar of buff at the tips; lower foreneck and chest olive gray, with obsolete vermiculations; rest of under parts buffy white, heavily vermiculated with dark gray, these vermiculations becoming dusky bars on flanks; under tail coverts ochraceous buff, irregularly barred with dusky olive; primaries and secondaries brown, the latter with broad irregular bars of olivaceous brown; underwing coverts dark olive gray. Wing (flat) 230; culmen (exposed) 32; tarsus 60; middle toe (without claw) 30 mm.

Range.—Brazil south of the Amazon from the Rio Acara west to the Rio Purús and south to Matto Grosso.

Remarks.—Specimens from the Rio Acara, Rio Tapajos and the right bank of the Rio Purús are olive green above with practically no rufescent tinge. Some examples from the left bank of the Purús, however, tend

toward the coloration of *peruvianus* having more or less of a brownish shading to the upper parts, especially on the lower back and secondaries.

SPECIMENS EXAMINED.

Tinamus major major.—8: British Guiana (Georgetown, 1; Kamakusa, 1; Tumatumari, Potaro River, 1); French Guiana (Oyapock, Pied Saut, 1); Brazil (Lago Cuipeua, near Obidos, 1; Obidos, 2); Venezuela (Rio Yuruan, 1).

Tinamus major zuliensis.—13: Colombia, Santa Marta (Las Vegas, 1; Valparaiso, 1; La Tigarrera, 1; Puebla Viejo, 1); Venezuela (Rio Cogollo, Perija, Zulia, 1 (type); Upper Caura River, 2; Caura River, 1; Upper Orinoco, 1; Boca de Sina, Cunucunuma River, Upper Orinoco, 1; foot of Mt. Duida, 1; Boca del Rio Ocamo, Rio Orinoco, 2).

Tinamus major serratus.—10: Brazil (Rio Caure, 1; Manacapuru, 4; Paranei de Matintins, Lower Rio Ica, 1; Lago do Caroara, Lower Rio Ica, 1; Tatu, Rio Negro, 2; Tonantins, 1).

Tinamus major ruficeps.—12: Ecuador (Concepcion, 2; Tio Yaco, 1; Raya-Yaco, 2; Romos Urco, 1; Headwaters Rio Tigre, 1; San Jose, 1; Lagarto Yacu, 1; Raya Chigta, 1; Suno, 2).

Tinamus major peruvianus.—15: Peru (Urubamba, 2; Puerto Indiana, Rio Amazonas, 1; Pozuzo, 2; Chuchurras, Huanuco, 1); Bolivia (Rio Surutu, St. Cruz, 2; Buenavista, St. Cruz, 2); Brazil, Rio Jurua (Santo Antonio, 2; Igarape do Gordao, 1; Igarape Grande, 2).

Tinamus major olivascens.—16: Brazil (Canutama, Rio Purús, 4; Labrea, Rio Purús, 6; Hyutanahan, Rio Purús, 1; Nova Olinda, Rio Purús, 2; Boim, Rio Tapajos, 1; Villa Braga, Rio Tapajos, 1; Tome-assu, Rio Acara, 1).

I am indebted to Dr. C. E. Hellmayr for many notes and for help in working out the different races. My thanks also are due for loan of additional material to Mr. W. E. Clyde Todd of the Carnegie Museum and Mr. J. T. Zimmer of the American Museum of Natural History.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

A CORRECTION.

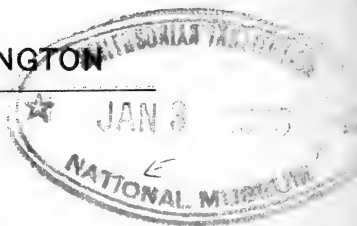
Through an inadvertent oversight on my part, the following paragraph was omitted from the description of *Microtus californicus halophilus*, Proc. Biol. Soc. Wash., vol. 50, p. 156, September 10, 1937:

Distribution.—In so far as known, co-extensive with the range of *Reithrodontomys megalotis distichlis*, as outlined above.

For the word *Distribution*.—, begining line three from the bottom of page 156, substitute *Diagnosis*.—

—JACK C. VON BLOEKER, JR.,
*Museum of Vertebrate Zoology, University of California,
Berkeley, California.*



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTONA NEW WOODPECKER OF THE GENUS PICULUS
FROM SONORA.

BY A. J. VAN ROSSEM AND THE MARQUESS HACHISUKA.

This genus of woodpeckers, widely distributed in the Neotropical Region, has previously been detected only as far north as southern Sinaloa (Plomosas and Mount Lisiarraga). The discovery that it reaches into the pine-oak regions in the mountains of southern Sonora definitely extends the limits northward of its range. In such an environment, van Rossem and Hannum found it present in the Sierra Madre foothills, where an intensive search finally produced three specimens,—two males and a female.

Specimens of the geographically nearest race, *auricularis* Salvin and Godman, and its probable synonym *godmani* Hargitt, seem to be rare in collections. However, thanks to the courtesy of the Bureau of Biological Survey, we have been able to examine one specimen from Xautipa, Guerrero, and three from Plomosas, Sinaloa. The three Sonora specimens are very different from any of these and we accordingly name the race as

***Piculus auricularis sonoriensis*, subsp. nov.**

Type.—Adult male, no. 31886, Dickey collection; Rancho Santa Barbara, 20 miles northeast of Guirocoba, southeastern Sonora, Mexico, June 8, 1937, altitude approximately 5000 feet; collected by A. J. van Rossem and Robert Hannum.

Subspecific characters.—Nearest to *Piculus auricularis auricularis* (Salvin and Godman) but general coloration gray tinged with green, instead of green slightly tinged with gray. Pileum and nape, "light neutral gray" to "gull gray"; upper back between nape and dorsum, prominently barred with grayish white; back gray, tinged with olive-green instead of green tinged with olive-gray.

Range.—Pine-oak association in the Sierra Madre foothills of south-

eastern Sonora and probably in the adjacent portions of Chihuahua and Sinaloa.

Remarks.—By the standards of fifty years ago or less, *sonoriensis* would have been described as a distinct species. Certainly the material at hand shows no intergradation but *sonoriensis* is so obviously a geographic representative of *auricularis* that we prefer to use a trinomial. For that matter it is not unlikely that all of the Mexican forms of the green woodpecker will eventually be classed as races of *Piculus rubiginosus* (Swainson).

The three specimens collected are the total take of this woodpecker in nearly two weeks' work in the type locality. The fact that Brewster's collectors, Frazar and McLeod, did not detect the species at all is further confirmation of the belief that it is very uncommon at this northern extreme of the species range.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTONA NORTHERN RACE OF *TITYRA SEMIFASCIATA*.

BY A. J. VAN ROSSEM AND THE MARQUESS HACHISUKA.

Continuation of our studies on birds of northwestern Mexico, particularly those recently collected by van Rossem and Hannum for the Dickey, Hachisuka, and Sheffler collections, has shown that northern extensions of many tropical species penetrate into southern Sonora. One of these is a race of the cotinga, *Tityra semifasciata*, which here reaches its northern species limit. Although only two specimens, a breeding pair, were collected they are so different from the race, *griseiceps* Ridgway, of southern Sinaloa and southward that we believe they are entitled to a distinctive name. This we provide as

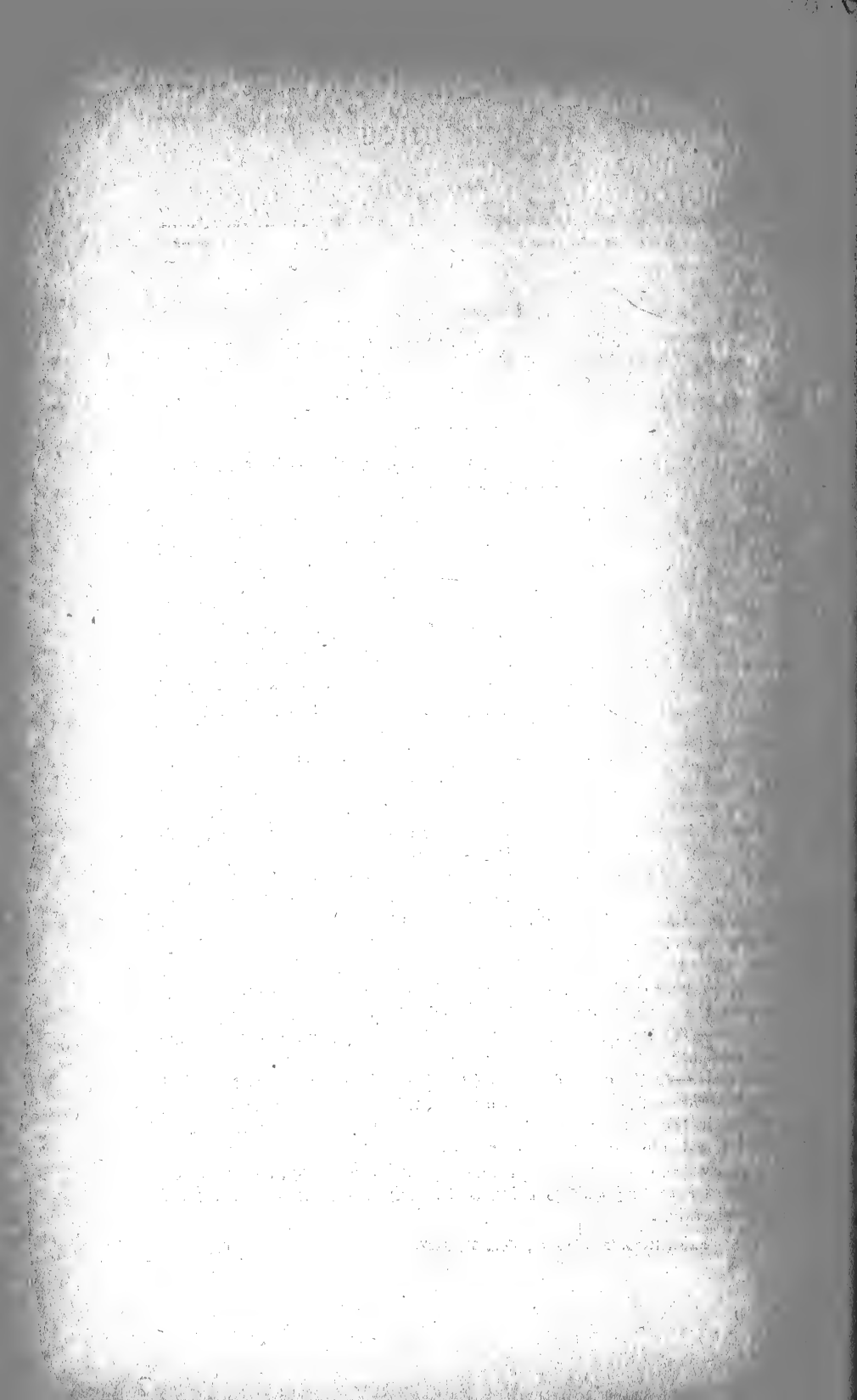
***Tityra semifasciata hannumi*, subsp. nov.**

Type.—Breeding male adult, No. 31885, Dickey collection; San Francisco Cañon on the Sonora-Sinaloa boundary line in extreme southeastern Sonora, altitude, 2000 feet in the Arid Tropical Zone; June 29, 1937; collected by A. J. van Rossem and Robert Hannum.

Subspecific characters.—Similar to *Tityra semifasciata griseiceps* Ridgway but under parts every where paler; both sexes with throat white instead of pale gray; male with posterior half of auriculars pure white and with a narrow white interval between the black of the pileum and the gray of the hindneck; black of pileum extending backward to a line even with the posterior corner of the eye; female with the auriculars paler,—these blending with the white of the throat instead of being concolor with the pileum.

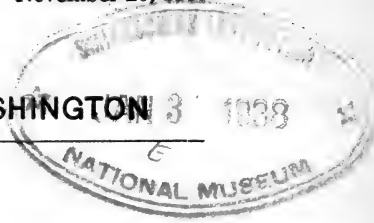
Range.—The Arid Tropical Zone in southeastern Sonora and northeastern Sinaloa.

Remarks.—In the series of the various Pacific Coast races at hand, that is of *costaricensis*, *personata*, *griseiceps*, and the two specimens of *hannumi*, there is, in the males, a gradually increasing darkness in the general tone of the dorsal coloration and an increasing width of the black frontal band. In the females, however, there is increasing pallor northerly, the transition from *personata* to *griseiceps* being particularly abrupt in the matter of head coloration.



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PROCEEDINGS
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A RACE OF VERREAUX'S DOVE FROM SONORA.
BY A. J. VAN ROSSEM AND THE MARQUESS HACHISUKA.

Some years ago Bangs and Penard (Proc. New England Zool. Club 8, 922, p. 29) redescribed, or rather renamed, the northern race of the "white-fronted" dove as *Leptotila fulvi-ventris angelica* and included Sonora in the range on the basis of 21 Frazar specimens from Alamos and Hacienda de San Rafael. Until recently the present writers had also considered, tentatively, that Sonora specimens of this dove were *angelica*, chiefly because they had available only the old Frazar specimens and a single recent skin from San Javier. New specimens recently collected by van Rossem and Hannum in the Arid Tropical Zone of southeastern Sonora show that this extremely "plastic" dove (Peters, Birds of the World, 3, 1937, pp. 122-124, recognizes 14 races) has a definable race in northwestern Mexico. The characters of this race are summarized below and we name it as

Leptotila verreauxi santiago, subsp. nov.¹

Type.—Male adult, no. 31887 Dickey collection; Guirocoba, southeastern Sonora, Mexico, May 23, 1937; collected by A. J. van Rossem and Robert Hannum.

Subspecific characters.—Most nearly like *Leptotila verreauxi angelica* of the Lower Rio Grande Valley and northeastern Mexico in the virtual elimination of the rufous areas on the inner webs of the primaries, but dorsal coloration duller and more ashy (less brownish) and with the iridescence of nape and hindneck less pronounced in intensity as well as in area; size definitely smaller.

Range.—The Arid Tropical Zone of southeastern Sonora and probably adjacent portions of the Pacific slope of neighboring States.

¹ Named for Jim (i. e. "Don Santiago") McCarty, the late owner of Rancho Guirocoba, and friend of every naturalist who has worked in southeastern Sonora in recent years. It is safe to say that without the assistance of Mr. McCarty much of the territory of southeastern Sonora, northeastern Sinaloa, and southwestern Chihuahua would be zoologically unexplored territory to-day.

Remarks.—Ridgway's measurements (in Vol. 7 of Bds. of Nor. and Mid. Amer., 1916, p. 454) show the smaller size of northwestern Mexico specimens, and on this basis it is not illogical to predict that *santiago* will be found to range over northwestern Mexico south to Nayarit.

In the present instance, just as in the past, we are indebted to Mr. J. L. Peters of the Museum of Comparative Zoölogy for the loan of personally selected material, designed to illustrate the maximum variation to which specimens from a given area are subject.

MEASUREMENTS OF ADULT MALES.

	WING	TAIL
15 <i>santiago</i> from Sonora.....	142 - 152	103 - 107
10 <i>angelica</i> from Texas		
and Tamaulipas.....	148 - 160	109 - 118

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTONNEW RACES OF MYADESTES, SPIZELLA AND
TURDUS FROM NORTHWESTERN MEXICO.BY ROBERT T. MOORE,
California Institute of Technology.

Among the specimens of birds from Sinaloa, collected by Chester C. Lamb, are appearing successively, new forms which must be credited to his indefatigable energy. They are described below.

My acknowledgments are gratefully made to Mr. George Willett and the Los Angeles Museum, to Dr. Louis B. Bishop, to Mr. James L. Peters and the Museum of Comparative Zoology, to Dr. Herbert Friedmann and the Smithsonian Institution, and to Dr. Oberholser and the Biological Survey, for the loan of extremely important comparative material for all three of the forms described below.

***Myadestes townsendi calophonus*, subsp. nov.**

DUSKY SOLITAIRE.

Type.—Female adult in breeding condition, nesting; number 18452, collection of Robert T. Moore; upper end of Trogon Valley, within 1000 feet of summit of Mt. Mohinora, southwest Chihuahua, Mexico; May 18, 1937; altitude 10,400 feet; collected by Robert T. Moore.

Subspecific characters.—Differs from *Myadestes townsendi townsendi* (Audubon) in being darker above and below; pileum darker, not uniform with back; Ochraceous-buff¹ band across surface of remiges richer in color both above and below; the underparts uniformly dark in coloration, not paler on chin, throat and abdomen; throat and breast tinged with olive, at least in summer plumage.

Our fresh series of seventeen specimens, chiefly males, from three localities in southwestern Chihuahua and Durango contrast sharply with a series of *M. t. townsendi* from near the type locality in Oregon and from Idaho. Colorado and New Mexico individuals are intermediate in coloration.

¹ Names of colors in this paper, when capitalized, are taken from Ridgway's "Color Standards and Color Nomenclature," 1912.

tion; Arizona birds nearer *townsendi*. An M. C. Z. ♂ (No. 89786 Mar. 20) from Newcastle, Col., is so much darker than any other winter specimens that it may represent melanism. Un-worn May and much-worn July-August *calophonus* show the pileum much darker than *townsendi* of same stage of wear. The auricular region tends to be darker and sharply defined. The May Type of *calophonus*, when compared with two May individuals from Idaho and Montana in the Bishop Collection, also reveals all the characters mentioned above, an even greater contrast in coloration, and like many of the males, a distinct blackish spot in front of the eye as contrasted with the gray of *townsendi*.

Range.—Breeds from the lower border of the Canadian Life Zone² on Mt. Mohinora, southwestern Chihuahua, down through the Transition Zone to about 6000 feet and south to Muertocito, Durango, and probably as far north as Pinos Altos, Chihuahua, where Frazar took six specimens in June and July.

Specimens examined.—*Calophonus*, S. W. Chihuahua, 4♂ 1♀ (Type) east side of Mt. Mohinora (above 10,000 feet), 10♂ Laguna Juanota, 4♂ 1♀ 1 juv. Pinos Altos, 1♀ 1(?) N. Chihuahua; Durango, 2♂ Muertocito, 1♀ Cienago de las Vacas. *Townsendi*, Oregon, 1♀ Columbia River-Astoria (Type), 1♂ 1♀ Prineville, 1♂ Ironsides, 1♂ Ft. Klamath, 1(?) Crooked River; Washington, 1♂ Puyallup; Brit. Col., 2♂ 1♀ Chilliwack, 1♂ Revelstoke; California, 1♂ Modoc County, 1♀ Stony Ford; 1♀ Placerito Cañon, 1♂ Nicasio, 1♀ Kern Riv. Canyon, 1♂ 1♀ Vade, 2♂ 1♀ Mt. Tallac, 1♂ Snow Mt., 1♀ Fyffe, 1♂ Silver Creek, 1♂ Placerville, 4♂ 2♀ Echo, 1(?) Rand, 1(?) Volcano Mines, 1(?) Big Trees, 1(?) Calaveras Riv., 1(?) Ft. Crook; Idaho, 3♂ 2♀ Coeur d'Alene; Montana, 1♀ Miles City; Wyoming, 1♂ Bear Lodge; Colorado, 5♂ 6♀ Colorado Springs, 2♂ 1♀ S. Fork San Miguel, 1♂ 1♀ Buena Vista Co., 2♂ Ouzel Lake, 1♂ 1♀ Cochitop Pass, 1♂ 1♀ Newcastle, 2♂ Placerville, 1♀ Park Co., 1♀ Larimer Co., 1(?) Elk Creek, 3 "Colorado"; Arizona, 2♀ Chiricahua Mts., 1♀ Huachuca Mts., 1♀ Santa Rita Mts., 1♂ Pinal Co., 3♀ Palmerlee, 3♀ Mineral Creek, 4♂ 3♀ Ft. Verde, 2♂ 1♀ Catalina Mills, 1♂ 1♀ Catalina Mts., 2♂ Cataract Creek, 1(?) Whipple Barracks; New Mexico, 1♂ Santa Fe, 1♀ Ft. Bayard, 1♂ Grant Co., 1♀ Silver City, 1(?) Cantonment Beywyn; Texas 1♂ Gracano, 1♀ Mecas.

Remarks.—Ridgway (Birds of N. & M. America, Part IV, p. 164, footnote) calls attention to the difference in coloration of Mexican specimens as compared with those in the United States. Apparently he had few, if any, taken in the breeding months, and the small size of his series seems to have thwarted the description of a new form. All of our five individuals from Mt. Mohinora are breeding birds, taken the latter part of May (the Type with large eggs in the oviduct); the two June males from Muertocito, Durango, have the breeding organs greatly enlarged and a July male and female from Laguna Juanota are also breeding. From the condition of the sex organs of our earliest taken males, I am doubtful if the bird breeds in the month of April,

² By a lapsus the term, "Temperate Zone," was used when referring to Mt. Mohinora, in the author's paper (Proc. Biol. Soc. Wash., vol. 50, July 23, 1937, p. 100).

at least at high altitudes. At our camp at 10,000 feet on Mt. Mohinora at the breeding level of the Solitaire, an inch and a half of snow fell on May 11th. The late March bird reported by Miller from Cienega de las Vacas, Durango, the April bird from Coahuila mentioned by Ridgway (Birds of N. & M. America, Part IV, p. 164) and the Jalisco bird, cited by Salvin & Godman (Ibis, 1889, p. 381) may have been migrants. The Type of *townsendi* is so badly faded that the true characters can be ascertained only from fresher specimens.

***Spizella passerina atremaeus*, subsp. nov.**

BLACK-STRIPED CHIPPING SPARROW.

Type.—Adult male in full breeding condition; number 18,596, collection of Robert T. Moore; Los Frailes, Chihuahua, Mexico, near Durango-Chihuahua state line, 10 miles east of Sinaloa state line; June 23, 1937; collected by Chester C. Lamb.

Subspecific characters.—Nearest to *Spizella passerina arizonae* Coues, but breeding plumage darker above, the dark streaks blacker and much wider, rectrices and lesser wing coverts blacker; breast darker gray, sharply contrasted with the white throat. Differs from the Type of *Spizella passerina mexicana* Nelson in having buffy chestnut borders to feathers of the back; pale buff instead of bright cinnamon; breast decidedly grayer, without buff, and lower underparts much less buffy.

In the winter plumage the upper parts of the northern races differ in much the same way, but the gray of the breast, throat and flanks of *atremaeus* are considerably overlaid with buffy, being closer in this character to *mexicana* than to *arizonae*. The young of the new form with streaked breasts are distinctly darker above, especially blacker on the head and slightly more heavily streaked below. An August young bird from Ojito, Durango, is much more lightly and faintly streaked below.

Range.—Breeds in the Transition Zone of the high mountains of eastern Sinaloa, northwestern Durango and extreme southwestern Chihuahua from an altitude of 5400 feet to about 8000 feet. It seems to winter in the same region, at least as high as 6400 feet at Babizos, Sinaloa.

The northern limit of the range seems to reach about latitude 26° in northeastern Sinaloa at Suratato and Babizos and extends southward at least to Rancho Batel in southeastern Sinaloa near latitude 23°. The birds of extreme northeastern Sinaloa and southeastern Sonora, from Santa Gertrudis to Guirocoba, are intergrades with *S. p. arizonae* and rather closer to *arizonae*. The Frazer-collected series from Pinos Altos, Chihuahua, is closer to *arizonae*, but slightly buffier below. Taken in the same months, they are more uniform below and streaking narrower above than *atremaeus*. The birds of Central Mexico are extremely buffy below, but their status can not be determined at present. A large series from Laguna Juanota, southern Chihuahua, and Ojito, extreme northern Durango, strongly resemble *atremaeus*, although showing individual variability. Many fully adult July birds from this region have much lighter pileums than any of the three races mentioned above. I have not seen the series from central and northern Durango which Miller reported to "agree in

coloration with Arizona birds," so I do not know if these resemble specimens from Laguna Juanota.

Specimens examined.—*Arizonae*, Arizona, 1 (?) Ft. Whipple, 1 ♂ 1 ♀ Sunnyside, 2 (?) Presnal, 1 ♂ 1 ♀ Fort Lowell, 1 ♂ Paradise, 2 ♂ Ft. Huachica, 1 ♂ Chiracahua Mts., 2 ♂ Palmerlee, 3 ♂ 1 ♀ Russelville, many immatures; New Mexico 1 ♂ Reserve, 1 ♂ Silver City, 1 ♂ Ancho; California, 1 juv. Humbolt Co., 1 ♂ San Antonio Canyon; Idaho, 2 ♀ juv. Coeur d'Alene; Oregon, 1 juv. ♂ Rogue River, 145 specs. in M. C. Z. from British Columbia to Texas; S. E. Sonora, 4 ♂ 1 ♀ Guirocoba, 1 ♂ Camoa; 1 ♂ Guirojaqui; Sinaloa, 3 ♂ 5 ♀ Huassa, 1 ♂ 4 ♀ El Orito, 1 ♂ Santa Gertrudis; Chihuahua, 9 ♂ 8 ♀ "Chihuahua," 2 ♀ Mina Abundancia, 1 ♂ Durazno, 1 ♂ Pachaco, 4 ♂ 4 ♀ Pinos Altos, 1 ♂ Vasagota. *Atremaeus*, Sinaloa, 6 ♂ 1 ♀ Los Frailes, 5 ♂ 3 juv. ♂ Surutato, 3 ♂ 2 ♀ 1 juv. ♀ Babizos, 5 ♂ 2 ♀ Rancho Batel. Probably intergrades: Chihuahua, 6 ♂ 4 ♀ Laguna Juanota; Durango, 6 ♂ 5 ♂ Ojito. *Mexicana*, Chiapas, 1 San Cristobal (type); Guatemala 1 ♂ Momostenango; Daraca, 3 ♂ Chivela, Guerrero, 1 ♂ 3 ♀ Tazco, 1 ♂ Tehuantepec, Morelos, 2 ♂ 1 ♀ Ocotetpec; Mexico, 3 ♀ 1 ♂ Temascaltepec, 1 ♂ near Mexico City, 1 ♂ Desierto de Leones, 2 ♂ Contreras; Michoacan, 2 ♀ Uruapan; "Agnas calientes" 1 ♂ 1 ♀.

Remarks.—The new race is clearly not an intergrade between *arizonae* and *mexicana*, because its upper parts are very much blacker than either. Adequate series of all the races in exactly comparable material, both for the breeding birds of each month, showing the same amount of wear, and for specimens in winter plumage must be assembled for satisfactory comparison. The characters of the upper parts can be judged better in June and July breeding specimens, when the softer margins of the feathers do not obscure the black streaking.

In this new race we have again, as in so many of the mountain birds of Sinaloa, a form that reaches its maximum characters in the heavy rainfall area of the western slope of the Sierra Madre. It seems increasingly evident that the meteorological conditions affect many species.

***Turdus assimilis calliphthongus*, subsp. nov.**

PALLID MEXICAN THRUSH.

Type.—Male adult in breeding plumage; number 8205, collection of Robert T. Moore; Baromicon, Sonora, Mexico, near Sonora-Chihuahua boundary line, east of Guirocoba, Sonora; May 16, 1933; altitude about 3000 feet; collected by Robert T. Moore.

Subspecific characters.—Nearest to *T. a. renominatus* Miller & Griscom, of southeast Sinaloa, but birds of breeding season with breast, sides and flanks Drab, instead of Buffy Brown or Isabella Color; upper parts Drab, but with a very faint olive tinge instead of light Brownish Olive to Sepia; axillars and under wing coverts Pinkish Buff instead of Cinnamon-Buff; white of abdomen more extensive; light area immediately below streaks on throat whiter and more extensive.

The winter plumage of both races shows the same differences in characters, but is proportionately darker.

Range.—Barrancas of the western slope of the main Sierra Madre of southeastern Sonora and extreme northeastern Sinaloa, breeding from approximately 2500 to 5500 feet.

Two males and one female secured by Mr. Lamb at San Jose, Chihuahua, 20 miles northeast of Choix, Sinaloa, seem to be true *calliphthongus*, but a series of nine specimens, taken by Mr. Lamb at Babizoa, Sinaloa, and an adult male and one immature female from San Feliz, Chihuahua, both localities approximately 75 miles due south of San Jose, are intergrades between *calliphthongus* and *renominatus*, most of the specimens being much closer to the latter.

Specimens examined.—*Calliphthongus*, S. E. Sonora, 3 ♂ 1 ♀ Baromicon, 1 ♀ San Rafael, 2 ♀ "Hacienda de San Rafael," 1 ♂ 1 ♀ Guirojaqui; N. E. Sinaloa, 1 ♀ Rosario, 1 ♂ 1 ♀ Huassa, 1 ♂ San Francisco Canyon; Chihuahua, 2 ♂ San Jose. *Renominatus*, Sinaloa, 1 ♂ 3 ♀ Rancho Santa Barbara, 20 miles northeast of Rosario³, 1 ♀ Palos Verdes Mine near Santa Lucia, 3 ♂ 4 ♀ Rancho Picacho, 15 miles east of Cacalotan, 6 ♂ 1 ♀ 1 juv. ♀ Babizos; Chihuahua, 1 ad. ♂ 1 im. ♀ San Feliz, near Chihuahua-Sinaloa state line; Nayarit, 1 ♀ Rio Los Canas, in extreme northwestern Nayarit, 1 ♀ Tepic; Colima, 1 ♂ Plains of Colima; Guerrero, 1 ♂, 2 ♀ Chilpancingo, 5 ♂ 1 ♀ Omilteme; Mexico, 4 ♂ Temascaltepec. *Assimilis*, Vera Cruz, 1 ♂ 4 ♀ 2 (?) Orizaba, 1 ♂ 1 ♀ 2 (?) Perote Mts., Jalapa, 1 ♂ Tlacotalpan.

Remarks.—The author's notes made on Sept. 19, 1933, in the Museum of Comparative Zoology, Cambridge, indicated his conviction that the birds of southeastern Sonora constitute a new race, the palest of all the races of *assimilis*. Publication was held in abeyance until a thoroughly adequate topotypical series could be secured of *renominatus* from the mountains of southeastern Sinaloa. The delay proved to be wise for in the year 1934 three series of fresh specimens were taken, not only of *calliphthongus*, but also of *renominatus* from close to the type locality in southeastern Sinaloa, and of specimens which were then presumed to be true *assimilis*, from Temascaltepec, state of Mexico. In a species, which is noted for its post-mortem change, it was imperatively necessary to compare series taken in the same year and months from these three widely separated localities. Apparently no student has had this opportunity before. Furthermore, we have both winter and summer birds taken in the same year. Comparison proved that June and July birds from Temascaltepec are almost identical both in coloration and size with June, July and August birds of *renominatus* from southern and central Sinaloa, but the birds of southeastern Sonora represent a much paler extreme. I am inclined to believe that the range of *renominatus* extends at least to the western portion of the state of Mexico. Juveniles of the two races at the same stage of development are almost identical. It is futile to attempt to compare the fresh breeding birds from Temascaltepec with the ancient specimens from Vera Cruz, nor do I believe it possible to determine the exact relationship unless new specimens are obtained in the same year and the same months.

³ There are two places called Rosario, one in N. E. Sinaloa and one in southern Sinaloa.

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A NEW INDIAN PAINT-BRUSH FROM
MOUNT RAINIER.

BY FRANCIS W. PENNELL AND GEORGE NEVILLE JONES.

With thousands of persons visiting its cool heights every year one would suppose that the flowering plants occurring on Mount Rainier or indeed throughout the whole area of the surrounding National Park would now be fully known to science. Ten years ago the senior author thought that whatever still awaited description would prove to be inconspicuous species or else members of genera of unusual taxonomic difficulty. It was in August, 1927, that this complacency was roughly shaken when Mr. F. A. Warren sent him a striking and beautiful *Pedicularis* which proved to occur widely over the Park, and this past summer the senior author was surprised to note the frequency and showiness of *P. rainierensis* Pennell & Warren¹ near Yakima Park, on the northern side of Mount Rainier. Here, on August 3, 1937, there was seen yet another member of the Scrophulariaceae, which, like the *Pedicularis*, has remained undetected, and which also seems likely to prove a locally frequent endemic of this mountain area.

On the previous evening, during an inspection of the small herbarium assembled at the Yakima Park headquarters, the naturalist, Mr. Edward Young Danner, called attention to this odd *Castilleja*, so different from the showy members of its genus on Mount Rainier, and the next day he guided the senior author to it in the meadow below Yakima Park in the direction of Mount Rainier itself. There, by a brook and half hidden by the grasses of an alpine meadow, grew this obscure Indian Paint-Brush. No wonder it has escaped collection! The

¹ Bull. Torrey Bot. Club 55 : 317. 1928.

corollas stay hidden within the pale yellow calyces, and the latter are shorter than the green or dull vinaceous-brown leafy bracts—one might be excused for supposing that here was some plant as yet only in bud. But inspection of the flowers showed that this *Castilleja* was in full blossom, and one detail seemed especially significant. In contrast to the usual condition of this genus the stigma was not extruded, but remained hidden within the calyx in such a position as to make it seem wholly probable that the setting of seed is by habitual self-pollination.

On reaching Seattle the senior author was again confronted with specimens of the same species, this time by the junior author, who has had a longer and more intimate acquaintance with the plant. He had first found it in the fruiting condition at Owyhigh Lakes, in September, 1936. In August, 1937, abundant flowering material was collected in Berkeley Park.

The following description has been prepared jointly. Foliage and flowering features have been checked carefully against the type specimens gathered at Yakima Park this summer, but fruiting data have been derived from specimens in the junior author's collection in Seattle.

***Castilleja cryptantha* Pennell & G. N. Jones, sp. nov.**

Perennial. Stems erect, tufted, slender, simple, 1–1.5 dm. tall, hirsute-pubescent throughout. Leaves linear-lanceolate, acuminate, 2–3 cm. long, hirsute-pubescent on both surfaces, the lowermost entire, the upper with a single pair of slender linear lobes. Bracts similar but slightly smaller, green or dull vinaceous-brown, 3-cleft, longer than the flowers. Spikes 3–8 cm. long. Calyx pilose-hirsute, 15 mm. long, about equally cleft medianly for the distal third of its length, the lateral segments slightly toothed at apex (actually, the sepals united medianly about two-thirds their length and laterally nearly to apex), the lobes only about 0.5 mm. long; calyx proximally greenish-yellow, distally "picric yellow" to "pale lemon-yellow" (Ridgway). Corolla 15 mm. long, about equaling and wholly included within the calyx; tube about 10 mm. long, loosely hirsute; galea 4–5 mm. long, puberulent, its narrow tip projecting or slightly decurved; lower lip 2–3 mm. long, proximally slightly inflated and with 3 green ridges which distally pass into the pale or white lobes. Anthers 1.5 mm. long, glabrous. Stigma included within the galea. Capsule 6–7 mm. long, ellipsoid, apiculate. Seeds 1.5 mm. long, ovoid, foveolate.

Perennis; caulis erectus gracilis simplex hirsuto-pubescentis 1–1.5 dm. altus; folia hirsuto-pubescentia lineari-lanceolata acuminata 2–3 cm. longa, infima integra, superiora trifida; bracteae virides trifidae calycem excedentes; calyx piloso-hirsutus 15 mm. longus in duas partes laterales aequaliter vel subaequaliter fissus, lobis ultimis flavis ca. 0.5 mm. discretis;

corolla 15 mm. longa inclusa, galea 4-5 mm. longa, labio inferiore 2-3 mm longo; stigma inclusum; capsula 6-7 mm. longa apice apiculata; semina 1.5 mm. longa, testa membranacea profunde foveolata.

Type.—Grassy meadow, at an altitude of 6300 to 6400 feet (1900 meters), Yakima Park, Mount Rainier National Park, Washington, collected in flower August 3, 1937, by F. W. Pennell & E. Y. Danner, no. 21173; in Herb. Academy of Natural Sciences of Philadelphia, isotype in Herb. University of Washington at Seattle.

Additional collections seen.—Wet meadow near Mystic Lake, alt. 5700 feet, July 17, 1928 (flower), *F. A. Warren*; Grand Park, alt. 5500 feet, July 6, 1934 (flower), *Charles Landes*; subalpine meadow, alt. 5200 feet, Owyhigh Lakes, September 12, 1936 (fruit), *G. N. Jones* 9667; Berkeley Park, August 24, 1937 (flower), *G. N. Jones* 10494. These specimens are in the Herbarium of the University of Washington at Seattle.

These records show that the species is locally frequent in subalpine meadows on the northern side of Mount Rainier, that it flowers in July and August and fruits in September.

The relationship of this peculiar Indian Paint-Brush is not as yet established, but its most obvious resemblance is to *Castilleja indecora* Piper,² an endemic species of the Wallowa Mountains of northeastern Oregon. The following distinctions between them appear to exist:

- Corolla 20 mm. long, the lower lip about one-third the length of the galea, the tip of the latter barely extruded beyond the calyx; stigma extruded; calyx cleft more deeply on anterior side; bracts yellowish at tip; leaves all entire, sparsely pubescent.....*C. indecora*.
- Corolla 15 mm. long, the lower lip about two-thirds the length of the galea, the tip of the latter as well as the stigma included within the calyx; calyx cleft equally anteriorly and posteriorly; bracts green or dull vinaceous throughout; leaves, except the lowermost, trifid, hirsute-pubescent.....*C. cryptantha*.

² Proc. Biol. Soc. Washington 31 : 76. 1918.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

EXTINCT CHOUGH FROM RODRIGUEZ.

BY THE MARQUESS HACHISUKA, PH. D., SC. D.

The anonymous author of "R elation de l' le Rodrigue," written in 1760, and preserved in Paris, gives the following description, freely translated into English:—"A little bird is found which is not very common, for it is not found on the mainland. One sees it on the *islet au M at*, which is to the south of the main island, and I believe it keeps to that islet on account of the birds of prey which are on the mainland, as also to feed with more facility on the eggs of the fishing birds which feed there, for they feed on nothing else but eggs or some turtles dead of hunger, which they well know how to tear out of their shells. These birds are a little larger than a black-bird, and have white plumage, part of the wings and tail black, the beak yellow as well as the feet, and make a wonderful warbling. I say a warbling, since they have many and altogether different notes. We brought up some with cooked meat, cut up very small, which they eat in preference to seeds."

Prof. Newton, in *Proc. Zool. Soc.*, p. 41, 1875, says "I am at a loss to conjecture what these birds were unless possibly some form allied to *Fregilupus*," but obviously this can not be so because this Starling is confined to R union and all the authors who mentioned this bird are struck by its peculiar crest, which caused its confusion with Hoopoe, *Upupa*. So far it was believed that Rodriguez had its representative Starling in two species of *Necropsar*. We know definitely that the "little bird" of the anonymous writer has a carnivorous habit and it is impossible to place it among the Starlings, while we know that *Fregilupus*, in captivity, lived on bananas, potatoes, cabbages, and the like.

In 1879, G unther and Newton described *Necropsar rodericanus* in *Philos. Trans.*, vol. 168, pp. 4-7, from the osseous specimens collected by the Rev. H. H. Slater. They thought that their bird was the same as the "little bird" of the anonymous author, but it can not be so because *Necrop-*

was entirely frugivorous and not omnivorous; its bill shows clearly that it was not an implement to tear out the flesh of dead turtles. Lord Rothschild repeated the same mistake in his "Extinct Birds" by accepting Günther and Newton's view, reconstructing the bird in color. *Necropsar rodericanus* is only known from fragmentary remains of the skeleton, and its coloration is not known, therefore the "little bird" of the anonymous author still remains unidentified.

This bird can not be very well referred to the birds of prey because the author states, "on account of the birds of prey which are on the mainland." What would be the bird to fit into this description after both Starlings and the birds of prey are excluded? It must be a bird that has the carrion habit, and is an enemy of the hawks. This would seem to point to the crow-tribe, and more specifically to the habits of the Yellow-billed Chough, *Pyrrhonorax graculus*. This bird is found in the mountains of Europe and Asia, as well as Morocco, but often along the coast, where it is rocky. It is as a rule common in certain localities and has a very striking note which can be heard from a great distance; it circles high in the air in large flocks. In the Himalayas it is as familiar and noisy in the neighborhood of villages and camping grounds as the Common House Crow in India. Its food is similar to that of the crows, and the passage, "cooked meat, cut up very small which they eat in preference to seeds," describes its diet very clearly. They must have been the habitual raiders of the turtles as well as the eggs of birds laid on the ground. We already know that a Flightless Blue Land Rail, *Erythromachus leguati*, also found in Rodriguez, ate nothing but land tortoises' eggs and was known to become extremely fat.

We have come to the point of examining the plumage of the bird. Genus *Pyrrhonorax* is entirely black; one species has a yellow bill and another red, but neither has white plumage on any part of the body. Therefore the description, "little larger than a blackbird" can not fit into any known member of *Pyrrhonorax* as they are considerably larger than blackbirds. In Australia, we have a small crow, *Cocorax melanorhamphus*, sometimes called the White-winged Chough. Its bi-colored plumage makes me think of the Rodriguez bird but the Australian bird has more arboreal habits and is not seen near the coast or on rocky islands. Among the Family *Corvidæ* found from the Indian region, I can not think of any small member close to this except a desert inhabiting *Podoces*, which is found from Turkestan as far as northern Tibet. Its plumage matches extremely well with the sand, and the habit is entirely terrestrial and not arboreal. In the classification, *Pyrrhonorax* and *Podoces* are placed next to each other.

We have enough material, in my opinion, to suppose that the Rodriguez bird must be an aberrant small member of the crow-tribe, and I conclude that it must have been an aberrant Chough.

Therefore I propose to call it

TESTUDOPHAGA, gen. nov.

The present bird forms one of the smallest groups in the *Corvidæ* or crow family. It is a little larger than a blackbird; color of the plumage white;

portion of the wing and tail black; the genus is confined to Rodriguez. The genotype and only included species is

***Testudophaga bicolor*, sp. nov.**

THE BI-COLORED CHOUGH.

The present Chough resembles the Yellow-billed Chough, *Pyrrhocorax graculus* by having the beak and feet yellow; the plumage is entirely white except the portion of the wing and tail, which is black. It was observed only by the anonymous author, one of the two contemporary visitors to the island. The species was very tame and had no fear of man. When the food supply, chiefly dead turtles and eggs of birds, became scarce, this bird became extinct and we have not heard of it since 1760.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW RACE OF *PEROMYSCUS MANICULATUS*
FROM BRITISH COLUMBIA.

BY IAN McTAGGART COWAN.

Field work during the summer of 1937 in the Selkirk Range of British Columbia resulted in the discovery of a population of mice of the genus *Peromyscus* differing so markedly from all geographically contiguous populations as to be at once recognizable as distinct. As there is apparently no name available for this alpine race of deer mouse I propose that it shall be known as

Peromyscus maniculatus alpinus (subsp. nov.).

SELKIRK DEER MOUSE.

Type.—Male adult, skin and skull, No. 2266, British Columbia Provincial Museum; taken July 4, 1937, by I. McT. Cowan at 6000 feet altitude on Mount Revelstoke, 19 miles N. E. of Revelstoke, British Columbia. Original number 1013.

Range.—Taken at several localities in Mount Revelstoke Park in a westerly spur of the Selkirk Range. Probably widely distributed in this mountain range and extending its influence onto the western slope of the Rocky Mountains north at least to Yellowhead Pass.

Diagnosis.—A brightly colored mouse with head and body same size as in *artemisiae* but hind foot larger, tail much longer; and skull smaller.

Measurements.—Averages of 10 fully adult individuals of both sexes: Total length 185 mm. (168-196); tail 96 (86-106); hind foot 21 (20-22). Averages of 15 sexually mature sub-adults 186 mm. (168-202); tail 96 (86-108); hind foot 21 (20-22).

Color.—Adults in fresh summer pelage (July specimens): Similar in general to *artemisiae* but darker and more richly colored; upperparts in general tone varying from between Sayal Brown and Verona Brown to between Tawny Olive and Wood Brown (capitalized color terms are of Ridgway, Color Standards and Color Nomenclature, 1912), brightest on sides, dullest mid-dorsally and acquiring a grayish cast on top of head; dusky dorsal area generally well defined; usually a pronounced dusky

orbital ring and spot at base of whiskers; ears dusky, edged with white; fore and hind feet white; fore legs dusky to wrists, hind legs with color of dorsum extending to just below ankle; tail dusky brownish above, white below; underparts white. Adolescent pelage averaging much darker than in *artemisiae* but occasional individuals of the two races are indistinguishable; ground color between Buffy Brown and Drab with a varying intermixture of dusky hairs; mid-dorsal area dark and clearly defined; eye ring and whisker spot large and dark, generally confluent, rather than generally absent as in *artemisiae*; underparts dusky white. Juvenal, general effect of upperparts Deep Mouse Gray, more brownish on lower sides and on head; darker mid-dorsally.

Comparisons.—In as much as the area occupied by *alpinus* is seemingly surrounded by territory occupied by *artemisiae* detailed comparison need only be made with that race. Apart from color differences indicated above, *alpinus* differs from *artemisiae* and from *borealis*, the only other race with approximately contiguous range, in the slightly larger hind foot, and much longer tail—in 25 adults and adolescents averaging 108% of length of head and body as opposed to 83% in toptypical *artemisiae* and 80% in *borealis*. This increased length of tail is not accompanied by increased body size, and is therefore not explainable as a result of heterogony. Cranially *alpinus* differs from *artemisiae* in having skull shorter and narrower, with shorter nasals; interorbital constriction relatively but not actually greater, 17% rather than 15% of greatest length; interparietal and anterior palatine foramina averaging somewhat larger in both dimensions; interpterygoid fossa generally wider, averaging 30% wider in the series measured for comparison; foramen magnum larger.

Remarks.—Osgood (North American Fauna No. 28) comments in several places (Op. cit. pp. 50, 53 & 60) upon the longer tailed mice occurring in the general region now found to be occupied by *alpinus*, but in as much as most of the material available at that time came from areas of intergradation between the new race and *artemisiae*, perhaps also with *borealis*, the pronounced racial characters were not discernible. The longer tails of *Peromyscus* from the upper Athabasca, Alberta, and from Glacier, Golden, and Sicamous, B. C., were thought to indicate intergradation with *oreas*. It is difficult to understand how this was conceived to be possible, as *oreas* does not range east of the coast mountain ranges and the area intervening between the range of *oreas* and the region occupied by these long-tailed mice of the Selkirks, an area several hundred miles in width, is inhabited exclusively by normal *artemisiae*.

The new race is another instance subscribing to what is apparently a rule in the Pacific Northwest at least; viz. whenever a mountain population of *Peromyscus* is distinguishable from adjoining lowland populations, among the differences will be the longer tail and larger hind foot of the alpine population. Other races that may be said to be illustrative of this behavior are *oreas* and *macrorhinus*.

Specimens examined.—43, all from vicinity of type locality.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW RACE OF *Yuhina flavicollis*, FROM THE
MOUNTAINS OF NORTH SIAM.

BY H. G. DEIGNAN.

Three skins of *Yuhina flavicollis*, the first specimens of the genus recorded from the Kingdom of Siam, can not be matched with any recognized form of the species; I therefore propose for them the name

Yuhina flavicollis rogersi, subsp. nov.

Type.—Adult male, no. 350132, United States National Museum; collected on Phu Kha, Nan province, North Siam, 10 April, 1936, by the author.

Diagnosis.—Streaks at sides of breast and on upper flanks without yellowish tinge—olive-brown (somewhat lighter than raw umber of Ridgway) instead of ochraceous (Ridgway's honey-yellow) as in *Y. fl. rouxi*, geographically the nearest known form. On the lower flanks the olive-brown gradually changes, becoming pale grayish-fulvous on the under tail-coverts. Crest colored as in *rouxi*. The collar on the hind-neck is intermediate in color between the rusty-yellow of *Y. fl. flavicollis* and the rusty-chestnut of *rouxi*. Upper plumage slightly darker than that of *rouxi* and more gray, almost without reddish tinge; the pale shaft-stripes extend to the middle of the back. Sexes alike. Wing (chord) 62-65 mm.

Range.—Known only from the humid evergreen between 5,000 and 5,500 feet (the summit) of Phu Kha, the highest mountain of Nan province, eastern North Siam.

Remarks.—A male from Muong Moun, Tongking (no. 78739, Field Museum of Natural History) approaches the new form in coloration of the underparts, especially the under tail-coverts, but has the upper plumage colored as in *rouxi* from nearby localities.

Four skins from Kyu Loi, Kengtung, S. Shan States, are intermediate in every character between *rouxi* and *rogersi*.

Six specimens from Sinlum, Bhamo, Burma, topotypes of Harington's *harterti*, are, as supposed by Kinnear,¹ inseparable from *rouxi* of Yunnan and Indochine.

¹ *Ibis*, 1929, p. 305.

SPECIMENS EXAMINED.

Y. fl. albicollis.—1: W. Himalayas (Darkali, 1).

Y. fl. flavicollis.—11: Bengal (Darjiling, 2); Sikkim (Singtam, 2; —, 3); N. Cachar (Hungrum, 4).

Y. fl. rouxi.—26: Yunnan (Mongtsze, 1; Tai-ping Pu, 1); Laos (Phong Saly, 2); Tongking (Lieng San, 6; Chapa, 3; Muong Moun, 1; Lo-qui-ho, 2; Fan-si-pan mountains, 2; Mao Xao Phing, 1; Lang-tu-va, 1); Burma (Sinlum, 6).

Y. fl. rouxi x *rogersi*.—4: S. Shan States (Kyu Loi, 4).

Y. fl. rogersi.—3 (2 males, 1 female): N. Siam (Phu Kha, 3).

The new form is named for Mr. Charles H. Rogers, of the Princeton Museum of Zoölogy.

To the authorities of the American Museum of Natural History, the Field Museum, and the Philadelphia Academy of Natural Sciences, I am indebted for the loan of comparative material. My thanks are also due to Dr. Herbert Friedmann and Mr. J. H. Riley, of the United States National Museum, for advice and assistance in working out the races.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



DESCRIPTION OF A NEW CHICKADEE FROM THE
EASTERN UNITED STATES.

BY HARRY C. OBERHOLSER.

The distribution of *Penthestes atricapillus* and *Penthestes carolinensis* in Ohio presented a problem solvable only by study of the birds of both species from neighboring regions. That part of the problem relating to *Penthestes carolinensis* has already been elucidated by the recent description of *Penthestes carolinensis extimus* Todd and Sutton.¹

The relationships of the other bird, *Penthestes atricapillus atricapillus*, are, however, more intricate, since the range of this subspecies overlaps that of the Northern Carolina Chickadee, *Penthestes carolinensis extimus*, over a considerable area in Ohio and elsewhere, and their characters, therefore, need careful examination and delineation. Certain individuals of *Penthestes atricapillus* approach *Penthestes carolinensis* in characters and may indicate hybridization. For a number of years the writer has been gathering data and specimens, the present study of which rather clearly indicates the existence of an undescribed southeastern race of *Penthestes atricapillus atricapillus*. Although the primary interest in this matter was proper identification of the chickadees of Ohio, as above indicated, it develops that not surprisingly the greatest differentiation of this form occurs in the southern Appalachian Mountains.

The Black-capped Chickadee was originally described as *Parus atricapillus* by Linnaeus,² and the habitat given as "Canada." It was based evidently entirely on *Penthestes canadensis atricapillus* of Brisson,³ which came from Canada.

¹ Proceedings Biol. Soc. Wash., Vol. XLIX, July 3, 1936, p. 70.

² Syst. Nat., ed. 12, Vol. I, 1766, after May 24, p. 341.

³ Ornith., Vol. III, 1760, p. 553, pl. XXIX, fig. 1.

As was so frequently the case with Brisson's descriptions, this one was evidently drawn from a specimen to which he had access, in this case in the Reaumur Museum. As the specimen on which this description was based most likely came from the general vicinity of Quebec, it seems best accordingly to restrict the type locality to the city of Quebec in Canada, which we, therefore, now do. As there is no name available for the southern race, it may be called

***Penthestes atricapillus practicus*, subsp. nov.**

Subspecific characters.—Similar to *Penthestes atricapillus atricapillus*, of Canada, but smaller, particularly the tail; upper parts darker, more grayish, less ochraceous, particularly in winter; wing-coverts and rectrices with narrower white edgings.

Measurements.—Adult male: wing, 63–65.5 (average, 63.7) mm.; tail, 57–60.5 (58.9); exposed culmen, 6.5–7 (6.8); tarsus, 15–16 (15.5); middle toe without claw, 9.5–10.5 (10). Adult female: wing, 59–64 (61.4); tail, 52–60.5 (56.6); exposed culmen, 6.8–8 (7.3); tarsus, 15–16.5 (15.6); middle toe without claw, 9–10 (9.4).

Type.—Adult male, No. 340642, U. S. National Museum, Mount Guyot, 6,500 feet altitude, Great Smoky Mountains, North Carolina, April 15, 1932; Thomas D. Burleigh, original No. 1797.

Geographic distribution.—Resident and breeds chiefly in the Appalachian Mountains region from southwestern North Carolina, north through western Virginia, West Virginia, southwestern Pennsylvania, to central eastern and northeast central Ohio.

Remarks.—In some plumages this race very closely resembles *Penthestes carolinensis*, but has more whitish on the edges of the wing-quills, and of the upper wing-coverts, and this, together with the difference in proportions, particularly those of the tail, will readily distinguish doubtful specimens.

For comparison with the above given measurements of this new race, the following dimensions of *Penthestes atricapillus atricapillus* may be of interest. Adult male: wing, 64–67.5 (average 66.1) mm.; tail, 60–65 (62.1); exposed culmen, 7.3–8 (7.9); tarsus, 16–17 (16.4); middle toe without claw, 9–11 (10.1). Adult female: wing, 60–66.5 (63.5); tail, 57–63 (60.3); exposed culmen, 7–8.5 (8.1); tarsus, 16–17 (16.5); middle toe without claw, 9.5–10 (9.8).

Some Ohio individuals have been misidentified as *Penthestes carolinensis* on account of the similarity in plumage. Summer birds from Geauga and Portage counties in northeast central Ohio are nearer this form, but intermediate in size. On the other hand, birds from farther north, from Pymatuning Lake, and from Cuyahoga and Lake counties, are also intermediate, but much nearer *Penthestes atricapillus atricapillus*.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW MAMMALS FROM UTAH.

BY E. A. GOLDMAN.

As the waters of ancient Lake Bonneville receded to the still sizable remnant, Great Salt Lake, Utah, several land areas emerged as islands of varying size. Some of these have become inhabited by small mammals obviously derived from the adjacent mainland. During the past summer specimens of the kangaroo rat, *Dipodomys microps*, and of the white-footed mouse, *Peromyscus maniculatus*, were obtained on Gunnison Island by Alfred M. Bailey, Director, and Robert J. Niedrach of the Colorado Museum of Natural History. Gunnison Island, in the northwestern part of the lake, is perhaps two miles long, and rises several hundred feet in elevation above the water level. It is described as rocky in character.

The specimens represent well-marked insular races, which, owing to the courtesy and cooperation of Mr. Bailey, I am privileged to describe as new. Contributions to our knowledge of natural history by Mr. Bailey have covered a wide field and it seems fitting that the kangaroo rat should bear his name. Another form of *D. microps* is described from near the mainland shore of Great Salt Lake.

Bird Island, Great Salt Lake, is occupied by a new form of *Dipodomys ordii*, recently collected by W. H. Marshall of the Biological Survey.

***Dipodomys microps alfredi*, subsp. nov.**

GUNNISON ISLAND KANGAROO RAT.

Type.—From Gunnison Island, Great Salt Lake, Utah (altitude about 4,300 feet). No. 262846, ♀ adult, U. S. National Museum (Biological Survey collection), collected by Alfred M. Bailey and Robert J. Niedrach, June 1, 1937. Original number 2994.

Distribution.—Known only from Gunnison Island.

General characters.—Size largest and color palest of the known geographic races of *Dipodomys microps*. Most closely approaching *D. m. celsus* of northwestern Arizona in size, but skull distinctly larger, more angular and massive, and color paler, the upper and lower longitudinal tail stripes in adults coarsely grizzled, instead of nearly uniform brown or brownish black.

Color.—Type: Upper parts in general near "pinkish buff" (Ridgway, 1912), purest on sides of head, flanks, and thighs, the top of head and back thinly but more distinctly mixed with black; under parts, postauricular and supraorbital spots, fore limbs, hind feet above, hip stripes and tail at extreme base all around pure white; tail beyond base brown mixed with gray above and below, becoming brownish in a subterminal zone all around, the white under color showing through strongly near tip, the sides white along the usual lines narrowing to the subterminal area mentioned; soles of hind feet blackish to base of toes which are white; ears white externally, except anterior fold which is black, thinly clothed with minute black hairs internally; cheek pouches lined with dusky hairs anteriorly.

Skull.—Most closely resembling that of *D. m. celsus*, but more massive; maxillary arches more extended antero-posteriorly, the external angles well developed; jugal heavier; rostrum broader; incisors decidedly broader.

Measurements.—Type: Total length, 286 mm.; tail vertebrae, 170; hind foot, 44. Five adult topotypes: 284 (270–299); 162 (150–175); 46 (44–48).

Skull (type): Greatest length (on median line), 37; greatest breadth (between outer sides of auditory bullae), 25; breadth across maxillary arches, 20.8; length of nasals, 13.5; width of nasals (in front of incisors), 3.9; least width of supraoccipital (near interparietal), 1.8; maxillary tooth row (alveoli), 4.4; width of cutting edge of upper incisors, 2.8.

Remarks.—*D. m. alfredi* exhibits differential color, general size and cranial details, suggesting isolation for a lengthy period. It might be treated as a distinct species, but subspecific designation seems in this case a better expression of relationship.

Specimens examined.—Fifteen, all from the type locality.

***Dipodomys microps bonnevilliei*, subsp. nov.**

LAKE BONNEVILLE BASIN KANGAROO RAT.

Type.—From Kelton, Boxelder County, Utah (altitude about 4,300 feet). No. 31894/43755, ♀ adult, U. S. National Museum (Biological Survey collection), collected by Vernon Bailey, November 7, 1891. Original number 3490.

Distribution.—Specimens examined only from the type locality, but the subspecies probably ranges widely in the basin of former Lake Bonneville.

General characters.—Closely allied to *Dipodomys microps levipes* of Panamint Mountains, California; size and color nearly identical, but cranial and dental details, especially the broader upper incisors distinctive. Similar in size to *Dipodomys microps preblei* of southeastern Oregon, but color paler and skull different. Paler also than either *Dipodomys microps celsus* or *Dipodomys microps leucotis* of northern Arizona. Somewhat

darker and contrasting in smaller size with its neighbor, *Dipodomys microps alfredi* of Gunnison Island, Great Salt Lake, Utah.

Color.—*Type* (winter pelage): Upper parts near "pinkish buff" (Ridgway, 1912), purest on sides of head, flanks, and thighs, the top of head and back moderately and more distinctly mixed with black; under parts, postauricular and supraorbital spots, fore limbs, hind feet above, hip stripes and tail at extreme base all around pure white; tail beyond base brownish above and below, the sides becoming white abruptly along lines narrowing gradually toward tip; soles of hind feet blackish to base of toes which are white; ears white externally, except anterior fold which is black, thinly clothed with short, deep black hairs internally; cheek pouches lined with black anteriorly, the black showing along external margins.

Skull.—Very similar to that of *D. m. levipes*, but usually shorter and relatively broader; maxillary arches less extended antero-posteriorly, the outer angles more rounded and less hook-like; incisors broader. Similar in size to those of *D. m. preblei* and *D. m. leucotis*, but maxillary arches with more rounded posterior edges, the outer angles less prominent; mastoid and auditory bullae larger, more inflated; supraoccipital and interparietal narrower, more compressed between mastoid bullae. Differing from that of *D. m. celsus* in decidedly smaller general size in combination with relatively broader incisors. Compared with that of *D. m. alfredi* the skull is much smaller and of lighter proportions, the maxillary arches notably weakly developed with scarcely a trace of the external angles that are prominent in *alfredi*.

Measurements.—*Type*: Total length, 260 mm.; tail vertebrae, 156; hind foot, 41. Two adult female topotypes: 287, 271; 173, 165; 42.5, 39. *Skull* (type): Greatest length (on median line), 34.8; greatest breadth (between outer sides of auditory bullae), 23.8; breadth across maxillary arches, 19; length of nasals, 11.8; width of nasals (in front of incisors) 3.9; least width of supraoccipital near interparietal, 1.4; maxillary tooth row, 4.5; width of cutting edge of upper incisors, 2.5.

Remarks.—*D. m. bonnevillei* more closely resembles *D. m. levipes* than its nearer insular neighbor *D. m. alfredi*.

Specimens examined.—Five, all from the type locality.

***Dipodomys ordii marshalli*, subsp. nov.**

BIRD ISLAND KANGAROO RAT.

Type.—From Bird Island, Great Salt Lake, Utah (altitude about 4,300 feet). No 262655, ♀ adult, U. S. National Museum (Biological Survey collection), collected by W. H. Marshall, June 22, 1937. X-catalog number 27969.

Distribution.—Known only from Bird Island.

General characters.—Allied to *Dipodomys ordii utahensis* of the adjacent mainland, but smaller and color paler; ground color of upper parts "pinkish buff" instead of "cinnamon buff" (Ridgway, 1912); orbital areas more extensively white; black facial markings less distinct; ears less dusky.

Color.—*Type*: Upper parts in general near "pinkish buff," thinly and

nearly uniformly mixed with black; entire under parts, postauricular and orbital areas, fore limbs, hind feet above, hip stripes and tail at extreme base all around pure white; tail beyond base light brown mixed with gray above and below, becoming brownish all around at tip; sides of tail white as usual in the group; soles of hind feet tinged with brown to base of toes which are white; ears white externally, except anterior fold which like the inner surface is thin and inconspicuously covered with dusky hairs.

Skull.—Closely resembling that of *D. o. utahensis*, but smaller; dentition very light.

Measurements.—*Type*: Total length, 237 mm.; tail vertebrae, 123; hind foot, 36. An adult male topotype: 237; 127; 40. *Skull* (type): Greatest length (median line), 35; greatest breadth (between outer sides of auditory bullae), 22.8; breadth across maxillary arches, 20; length of nasals, 13.7; width of nasals (in front of incisors), 3.4; least width of supraoccipital (near interparietal), 2.6; maxillary tooth row (alveoli), 4.1; width of cutting edge of upper incisors, 1.7.

Remarks.—This rather well-marked new subspecies is named for the collector, W. H. Marshall. Like *Dipodomys microps alfredi* of Gunnison Island it is distinguished from the mainland representative of the species by its pallor. In the topotypes the upper parts are purer buff (fewer dark-tipped hairs present) than in the type.

Specimens examined.—Four, all from the type locality.

***Peromyscus maniculatus gunnisoni*, subsp. nov.**

GUNNISON ISLAND WHITE-FOOTED MOUSE.

Type.—From Gunnison Island, Great Salt Lake, Utah (altitude about 4,300 feet). No. 262845, ♀ adult, U. S. National Museum (Biological Survey collection), collected by Alfred M. Bailey and Robert J. Niedrach, June 1, 1937. Original number 3010.

Distribution.—Known only from Gunnison Island.

General characters.—A pinkish buffy subspecies of similar proportions and most closely allied to *Peromyscus maniculatus sonoriensis* of Sonora, but decidedly paler; buffy element in upper parts lighter in tone and dorsum less obscured by dusky hairs; ears more distinctly clothed internally and edged with silvery white; tail lighter brown above; skull about the same. Very similar in color to *Peromyscus maniculatus nebrascensis* of Montana, and *Peromyscus maniculatus luteus* of Nebraska but larger than either, the disparity in size well shown in larger ears and longer tail.

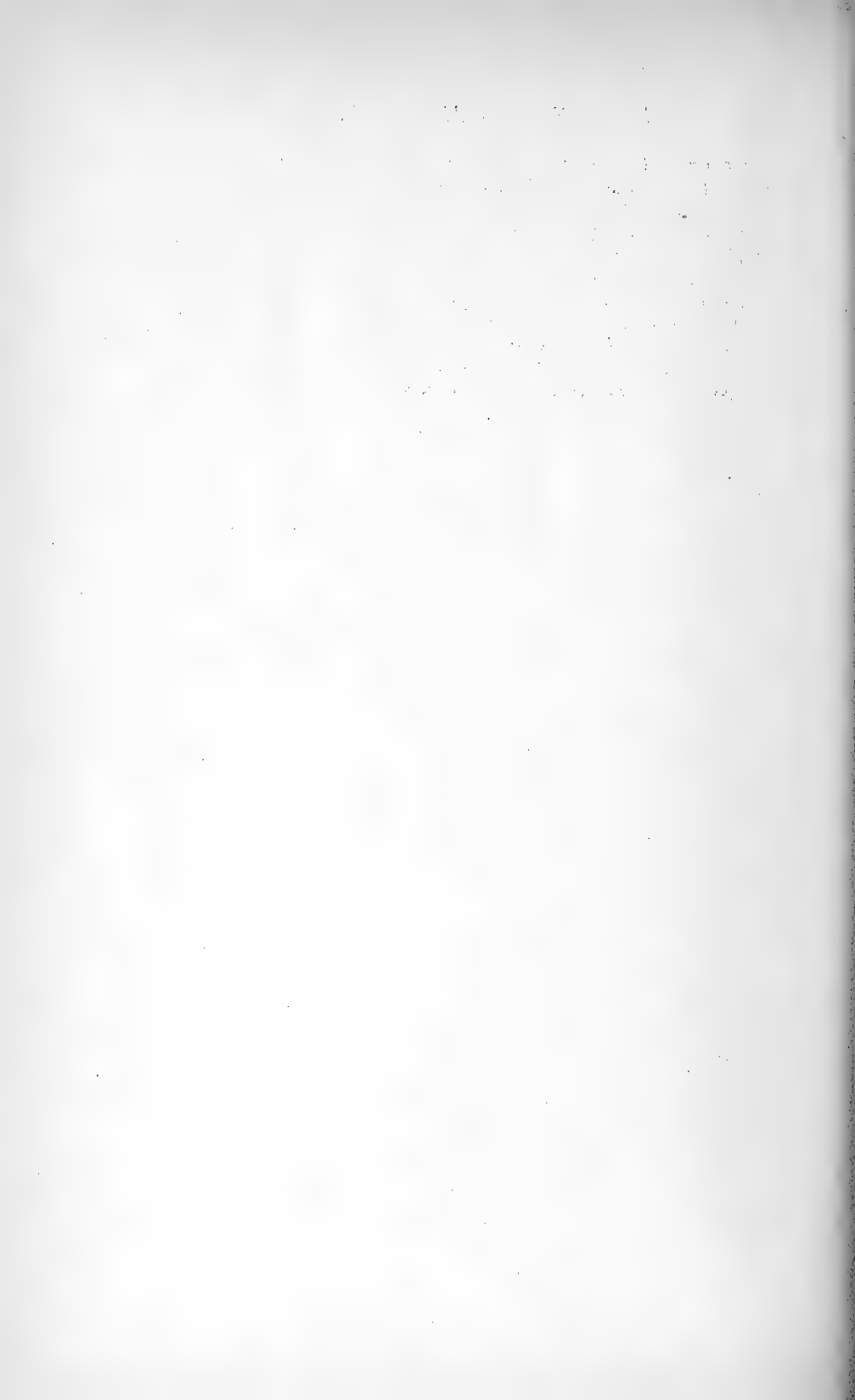
Color.—*Type* (summer pelage): Upper parts "pinkish buff" (Ridgway, 1912), nearly pure along sides, the top of head and back thinly overlaid with dusky hairs; under parts, forearms and feet white; ears dusky, thinly lined internally and distinctly edged with minute silvery white hairs, white spots at anterior base of ears showing through; tail sharply bicolor, light brown along narrow line above, white on sides and below. *Young* (about two-thirds grown): Upper parts much duller and grayer, lacking the vivid buffy tone of adults.

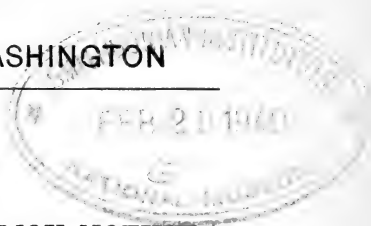
Skull.—About as in *P. m. sonoriensis*.

Measurements.—*Type*: Total length, 168 mm.; tail vertebrae, 72; hind foot, 20.5. Average of eight adult topotypes: 155 (148–178); 68 (63–72); 20 (19–22). *Skull (type)*: Greatest length, 25.2; condylobasal length, 23.3; zygomatic breadth, 12.8; interorbital constriction, 4; length of nasals, 9.2; length of incisive foramina, 5.2; length of palatal bridge, 3.6; interparietal, 9.4 x 2.2; maxillary tooth row, 3.6.

Remarks.—*P. m. gunnisoni* approaches *P. m. nebrascensis* and *P. m. luteus* in vivid coloration, but in general size and proportions shows alliance to *P. m. sonoriensis* as represented on the adjacent mainland. All of the adults appear to be in the "buff phase."

Specimens examined.—Sixteen, all from the type locality.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTONA NEW RACE OF THE SPOTTED TINAMOU, *NOTHURA MACULOSA*, FROM THE PARAGUAYAN CHACO.

BY H. B. CONOVER.

A few months ago I received a shipment of birds from the northern Paraguayan Chaco. Among them was a series of *Nothura* belonging to the *maculosa* complex.¹ On comparison these Chaco specimens were found to be quite distinct from a series of typical *maculosa* from southern Paraguay (Villa Rica) and also from a series taken in the highlands of Bolivia (Cochabamba) which were assumed to be typical of *boliviana* Salvadori. Through the kindness of Dr. C. E. Hellmayr and Dr. W. H. Osgood, who were in London at different times, a pair of the Chaco and a pair of the Bolivian birds were compared with the type and three other Bolivian specimens (collected by Bridges) in the British Museum of Natural History. As had previously been assumed, the specimens from the highlands of Bolivia proved to be typical of *boliviana*. The birds from the Chaco, however, can not be assigned to any of the other known forms of *maculosa* and it becomes necessary to describe them.

***Nothura maculosa chacoensis*, new subspecies.**

Type.—From 265 kilometers west of Puerto Casado, Paraguayan Chaco; No. 12,501, adult male, in the Conover Collection, Field Museum of Natural History, Chicago; collected September 16, 1936, by Alberto Schulze.

Characters.—Differs from typical *maculosa* by being much grayer, less rufescent buff on the upper parts and much lighter buff (less rufescent) below. The dark streakings on the lower neck and chest are also much lighter and narrower and the flanks and sides less heavily barred. From *boliviana* it differs by having the upper parts darker, less rusty, more

¹Besides the specimens of the *maculosa* group, there was received from the same locality a series of *Nothura boraquira*. It is evident, therefore, that *boraquira* is not conspecific with *maculosa*.

grayish buff; the lower breast and belly buffier (not creamy white); the flanks barred (immaculate in *boliviana*); and the lower neck and chest with dark longitudinal streaks, not dark spots or cross bars and with no rusty blotches. From *salvadorii* it differs by having the upper parts more grayish buff (less reddish brown); the under parts much more ochraceous buff; the flanks more heavily barred; and the longitudinal streaks on the lower neck and chest darker, more sharply defined, and with no rusty tinge. From *nigroguttata* (Buenas Aires, Cordoba) it is grayer, less buffy above; more buffy, less yellowish below; the flanks are less broadly barred; and the dark markings on the lower neck and chest much narrower.

Description of type.—Top of head dark brown, finely vermiculated with paler brown; throat white; sides of head, superciliary stripe and neck all around yellowish buff with narrow dark brown shaft streaks to each feather; feathers of mantle, back, scapulars and upper tail coverts thickly but unevenly vermiculated with chocolate brown, with a broad edge of dirty grayish buff, inside of which is generally a longitudinal streak of buffy white; upper wing coverts barred with dark brown and buff; primaries dark brown, the outer web broadly notched with buffy white, and the inner web broadly barred with fulvous buff; secondaries barred with dark brown and fulvous buff; under wing coverts and axillaries ochraceous buff; chest fulvous buff, each feather with a narrow dark brown shaft streak; rest of under parts light ochraceous buff, the flanks with narrow bars of dull brown. Wing (flat) 123; culmen (exposed) 20; tarsus 35; middle toe (without claw) 21 mm.

Range.—Probably from the Bolivian Chaco south through the Paraguayan Chaco to Argentine.

SPECIMENS EXAMINED.

Nothura maculosa maculosa.—26: Paraguay (Villa Rica, 10; Horqueta, 6); Argentine (Santa Ana, Misiones, 3); Uruguay (Mercedes, Soriano, 4; San Vicente, Rocha, 3).

Nothura maculosa boliviana.—8: Bolivia (Poja, Cochabamba, 1; Tiraque, Cochabamba, 3; Vacas, Cochabamba, 2; Coloni, Cochabamba, 1; Tarija, 1).

Nothura maculosa salvadorii.—24: Argentine (Arenal, Salta, 2 (including type); Rosario de Lerma, Salta, 3; Tucuman, 1; Tapea, Tucuman, 1; Lavalle, Santiago del Estero, 3; Angaco Sud, San Juan, 6; Tunuyan, Mendoza, 8).

Nothura maculosa nigroguttata.—22: Argentine (Collon Cura, Neuquen, 2; Henderson, Buenas Aires, 1; Alvarez Yonte, Buenas Aires, 2; Papin, near Bonafacio, Buenas Aires, 3; Torrecita, Buenas Aires, 1; Cambaceres, Buenas Aires, 3; Los Ingleses, Buenas Aires, 1; Noetinger, Cordoba, 9).

Nothura maculosa darwini?—1: Argentine (Chos Malal, Neuquen, 1).

Nothura maculosa chacoensis.—13: Paraguay (265 kilometers west of Puerto Casado, 8 ad., 1 im.; Puerto Pinasco, 1); Argentine (Riacho Pilaga, Kilometer 182, Formosa, 2; Las Palmas, Chaco, 1).

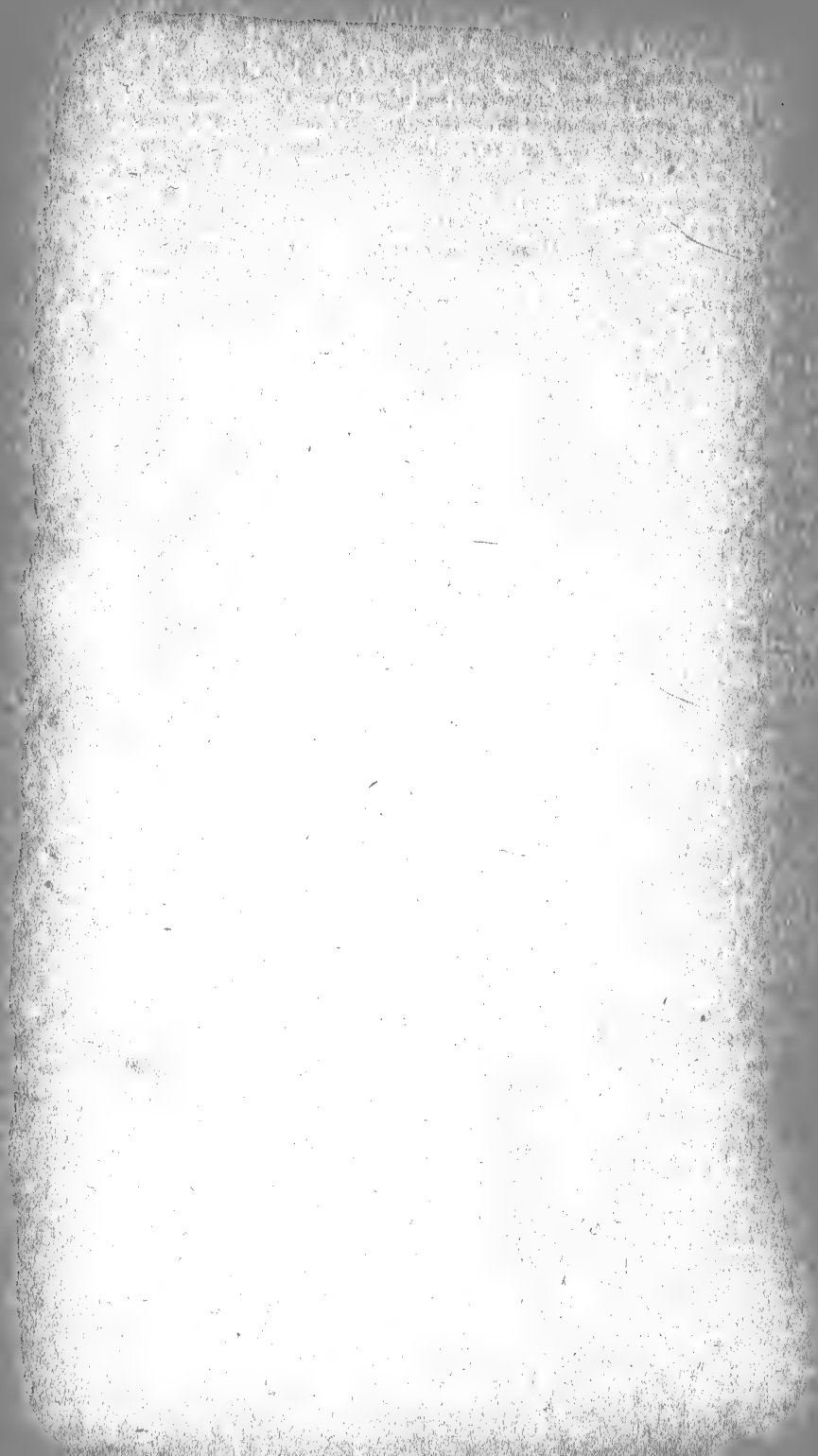
Remarks.—The specimens from Puerto Pinasco, Paraguayan Chaco and Kilometer 182, Formosa Territory and Las Palmas, Argentine Chaco, are not exactly typical of *chacoensis* as represented by the series from the type

locality. The upper parts are more heavily blotched with blackish and purer gray (less buffy). The under parts of the Puerto Pinasco example are typical of the new race, but the other three have much broader and more conspicuous dark shaft streaks to the feathers of the chest. On the other hand, all of them are much grayer, less buffy than *nigroguttata* and much less rufescent than *maculosa*.

Some of the Horqueta specimens tend rather strongly toward *chacoensis*. Of the six examples examined four are like typical *maculosa* from Villa Rica, except for being slightly lighter on the under side. The other two specimens are lighter on the upper parts tending toward *chacoensis* but with the dark markings more pronounced. On the under parts, however, they are typical of the new race, being very light buff with narrow dark shaft markings to the feathers of the lower neck and chest.

Uruguayan specimens have been listed under the nominate race as being closer to typical *maculosa* than to *nigroguttata*. There is so much variation even in the three specimens from San Vicente, Rocha, the type locality, that *savannarum* Wetmore does not seem to be a good race. In fact among these three specimens is one that is like typical *maculosa* (Villa Rica), a second like some specimens of *nigroguttata* from the province of Buenas Aires, and a third, lighter still, resembling specimens from Cordoba. The four specimens from Mercedes, however, are very like Paraguayan specimens.

I am indebted to Dr. Herbert Friedmann of the National Museum and to Mr. J. T. Zimmer of the American Museum for the loan of additional material.



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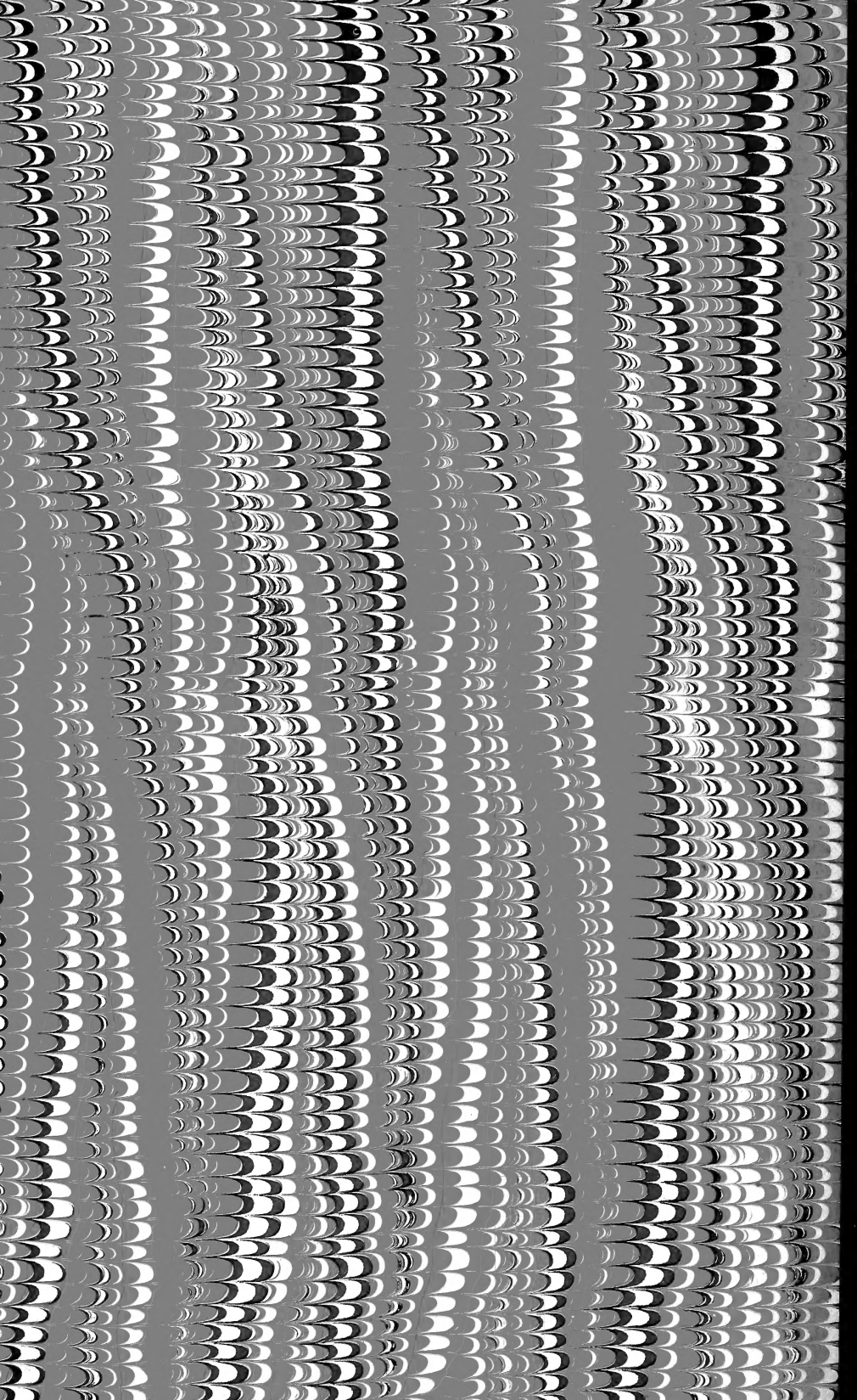
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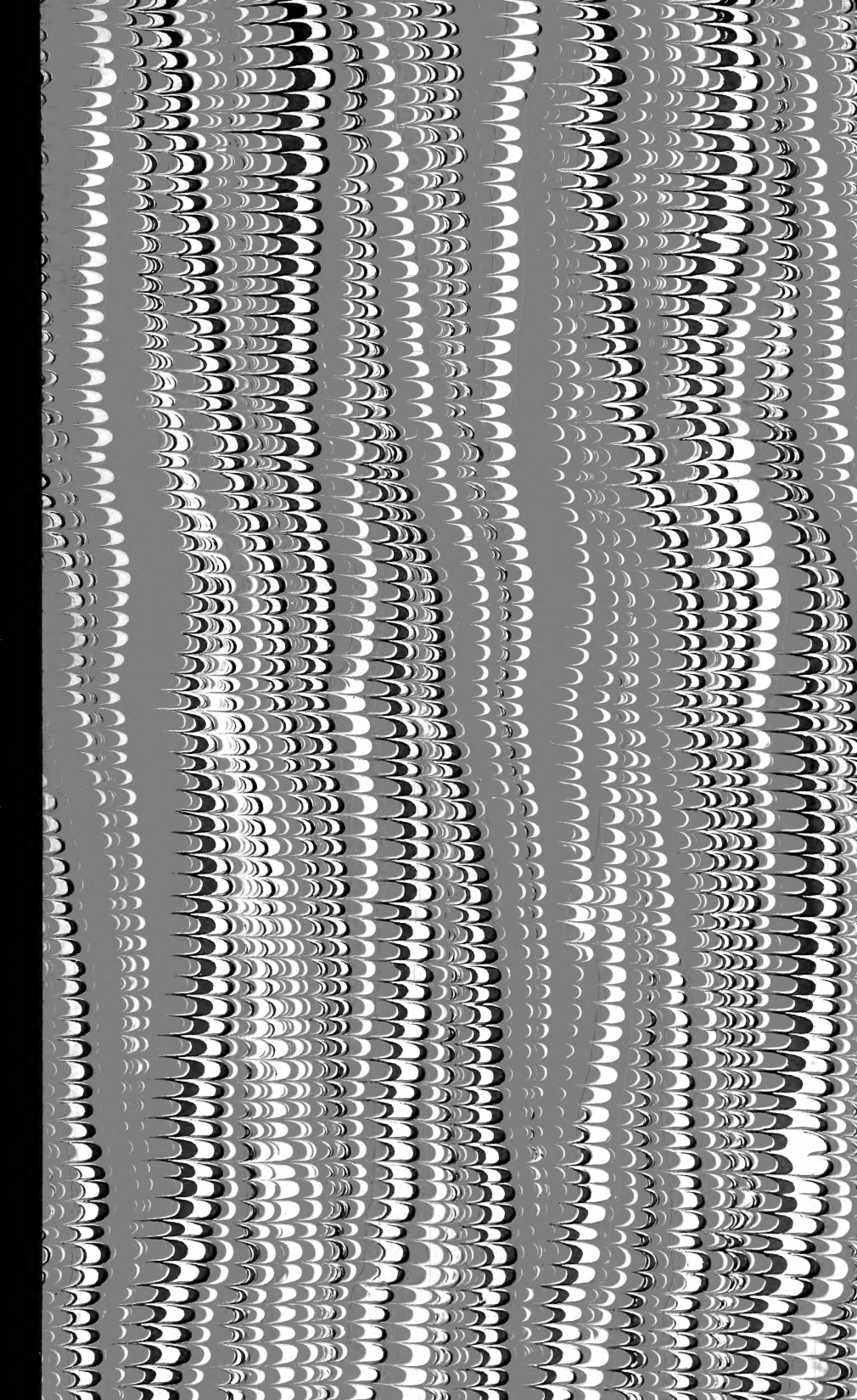












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